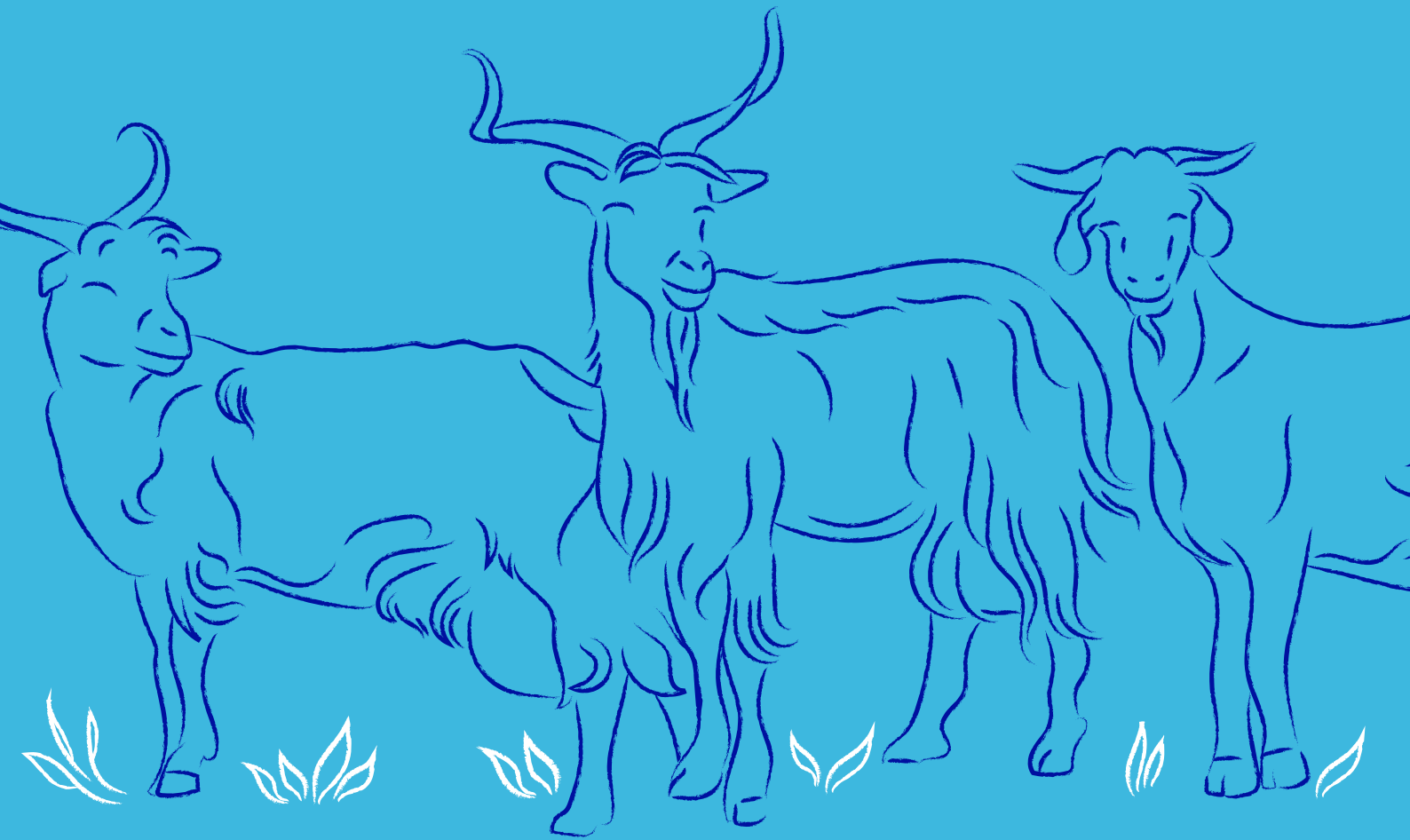




International Goat Association (IGA)

Regional Conference 2025



ISBN 978-84-120939-8-8

Editorial: INSTITUTO CANARIO DE INVESTIGACIONES AGRARIAS (ICIA).

Autor: Varios autores.

Editores: Alexandra Torres, Anastasio Arguello, Sergio Álvarez.

Congreso: International Goat Association (IGA). Regional Conference 2025 (España).

Número de edición: 1

Fecha de edición: 17/05/2025

País de Edición: España.

PRESENTATIONS

Dear Congress participants, it is a great honor to welcome you to the Regional Congress of the International Goat Association, which will be held in Tenerife from May 14 to 17, 2025.

For centuries, goats have been a fundamental pillar of economic activity in the Canary Islands, contributing to the livelihood of numerous families.

Beyond its productive dimension, goat breeding has shaped the social structures of our communities, linking generations through shared knowledge and ancestral practices.

In many local celebrations, goat products, especially artisan cheeses, evoke the authentic flavor of our gastronomy and the link with the land.

Majorero cheese, Palmero cheese or Flor de Guía, Media Flor de Guía and Guía cheese, with Protected Designations of Origin, symbolize that fusion of tradition and excellence that distinguishes the Canary Islands in the world.

From the first Berber settlers to the present day, the goat has accompanied the Canary Islander in his daily life, providing not only milk and meat, but also skin and fiber for clothing and everyday implements. This versatility reflects the ability of our ancestors to adapt an essential resource to the conditions of an archipelago forged by volcanic fire and the force of the sea.

At the Canary Islands Institute of Agricultural Research (ICIA) we work with dedication to promote innovation in the goat sector, always with the goal of offering useful solutions to our farmers. Our work is oriented towards the sustainability of farms and the continuous improvement of the quality of goat products, a challenge that we approach with scientific rigor. At the same time, we explore new value-added opportunities, such as the study of dairy and meat products with controlled maturation, in order to diversify the offer and expand into new markets.

Tenerife, with its majestic Teide towering over a landscape of contrasts, is an authentic natural laboratory that captivates and arouses the curiosity of those who visit it. The Teide National Park, declared a World Heritage Site by UNESCO, is a testimony to the ecological and geological wealth that our island treasures.

The Canary Islands offer a gastronomic proposal in which goat products occupy a place of honor: from fresh cheese with a delicate flavor to cured cheeses with a

more marked character, as well as innovative creations such as aged adult goat meat. During these days you can enjoy routes through artisan cheese factories, pairings with local wines and tastings that link the ancestral with the culinary avant-garde.

The Canary Islands enjoy a mild climate throughout the year, which favors a pleasant stay for all visitors. In addition, the warmth and hospitality of our people will be the perfect complement for this congress to leave an unforgettable impression on each of you.

We trust that these days of exchange and dialogue have strengthened the networks of scientific cooperation and will project the future of goats, not only in the Canary Islands, but beyond our borders.

We hope that the congress was a success and that you were able to enjoy the island and its goat sector.

Janira Guierrez Peraza

PRESIDENT OF CANARIAN DE AGRONOMIC RESEARCH INSTITUTE (ICIA)

The importance of goats in global agriculture is increasing over the years. They are crucial source of milk, meat or fibre, and income for millions of households worldwide. Beyond their economic value, goats play a key role in poverty alleviation, gender equality among other sustainable development goals. The International Goat Association (IGA), through its mission, continues promoting goats and sustainable goat production systems.

This Regional Conference, held under the inspiring subject “From Knowledge to Progress” serves as a distinguished platform for exchange scientific knowledge and practical experience concerning one of the most adaptable and valuable livestock species, goats.

This Conference brings together a diverse community of researchers, extension professionals and, also producers from different countries around the world. It always provides an exceptional opportunity to share recent scientific advancements, innovative knowledge and field-based experiences. The topics covered, nutrition, health, welfare, genetic, reproduction, physiology, precision farming product and production systems, reflect the multifaceted nature of goat farming and its relevance contemporary global challenges, showing the unique productive capacities of the goats. All the contributions of this book of abstracts aim to improve our understanding of goats and promote strategies that enhance productivity, animal well-being and sustainability, contributing to the improvement of rural livelihoods and the advancements of agricultural systems.

The International Goat Association extend our sincere appreciation to all authors, reviewers, and participants. We also wish to thank the local organizers and our kindly hosts Instituto Canario de Investigaciones Agrarias (Canarian Government) and La Laguna University who proposed this initiative and brought it to fruition in the beautiful island of Tenerife (Canary Islands). This region maintains a robust and culturally significant goat sector, with autochthonous breeds, adapted to its unique climatic conditions, sustaining local agriculture, preserving traditional practices and producing delicious goat cheeses.

May this conference foster productive discussion, interdisciplinary collaboration, and new pathways of progress-from knowledge to practical impact.

The International Goat Association is pleased to announce next year, September 2026 the 14th International Conference on Goats will take place in Chongqing, China, we look forward to continuing bringing attention to the goats.

We wish you a productive and inspiring Conference.

Best wishes

Noemí Castro.

IGA PRESIDENT

The development of economic sectors in any region of the world fundamentally relies on research institutions as one of its main pillars. The knowledge generated within these institutions enables innovation, allowing agrarian sectors in general and the livestock sector in particular to progress, and contribute to improving quality of life as a foundational element of development.

Historically, this has been the purpose of the Canarian Institute of Agricultural Research (ICIA) and the University of La Laguna. Both institutions have a strong commitment not only to the development of the Canary Islands but also to supporting global agrarian development. This vision is increasingly rooted in the need to strengthen technical capacities at all scales and levels within the agricultural sector, with a special emphasis on one of the key components of regional development: the establishment and consolidation of internal and external networks for integration and exchange.

It is within this context that both institutions undertake the organization of this IGA Regional Conference. It thus contributes to enhancing relations between the two Canarian universities and the ICIA and, especially, to creating new national and international networks and strengthening existing ones.

There is now no doubt that the potential of research, knowledge sharing, and resource exchange is unlimited. This Regional Conference aims to create a space for this global integration, as a basis for the development of the goat sector worldwide.

We therefore encourage all participants to take full advantage of this space created for global goat development and progress.

María del Rosario Fresno

CANARIAN AGRONOMIC RESEARCH INSTITUTE – ICIA.

Luis Alberto Bermejo Asensio

UNIVERSITY OF LA LAGUNA

COMMITTEES

COUNTRY ORGANIZING COMMITTEE

CHAIRMAN AND VICE-CHAIRMAN:

DR. MARIA DEL ROSARIO FRESNO (ICIA) AND
DR. LUIS ALBERTO BERMEJO (ULL).

SECRETARY AND VICE-SECRETARY:

DR. SERGIO ÁLVAREZ (ICIA)
AND DR. ÁNGELES CAMACHO (ULL).

TREASURER:

DR. ALEXANDR TORRES (ICIA).

VOCALS:

DR. ANTONIO MORALES DE LA NUEZ (ULPGC).
DR. LORENZO E. HERNÁNDEZ CASTELLANO (ULPGC).
DR. JAVIER MATA (ULL).
DR. JUAN LUIS RAMOS (ULL).
ATTENERI LUIS (FGULL).
FRANCISCO DE ASÍS RUIZ (IFAPA).
RAFAEL GONZÁLEZ MARTÍN (CABILDO DE TENERIFE).
YAIZA BETANCORT (ICIA STUDENT).
MANUEL BETANCOR (ULPGC STUDENT).
YERAY CALDERÓN (ULL STUDENT).

LOCAL SCIENTIFIC COMMITTEE

DR. SERGIO ÁLVAREZ (ICIA).
DR. ALEXADR TORRES (ICIA).
DR. JUAN LUIS RAMOS (ULL).
DR. ANTONIO MORALES (ULPGC).
DR. LORENZO HERNÁNDEZ (ULPGC).
DRA. ESPERANZA CAMACHO (IFAPA).

PRESENTATIONS

COMMITTEES

GENETIC AND REPRODUCTION

| | |
|--|----|
| MAIN LECTURE Livestock 5.0 and genetic advances in the future of global goat farming. | 17 |
| Cryosurvival of Beetal buck (<i>Capra hircus</i>) sperm by modulating cooling rate in critical temperature zone. | 18 |
| An attempt to establish a standard kinetic analysis in buck semen. | 19 |
| A genome-wide single nucleotide polymorphism-based investigation of coat colour variation in indigenous South African goats. | 20 |
| Survival analysis of longevity in Spanish dairy goat breeds using a Weibull proportional hazards model | 21 |
| Estimates of genetic and phenotypic parameters and their correlations for response to artificial infection with <i>Haemonchus contortus</i> in growing male goats. | 22 |
| The suitability of infrared thermography to detect estrous in dairy goats. | 23 |
| Investigating the Genetic Diversity and Population Structure of Jabal Akhdar Goats Using Genome-Wide Single Nucleotide Polymorphisms Markers. | 24 |
| Livestock 5.0 and genetic advances in the future of global goat farming. | 25 |
| Estimation of genomic inbreeding (FROH) in Istrian goat – baseline for conservation of the breed. | 26 |
| Relevance of multicollinearity analysis for the choice of factors to be included in models for the study of fertility in goats. | 27 |
| Improving the productive efficiency and resilience of the Malagueña goat through the inclusion of new selection parameters. | 28 |
| Estimation of α S1-casein genotype impact on milk yield and composition in Palmera goats using multiple-trait gene content REML models. | 29 |
| Molecular docking analysis of phytoestrogenic compounds from <i>salvia officinalis</i> targeting estrogen receptors in goats. | 30 |

ANIMAL HEALTH AND WELFARE

| | |
|--|----|
| MAIN LECTURE From lab to barn – human-goat interactions and future avenues for better animal husbandry. | 33 |
| Abattoir countrywide survey of dairy goats' haemonchosis in Greece and associated risk factors. | 34 |
| Pulmonary lesions in adult dairy goats slaughtered in Cyprus. | 35 |
| Lungworms in an abattoir survey: Preliminary findings of the Cypriot dairy goat industry. | 36 |
| Improving the ante-mortem diagnosis of tuberculosis in goats: the imdiTBap project. | 37 |
| Milk excretion of doxycycline and tildipirosin in lactating goats. | 38 |
| Comparison of plasma pharmacokinetics of doxycycline and tildipirosin after intramuscular administration in lactating goats. | 39 |
| Pharmacokinetics of macrolides after intramuscular administration in goats. | 40 |
| Challenges and opportunities for the Australian goat industry. | 41 |
| Effect of litter size on growth of Boer goat kids. | 42 |

| | |
|---|----|
| Validation of Digital and Optical Brix Refractometers for Assessing Passive Immunity in Goat Kids. | 43 |
| Effect of Enriched Maternal Colostrum Versus Bovine Colostrum Replacer on Passive Immunity, Health, and Growth in Goat Kids. | 44 |
| Somatic cell counts and causative agents of mastitis in dairy goats. | 45 |
| A complex neurological case in an extensive goat farm. | 46 |
| Detection of antibodies against <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> by ELISA - do cut-offs for cattle work in goats? | 47 |
| Enhancing CO₂-based ventilation estimates in goat barns: introducing a day-night activity parameter. | 48 |
| The effect of somatic cells, farms and breeds on milk yield and its composition in dairy goats. | 49 |
| Quantification of visual responses of goats using deep learning-based image analysis. | 50 |
| Somatic cells in goat milk: milk production and its composition. | 51 |
| Molecular epidemiology of cryptosporidiosis on goat farms in Gran Canaria, Canary Islands (Spain). | 52 |
| Colostrum quality and bacterial contamination in pooled samples from commercial dairy goat farms. | 53 |
| Suitability of an infrared thermometer and a finger pulse oximeter to assess animal welfare in dairy goats. | 54 |
| Small Ruminant Hoof Inspection as an Animal Welfare Indicator: A Study in Gran Canaria. | 55 |
| Colour and Shape Preferences in Goat Kids: Implications for Environmental Enrichment, preliminary results. | 56 |
| Comparative antimicrobial activity of goat cathelicidins SC5 and Bactenecin 3.4 against <i>E. coli</i>. | 57 |
| Goats' Sensory Responses to Colour and Shape: Preliminary results. | 58 |
| Assessing IgG Concentration in Goat Colostrum: A Comparative Analysis of Techniques. | 59 |
| Chlorine Dioxide as an Alternative Sanitization Method for Goat Colostrum. | 60 |
| Ozone as a Sanitizing Agent for Goat Colostrum: Microbiological and Immunological Impact. | 61 |
| Morphological, Genetic and Population Characteristics of <i>Haemonchus</i> species isolated from Goats in Nigeria. | 62 |
| In vivo study on the preventive effect of a plant extract (Polifam™) against coccidiosis in goats. | 63 |
| Impact of dietary copper levels on growth performance, blood profiles, and mineral deposition in French Alpine goats. | 64 |
| Salmonellosis in small ruminants in the Netherlands | 65 |

NUTRITION AND PHYSIOLOGY

| | |
|--|----|
| MAIN LECTURE Use of agro-industrial byproducts rich in polyphenols in goat nutrition. | 69 |
| Impact of indoor forage feeding strategies on utilisation in dairy goats: a collaborative effort between research and practitioners. | 70 |
| Effects of Cysteine and methionine on Secondary Hair Follicle Growth and Hair Dermal Papilla Cell Proliferation in vitro in Yanshan Cashmere Goats. | 71 |
| Nutritional value of some shrub species as feed resource for goats in mountainous region of Tunisia. | 72 |
| Goats as model animals for neuroregenerative research. Invitation to discussion. | 73 |
| The use of integrated Omics to understand Seasonal Weight Loss Tolerance in Dairy Goats. | 74 |
| The inclusion of coffee by-products in the diet of dairy goats: the carry-over of bioactive compounds and the oxidative stability of milk. | 75 |
| Evaluation of nutrient intake and selectivity in dairy goats fed with grass-dominated forage – a pilot study. | 76 |
| Precision Weaning: Optimizing Protein Levels for Beetal Kids' Growth Efficiency. | 77 |
| Valorization of agricultural by-products as alternative feed resources for a sustainable goat farming in Northern Morocco. | 78 |

| | |
|--|----|
| Effect of breed and plane of nutrition on growth performance and carcass characteristics of male goats. | 80 |
| Effects of physiology and blood traits of Taiwan black goat at various temperatures. | 81 |
| Meta-Analysis of Dietary Tannins in Small Ruminant Diets: Effects on Growth Performance, Serum Metabolites, Antioxidant Status, Ruminal Fermentation, Meat Quality, and Fatty Acid Profile. | 82 |
| Dry matter consumption of native forages in lactating goats under extensive grazing in Wayuu indigenous communities in Colombia. | 83 |
| Concentrate feed management in a semi-extensive goat production system. | 84 |
| Use of dehydrated palm prunings pellets as feed for goats. | 85 |
| Silage potential of <i>Tecia solanivora</i>-infected potato waste for goat feed purposes. | 86 |
| Fermented <i>Opuntia</i>: an alternative protein feed for small ruminants. | 87 |
| Improvement of the fatty acid profile in the meat of canary goat kids through dietary inclusion of <i>Echium plantagineum</i> oil. | 88 |
| Using saliva to determine passive immune transfer in goat kids. | 89 |
| Evolution of white and red blood cells in dairy goats around parturition. | 90 |

PRECISION GOAT FARMING, PRODUCTION SYSTEMS AND PRODUCT QUALITY

| | |
|--|-----|
| MAIN LECTURE Precision goat farming-current opportunities and future challenges. | 93 |
| Zootechnical Biodiversity in the Campania Region - Goat Breeds and Native Genetic Type (NGTs). | 94 |
| Development of a mathematical model to predict the production of South African Boer goats. | 95 |
| Proteome changes in goat <i>Longissimus thoracis et lumborum</i> muscle: impact of dry ageing and cooking. | 96 |
| Comparative sensory and other meat quality characteristics of Boer goat and Dohne Merino meat. | 97 |
| Evaluating meat production traits in South African Boer Goats and Dohne Merino sheep. | 98 |
| Fermented milk produced with milk from goats fed extruded linseed. | 99 |
| Effect of short-term cooling on milk production and physiological response of lactating Saanen goats during the summer season. | 100 |
| Exploring the effects of white grape pomace in goat diets on kefir's physicochemical and microbiological properties: preliminary results. | 101 |
| Fatty acid profiles of milk from Murcian-Granadina goats fed with white grape pomace silage. | 102 |
| Effect of marine algae supplementation on chemical and fatty acid composition of goats' milk and cheese. | 103 |
| Effect of the inclusion of black grape pomace in the diet of dairy goats on the quality characteristics of yogurt: preliminary results. | 104 |
| Fatty acids profile of kefir produced from goat's milk feeding by a diet including black grape pomace byproduct. | 105 |
| Effects of <i>Sulla Flexuosa</i> Hay as Alternative Feed Resource on Goat's Milk Production and Quality. | 106 |
| Seasonal variations of goat milk casein and their relationship to cheese production. | 107 |
| Enhancing circular economy in goat farming production systems: biogas generation from cheese whey. | 108 |
| Relationship between somatic cell count and some milk quality parameters in Alpine goats. | 109 |
| Enhancing Goat Breeding Season Using CIDRs® to Synchronize <i>Estrus</i> Cycles for Efficient Kidding Planning and Targeting Peak Chèvon Demand for Farmer Profitability. | 110 |
| Analysis of Immunoglobulin G in Goat Colostrum Using Data Science and Colour-Based Techniques. | 111 |
| An agroecological strategy for forage production in arid regions. | 112 |
| Effects of a simplified milk production method on the estimation of milk yield and genetic evaluations in the Florida goat breed. | 113 |

| | |
|---|-----|
| Pairing goat's cheese with different types of wines. | 114 |
| Prospective of the organic dairy goat sector in Europe. | 115 |
| Milking frequency and melatonin implants affect milk yield but not chemical composition during the dry-off period in pregnant dairy goats. | 116 |
| Evaluating the Suitability of Subcutaneous Loggers for Measuring Temperature, Activity, and Heart Rate Variability in Dairy Goats. Preliminary resu. | 117 |
| Relationship Between Thermography and Rectal Temperature in Goat Kids. | 118 |
| Acceptance of aged adult goat meat by consumers. | 119 |
| Effect of dry maturation on the instrumental quality of goat meat. | 120 |
| Effect of ageing on physicochemical characteristics of adult goat meat. | 121 |
| Effect of potato waste silage use on production and quality of milk and goat cheeses. | 122 |
| Sensory properties of an ice cream made from goat or cow milk: preliminary resul. | 123 |
| Inference of the Classical Carcass Cutting of Goats from Gastronomic Butchering Methods. | 124 |
| Using saliva to determine passive immune transfer in goat kids. | 125 |
| Evolution of white and red blood cells in dairy goats around parturition. | 126 |
| Characterization of grazing activities of goats using precision tools. | 127 |
| Goat value chain and the innovation of short marketing channel in Chefchaouen, Northern Morocco. | 128 |

GENETIC AND REPRODUCTION

MAIN LECTURE

Livestock 5.0 and genetic advances in the future of global goat farming

Dr. Juan Vicente Delgado Bermejo

University of Córdoba. Spain.

XXIth Century is being a great revolution to the world human Society. Finally hunger and poverty is reducing by mean of a better distribution of richness, but specially for the increasing in scientific and technological knowledge and development. In this communication we are doing a review and criticism of the advances of the agriculture 5.0 and the Genetic discipline in the improvement expected for the goat farming for the future. Generic objectives of the goat farming 5.0 will be:

- Contribute to public health;
- Expand production capacity;
- Make goat farming a pillar of sustainability in the world.
- Take goat farming to the next level by deepening the use of data to make operations more profitable.

In these objectives Genetics but specially the “omic” sciences will be important starring in research, development and innovation, because wide sequencing is giving a data set capable to describe most of the biological and productive characteristics of the goats. So, in this review a novel vision of the goat farming will be presented.

Cryosurvival of Beetal buck (*Capra hircus*) sperm by modulating cooling rate in critical temperature zone

Kumar A^{1*}, Singh H¹, Singh AK¹, Honparkhe M¹, Singla M² ajeetvet@yahoo.com

1 Department of Veterinary Gynaecology and Obstetrics.

2 Department of Livestock Production and Management.

College of Veterinary Science, Ludhiana, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana 141004, Punjab, India.

KEY WORDS: BEETLE, BUCK SEMEN CRYOPRESERVATION, COOLING RATES, CRITICAL TEMPERATURE ZONE.

Cryopreservation of Beetle buck semen was optimized by modulating cooling rates within critical temperature zone (4°C to -60°C). Six ejaculates each from 3 Beetle bucks maintained at GADVASU, Ludhiana, India (Latitude/Longitude, 30.55°N, 75.54°E) were collected; seminal plasma removed and extended in tris citrate egg yolk (20%), glycerol (8%) extender. Straws (0.25ml) were filled, sealed and equilibrated at 4°C for 4 hrs. Freezing of straws were carried out using a programmable biofreezer by applying various cooling rates within critical temperature zone: 4 to -15°C (Phase-1) and -15 to -60°C (Phase-2). In phase 1, various cooling rates -2, -5, -10, -20, -30, -40, -50, -60°C/min were applied and a fixed cooling rate of 50°C/min was used during -15°C to -60°C. In phase 2, a fixed cooling rate of -30°C/min was applied during 4°C to -15°C and cooling rates of -10, -20, -30, -40, -50, -60°C/min were applied between -15°C to -60°C. Further, a fixed cooling rate of -50°C/min was applied in both phases from -60 to -140°C. Post thaw semen quality was assessed and data was analyzed. Progressive motility, HOS reactive sperm and % active mitochondria were significantly higher with -30°C/min (1st phase) and -60°C/min (2nd phase). It was concluded that the optimum cryosurvival of Beetle buck sperm was achieved with cooling rate of -30°C/min (4°C to -15°C), -60°C/min (-15°C to -60°C) and -50°C/min (-60 to -140°C) followed by plunging of straws in into liquid nitrogen.

An attempt to establish a standard kinetic analysis in buck semen

Yáñez-Ortiz I^{1,2}, Tabarez A^{1,3} and Palomo MJ¹.

1 Universitat Autònoma de Barcelona, Bellaterra, Spain.

2 Universidad Internacional del Ecuador, Quito, Ecuador.

3 University Veracruzana, Tuxpan, Veracruz, México.

KEY WORDS: GOAT, SPERM, MOTILE, SUBPOPULATIONS, ANALYSIS.

Kinematic sperm analysis using CASA systems often involves clustering techniques to identify distinct motile subpopulations (SP). However, the optimal number of SP is not well established between species and no consensus exists among researchers. To achieve more reliable and comparable results, a retrospective study was conducted using data from sperm analysis performed during the cryopreservation of 80 semen samples collected from 7 bucks (1 and 2.5 years old). A total of 16,519 sperm trace measurements were obtained before and after thawing using the ISAS® system (PROISER SL, Spain) and clustering analyses were applied to establish the motile subpopulations. As objective criterion, elbow method was used to establish the number of SP using the R software (version 4.0.3, 2020), obtaining three different motile SP by the FASTCLUS procedure of SAS software (Version 9.4, 2015). Additionally, an adjustment of the proportion of each SP with different motility patterns ($P < 0.05$) was made based on the total motility of each sample, obtaining a fourth subpopulation of static sperm (SP4=36%). Thus, SP1 (22.5%) showed intermediated curvilinear velocity (VCL), linearity (LIN) and amplitude of lateral head displacement (ALH). SP2 (5.4%) presented the highest VCL and ALH but the lowest LIN, while SP3 (36.1%) had the lowest VCL and ALH, but the highest LIN. In conclusion, this work has shared the method used in our group to promote greater coordination between researchers regarding sperm SP.

A genome-wide single nucleotide polymorphism-based investigation of coat colour variation in indigenous South African goats

Jansen van Rensburg, T.¹, Lashmar, S.F.² and Visser, C¹. carina.visser@up.ac.za

¹ Department of Animal Science, University of Pretoria, Pretoria, South Africa, ² Animal Production, Agricultural Research Council, Irene, South Africa

KEY WORDS: DIVERSITY, INDIGENOUS GOATS, MORPHOLOGICAL TRAIT, PCA, SELECTION SIGNATURES.

Studying the differences and similarities in single nucleotide polymorphism (SNP) profiles between phenotypically defined coat colours in economically important but non-descript goats may provide the foundation for 1) a better understanding of coat colour diversity and 2) better utilizing this characteristic as a tool for ecotype/breed assignment (and, hence, simplifying conservation strategies). This study analyzed 192 indigenous goats from both recognized (i.e. defined) and non-descript (i.e. undefined) ecotypes, as well as 96 South African Angora goats as a commercial, unicoloured control breed. Using Illumina® Goat SNP50 data, genetic relatedness, selection signatures (SS), and genotype-phenotype associations (i.e. GWAS) were characterized. Principal component analysis revealed distinct genetic clusters, with the selectively bred Angora goats forming a separate, tight cluster, while indigenous goats grouped into two main clusters. The fixation index based SS approach and GWAS identified 26 and 14 genomic regions of interest, respectively. Notably, the KIT, MC1R, ASIP, and TYRP1 genes, all with a well-recognized role in coat colour expression, were amongst the genes harboured in these regions of interest, indicating conserved genetic pathways shared with other goat breeds. These findings demonstrate how ecological pressures and environmental adaptations influence genetic diversity and coat colour patterns in locally important goat genetic resources.

Survival analysis of longevity in Spanish dairy goat breeds using a Weibull proportional hazards model

Ziadi C¹ z72zizic@uco.es, Sánchez JP¹, Muñoz-Mejías E², Sánchez M³, López MD⁴, Casquet O⁵ and Molina A¹.

1 Department of Genetics, University of Córdoba, Córdoba, Spain.

2 Department of Animal Pathology and Animal Production, University of Las Palmas de Gran Canaria, Cardones de Arucas University Campus, Arucas, Spain.

3 Department of Animal Production, University of Córdoba, Córdoba, Spain.

4 ACRIFLOR, Department of Animal Production, University of Córdoba, Spain.

5 Association of Breeders of the Payoya Goat Breed, Arcos Street, Algodonales, Cádiz, Spain.

KEY WORDS: WEIBULL MODEL, GENETIC PARAMETERS, LONGEVITY, DAIRY GOAT.

Longevity is an economically important trait, as extending the doe's functional life allows for keeping the most productive females in the herd as long as possible, potentially increasing the profitability of dairy farms. Thus, this study aimed to assess the risk factors that influence female longevity in Spanish dairy goat breeds and to estimate its genetic parameters. The dataset consisted of 70,695 and 49,176 lactation records of Florida and Payoya females, respectively. These breeds represent the intensive and semi-intensive production systems, respectively. The pedigree included 56,901 animals for Florida and 59,957 for Payoya. Longevity was defined as length of productive life (LPL), productive life (PL), and lifetime milk production (LMP). The effects included in the model for both breeds were age at first kidding and herd-year-season of birth of the doe as time-independent effects; and age at kidding, herd-year-season of kidding, within-herd class of milk production deviation, and lactation number*stage of lactation as time-dependent effects. Genetic parameters were estimated using a Weibull proportional hazards model with the Survival Kit V6.0 software. Heritability estimates were 0.58, 0.43, and 0.26 in Florida breed, and 0.42, 0.11, and 0.17 in Payoya breed for LPL, PL, and LMP, respectively. These results are expected to contribute to the genetic improvement of longevity in Spanish goat breeds, whose longevity was perceived to be decreasing over the last decade.

Estimates of genetic and phenotypic parameters and their correlations for response to artificial infection with *Haemonchus contortus* in growing male goats.

Tsukahara Y^{1,2} tsukahara.yoko.8v@kyoto-u.ac.jp, Gipson TA², Hart SP², Dawson L^{2,3}, Wang Z², Puchala R², Sahlu T², Goetsch AL².

¹ Laboratory of Animal Husbandry Resources, Division of Applied Biosciences, Graduate School of Agriculture, Kyoto University

² American Institute for Goat Research, Langston University.

Phone: +81-75-753-6327 Email: tsukahara.yoko.8v@kyoto-u.ac.jp

KEY WORDS: HAEMONCHUS CONTORTUS, GENETIC SELECTION, GENETIC PARAMETERS, MEAT GOATS.

Internal parasitism has been the leading cause of morbidity and mortality in goats in the world, including the southcentral USA. Among the different approaches and management practices to deal with internal parasitism, genetic selection for internal parasite resistance is recognized as one with considerable potential long-term impact. A central performance test with artificial infection of *Haemonchus contortus* for selection of different breeds of growing sire candidate goats to increase resistance to internal parasitism was conducted for 3 years along with on-farm female selection. The results varied considerably among breeds of goats. Spanish goats maintained relatively low fecal egg count (FEC) each year categorized as highly resistant compared to Boer and Kiko goats. Packed cell volume (PCV) was similar among breeds. Total serum immunoglobulin (Ig) levels, such as IgA, IgM, and IgG, were negative but not strongly related to FEC. Genetic parameters revealed that the heritability of FEC was moderate ($h^2 = 0.314$), whereas that of PCV was high ($h^2 = 0.595$). The genetic correlation between FEC and IgM and IgG was negative, which suggests a possible genetic association. Genetic and phenotypic correlations between average daily gain (ADG) and FEC were nonsignificant. In conclusion, the lack of genetic relationship between ADG and FEC suggests that the selection of growing male meat goats for resistance to internal parasitism will not adversely affect growth performance.

The suitability of infrared thermography to detect estrous in dairy goats

Y. Santana-Rodríguez, M. González-Cabrera, marta.gonzalezcabrera@ulpgc.es, A. Morales-de-laNuez, A. Argüello, N. Castro, L.E. Hernández-Castellano.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: ESTROUS, INFRARED THERMOGRAPHY, HEAT, REPRODUCTION.

This study aimed to assess the suitability of infrared thermography (IT) to detect estrous using vulvar temperature. Fourteen estrous synchronized Majorera dairy goats were used. Vulvar temperature was recorded using an IT camera (193-8700, RS PRO, Spain) and rectal temperature (RT) was measured using a digital thermometer at different timepoints throughout the estrous synchronization period (i.e., sponge insertion day (T0), 5 days after sponge insertion (T1), serum gonadotropin and prostaglandin injection day (T2), the day before estrous (T3), the day of the onset of estrous (T4) and the day after estrous (T5)). Data was analyzed using PROC ANOVA and the Pearson correlation coefficient was determined using the PROC CORR of SAS 9.4 software. The statistical significance was set as $p < 0.05$. Results showed increased vulvar temperature throughout the synchronization period ($p < 0.001$) and high correlation between RT and vulvar temperature the day of estrous exhibition (T4; $\rho = 0.840$, $p < 0.001$) and the next day (T5; $\rho = 0.710$, $p = 0.015$). In conclusion, the IT can be used to monitor changes in body temperature associated with the estrous cycle, especially in the urogenital area. Although this technique offers a promising approach to enhance reproductive management strategies, it should be combined with other tools to reduce the effect of confounding factors such as the ambient temperature.

Investigating the Genetic Diversity and Population Structure of Jabal Akhdar Goats Using Genome-Wide Single Nucleotide Polymorphisms Markers

Ola Ali Al-Yarubi¹, Hussain Bahbahani², Waleed Al Marzooqi¹, Hani El Zaiat¹, Kaadhia Al-Kharousi¹, Al Ghalya Al-Toobi¹, Abeer Al-Hamrashdi¹, Mohammed Al-Abri¹ abri1st@squ.edu.om

¹ Department of Animal and Veterinary Sciences, Sultan Qaboos University, Oman.

² Department of Biological Sciences, Faculty of Science, Kuwait University, Sh. Sabah Al-Salem campus, Kuwait.

KEY WORDS: GENETIC DIVERSITY, POPULATION STRUCTURE, SNP MARKERS, JABAL AKHDAR GOATS, CONSERVATION GENETICS.

Omani Jabal Akhdar goats are highly valued for their resilience, superior growth rate and twinning rate compared to other Omani goats. Therefore, understanding their genetic diversity and population structure is imperative for sustainable breeding efforts and conservation of the breed. This study aimed to assess the genetic diversity and population structure of Jabal Akhdar goats by genome-wide nucleotide polymorphisms (SNPs) using the Illumina 50K Goat Chip. Multidimensional Scaling Analysis (MDS) and Admixture analysis revealed that Jabal Akhdar goats has a distinct genetic ancestry that is a mixture between the Asian and African goat lineages which highlights the historic maritime trading and activities of the Omanis with both continents. The MDS analysis and the Reynolds unweighted distances both showed that the Jabal Akhdar goats share a close genetic ancestry with West Asian breeds such as Iranian Bezoar, the Australian Cashmere breed, and Turkish goats such as the Kil breed, all of which are adapted to cold climates and high elevations. Notably, the breed exhibited a reasonable inbreeding level (0.219), comparable to other West Asian breeds, indicating adequate levels of genetic diversity. This study represents the first genome-side characterization of the Jabal Akhdar goats breed. Despite its moderate inbreeding levels, attention should be focused on conservation efforts to safeguard the distinctive genetic diversity of Jabal Akhdar goats to prevent the erosion of it.

Livestock 5.0 and genetic advances in the future of global goat farming

Dr. Juan Vicente Delgado Bermejo

University of Córdoba. Spain.

XXIth Century is being a great revolution to the world human Society. Finally hunger and poverty is reducing by mean of a better distribution of richness, but specially for the increasing in scientific and technological knowledge and development. In this communication we are doing a review and criticism of the advances of the agriculture 5.0 and the Genetic discipline in the improvement expected for the goat farming for the future. Generic objectives of the goat farming 5.0 will be:

- * Contribute to public health;
- * Expand production capacity;
- * Make goat farming a pillar of sustainability in the world.
- * Take goat farming to the next level by deepening the use of data to make operations more profitable.

In these objectives Genetics but specially the “omic” sciences will be important starring in research, development and innovation, because wide sequencing is giving a data set capable to describe most of the biological and productive characteristics of the goats. So, in this review a novel vision of the goat farming will be presented.

Estimation of genomic inbreeding (FROH) in Istrian goat – baseline for conservation of the breed

Kasap A, Ramlijak J, Šubara G, Šuran E, Bara Z, zdravko.barac@mps.hr, Špehar M.

1 University of Zagreb, Faculty of Agriculture, Zagreb, Croatia.

2 Agency for Rural Development of Istria Region, Pazin, Croatia.

3 Ministry of Agriculture, Zagreb, Croatia.

4 Croatian Agency for Agriculture and Food, Zagreb, Croatia.

KEY WORDS: ISTRIAN GOAT, RUNS OF HOMOZYGOSITY, GENOMIC INBREEDING, CONSERVATION

Continuous stretches of homozygous genotypes in an individual's genome, known as Runs of Homozygosity (ROH), provide valuable information for studying inbreeding, genetic diversity, and the potential impact of genetic relatedness on individual health and population dynamics. The rationale for using ROH in estimating inbreeding lies in the fact that identical DNA segments inherited from both parents (sire and dam) most likely originate from a common ancestor; moreover, the longer the segment, the more recent the inbreeding event. This study aimed to estimate the genomic coefficient of inbreeding (FROH) in a genotyped population (50K Illumina Goat Bead Chip; n=145) of the Istrian goat (a Croatian indigenous breed). After quality control, a total of 140 genotyped animals and 47,357 SNPs were analyzed using the PLINK toolset (v1.09). The estimation of genomic FROH for different segment lengths (from 1 to >16 Mbp) was conducted in R ($FROH = \sum_i \text{length}(ROH_i) / L_{\text{genome}}$). The NROH1–2, NROH2–4, NROH4–8, NROH8–16, NROH>16 were and NROH1>1 were 95, 495, 465, 423, 448 and 1924, respectively. The average FROH1–2, FROH2–4, FROH4–8, FROH8–16, FROH>16 were and FROH1>1 were 0.05%, 0.42%, 0.77%, 1.41%, 4.52% and 6.66%, respectively. These estimates of FROH indicate a high proportion of recent inbreeding in this population. There were 6% of animals having FROH1>1 above 30%. The results of this study provide the first comprehensive insight into genomic inbreeding (FROH) in the Istrian goat. Based on these findings, it appears that the Istrian Goat requires carefully designed conservation plan.

Relevance of multicollinearity analysis for the choice of factors to be included in models for the study of fertility in goats.

María Pía Peláez Caro^{1,2}, mpiapelaezcaro@gmail.com, Ander Arando Arbulu, José Manuel León Jurado³, Juan Vicente Delgado Bermejo¹, Javier Fernández Álvarez^{1,2} & Francisco Javier Navas¹

1. Department of Genetics, Faculty of Veterinary Medicine, University of Cordoba, Cordoba, Spain.

2. National Association of Breeders of Murciano-Granadina Goat Breed, Granada, Spain.

3. Centro Agropecuario Provincial de la Diputación de Córdoba, Córdoba, Spain.

KEY WORDS: MULTICOLLINEARITY, FERTILITY, MURCANO-GRANADINA

Artificial insemination (AI) has positioned itself as one of the safest and most effective methods for the dissemination of genetic improvement without compromising the health of farms, being a key element in any breed improvement programme, as is the case of the Murciano-Granadina breed. However, AI has negative aspects, such as the decrease in fertility compared to natural mating or the additional costs derived from loss of lactations and kids. This is why a study that can optimize the success of the technique is key.

A multicollinearity test was used, leaving variables for which three evaluation rounds were necessary to obtain the variables that are really interesting to study and that are not redundant among them. Farm x Protocol and Farm were eliminated, which indicates that Farm is a variable that compasses many others: health, management, feeding (between many others). Despite this, different farms could have more in common because of the synchronisation protocol than because of other intrinsic characteristics, they use than because of the proper farm characteristics, thus enabling fewer and more homogeneous groups to be made. This is why the use of the multicollinearity test is important, improving the understanding and design of studies for the evaluation of reproductive aspects such as fertility in goats.

Improving the productive efficiency and resilience of the Malagueña goat through the inclusion of new selection parameters

González Ariza A¹, angoarvet@outlook.es, León Jurado JM¹, Lara González C², Arias Saez M², Salgado Pardo JI³, Delgado Bermejo JV³

1 Agropecuary Provincial Centre, Diputación de Córdoba, Córdoba, Spain.

2 Spanish Association of Breeders of the Malagueña Goat (CABRAMA), Málaga, Spain.

3 Department of Genetics, University of Córdoba, Córdoba, Spain.

KEY WORDS: LIFETIME PRODUCTION, PRODUCTIVE LONGEVITY, GENETIC IMPROVEMENT, PROTEIN, FAT

The Malagueña goat is known for its high milk production and hardiness, which has historically allowed it to play a pivotal role in depressed rural areas. Currently, the organizations involved in the development of the breed's breeding program are making an effort in the search for new ways to improve the productive efficiency of the breed. This efficiency is based on two fundamental pillars: productive longevity, defined as the age of the goat at the time of the animal's death, and its lifetime production.

For this, the following factors were used for the evaluation model:

- a. Fixed effects: Livestock (83 levels); Year of birth (23 levels from 2001 to 2024); Month of birth (12 levels); Reason for leaving (5 levels); Number of lactations per animal (9 levels).
- b. Random effects: the additive genetic value of the animal.

Finally, the response variables were total production in kilograms of milk, fat, protein and dry matter, as well as the length of the animal's productive life (productive longevity) expressed in months.

The breed's average longevity was 67.5 months. The heritability of the productive traits for milk and components remained in a range of 0.32 to 0.35, which can be classified as medium heritability while the heritability estimated for productive longevity was considered high, at 0.71.

Estimation of α S1-casein genotype impact on milk yield and composition in Palmera goats using multiple-trait gene content REML models

Ziadi C¹, Muñoz-Mejías E², Sánchez JP¹ and Molina A¹.

¹ Department of Genetics, University of Córdoba, Córdoba, Spain.

² Department of Animal Pathology and Animal Production, University of Las Palmas de Gran Canaria, Cardones de Arucas University Campus, Arucas, Spain.

KEY WORDS: α S1 CASEIN, GENE CONTENT, GENOTYPE EFFECT, DAIRY GOAT.

Casein gene genotype significantly influences milk composition, with α S1-casein being the most impactful in dairy goats. This highly polymorphic gene exhibits multiple allelic variants categorized by expression level (high, medium, low, and null). Alleles A, B, and C are associated with increased production of alphaS1 casein in milk and probably with variations in protein activity (e.g. affinity with other casein molecules to form the casein matrix). Therefore, this study aimed to study the effect of α S1casein genotypes on milk yield and main composition traits in the Palmera goat breed. The dataset consisted of 37,875 test- day milk records from 3,168 females of the Palmera breed and the pedigree included 4,342 animals. A total of 156 males were genotyped for the α S1casein gene, of which 1,069 daughters had data. Traits considered were milk yield (MY), protein percent (PP), and fat plus protein yield (FPY). The genetic covariance between genotypes at the major gene and the traits was estimated using the gene content multiple-trait REML method implemented in REMLF90 software. Results revealed a significant effect of α S1-casein on all analyzed traits. Genotype AB had the largest positive effect on MY and FPY, while PP was primarily influenced by genotype AA. Using the α S1 casein genotype in the genetic selection of the Palmera breed is feasible; however, further studies should focus on expanding the size of the genotyped population to maximize the potential benefits for this breed.

Molecular docking analysis of phytoestrogenic compounds from *salvia officinalis* targeting estrogen receptors in goats

Kchikich A1, Ben Moula A2, Kounnoun A3, Kirschvink N4, Chebli Y.1, EL otmani S.1, Barrijal S5, Chentouf M1

1 National Institute of Agricultural Research, Regional Center of Agricultural Research of Tangier, Rabat, Morocco

2 Department of Life Sciences, Polydisciplinary Faculty of Larache, Abdelmalek Essaadi University, 745 BP, 92004, Larache, Morocco

3 Regional Analysis Laboratory and Research ONSSA, Tangier 93000, Morocco

4 Department of Medicine, Namur Research Institute for Life Sciences (NARILIS), University of Namur, Namur, Belgium

5 Faculty of Sciences and Techniques, University Abdelmalek Essaadi, Tangier, Morocco.

KEY WORDS: COUMESTROL, ESTROGEN RECEPTOR, GENISTEIN, MOLECULAR DOCKING, PHYTOESTROGENS, SALVIA OFFICINALIS.

This study aimed to identify and evaluate phytoestrogens in the aqueous extract of *Salvia officinalis* for their potential as selective estrogen receptor modulators to regulate the estrous cycle in goats. The phytoestrogens were extracted using distilled water, followed by filtration through a 0.45 µm syringe filter to ensure sample purity. The chemical composition was then analyzed via ultra-performance liquid chromatography to accurately identify active compounds. The in-silico approach targeted the estradiol receptor ER-α 6PIT in rats, essential in reproductive hormone regulation. Molecular docking simulations were performed using tools such as AutoDock, Pymol, AutoDockVina, and Discovery Studio, assessing molecular interactions and binding affinities between the extracted compounds and the receptor. Binding energies and modes were analyzed for various compounds, including flavonoids, lignans, and steroidal saponins, with 17-β-estradiol (E2β) as a standard for comparison. Chemical analysis of *Salvia officinalis* revealed significant phytoestrogens, notably genistein and coumestrol, which displayed promising receptor affinities. Coumestrol, in particular, showed a stronger binding affinity with the estradiol receptor than the E2β agonist, underscoring its potential as a selective estrogen receptor modulator.

ANIMAL HEALTH AND WELFARE

MAIN LECTURE

From lab to barn – human-goat interactions and future avenues for better animal husbandry

Christian Nawroth

Research Institute for Farm Animal Biology (FBN), Germany

In recent decades, our understanding of the cognitive abilities of non-human animals - their ability to acquire, process, store and use information - has grown considerably. The study of how animals interpret subtle human behaviours has been a major area of recent animal cognition research, but has mainly focused on primates and canids, with more recent studies investigating whether farm animals are similarly responsive to these cues. This talk will 1) summarise previous research showing that goats can interpret human behaviour in sophisticated ways, 2) highlight challenges in research design that limit the generalisability and practical application of these findings, and 3) outline how applied research could use these findings to improve habituation to new environments and reduce stress during routine handling.

Abattoir countrywide survey of dairy goats' haemonchosis in Greece and associated risk factors

Arsenopoulos KV¹ arsenopoulos.k@unic.ac.cy, Gelasakis AI² and Papadopoulos E³.

¹ Department of Veterinary Medicine, University of Nicosia, School of Veterinary Medicine, 2414 Engomi, Nicosia, Cyprus.

² Laboratory of Anatomy and Physiology of Farm Animals, Department of Animal Science, Agricultural University of Athens (AUA), Iera Odos 75 str., 11855 Athens, Greece.

³ Laboratory of Parasitology and Parasitic Diseases, School of Veterinary Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, 54124 Thessaloniki Greece.

KEY WORDS: HAEMONCHUS CONTORTUS, ABOMASUM, GOATS, EPIZOOTIOLOGY, RISK FACTORS

The objectives of the present study were to determine the prevalence of *Haemonchus contortus* infections, in dairy goats in continental and insular Greece, based on an abattoir survey and to evaluate potential host-related risk factors including the age, the sex, the altitude, the management system, the co-existence of goats with sheep, the season and the anthelmintic treatment on the occurrence of haemonchosis. In total, 431 abomasa of dairy goats were examined to evaluate the prevalence of *Haemonchus* spp. infection. Moreover, a questionnaire was used to obtain relevant information regarding animal and farm characteristics. *Haemonchus*-like helminths were collected from the abomasa and used for the molecular species identification; for this reason, a fragment of 321 base pairs of the internal transcribed spacer 2 sequence of nuclear DNA was amplified. The prevalence of mono-species *H. contortus* infection of dairy goats was 32%. In dairy goats, the management system (i.e., intensive management system), the anthelmintic treatment (i.e., treatment with macrocyclic lactones and their combination with pro/benzimidazoles), the altitude of the farms (i.e., farms located over 300 meters above sea level) and the season (i.e., spring and summer) were significant risk factors in preventing *H. contortus* infection.

Pulmonary lesions in adult dairy goats slaughtered in Cyprus

Panayi RM ¹, Arsenopoulos KV ¹ arsenopoulos.k@unic.ac.cy, Christoforou M ¹ and Nikolaou G ¹.

¹ Department of Veterinary Medicine, University of Nicosia, School of Veterinary Medicine, 2414 Engomi, Nicosia, Cyprus.

KEY WORDS: PULMONARY LESIONS, DAIRY GOATS, ADULT GOATS, SLAUGHTERHOUSE, CYPRUS

Despite that dairy goats consist of an important part of the Cypriot agricultural economy, no studies were conducted on the epidemiology and health of caprine flocks on this island, till now. Taking into consideration that slaughterhouse surveillance is a useful monitoring tool for the health of small ruminants, we adopted a modified pulmonary score system to evaluate these lesions in adult dairy goats. More precisely, the score system used for the evaluation of the pulmonary lesions of slaughtered pigs was modified and adapted for the scoring of lesions in slaughtered adult goats as follows:

0= no lesions.

1= approximately 1-25% of the lungs affected.

2= approximately 26-50% of the lung affected.

3= approximately 51-75% of the lung affected.

4= More than 75% of the lungs affected.

accompanied or not with.

L= lymph nodes affected.

P= pleuritis present.

According to this system, over 50% (22 out of 37 lungs examined, in total) of the lungs had been recorded with score 1 or higher accompanied with a significant percentage (13 out of 22 affected lungs) of mediastinal lymph nodes involvement (L), consistent with *Corynebacterium pseudotuberculosis* infection. Therefore, it is apparent that pulmonary lesions caused by *Corynebacterium pseudotuberculosis* infection constitute a serious threat for the local dairy goat industry. These findings emphasize the urgent need for targeted management practices and specific veterinary protocols to effectively reduce/prevent this infection.

Lungworms in an abattoir survey: Preliminary findings of the Cypriot dairy goat industry

Nikolaou G ¹, Panayi RM ¹, Christoforou M ¹, Arsenopoulos KV ¹ arsenopoulos.k@unic.ac.cy and Papadopoulos E ².

¹ Department of Veterinary Medicine, University of Nicosia, School of Veterinary Medicine, 2414 Engomi, Nicosia, Cyprus.

² Laboratory of Parasitology and Parasitic Diseases, School of Veterinary Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, 54124 Thessaloniki Greece.

KEY WORDS: LUNGWORMS, MUELLERIUS CAPILLARIS, DAIRY GOATS, ABATTOIR, CYPRUS.

Lungworms are nematode parasites, which infect the lungs, causing significant health and productivity issues in small ruminants. Despite their potential impact on health and welfare of dairy goats, little is known about their prevalence and significance in Cyprus. This study investigates the occurrence of lungworm infections of dairy goats in Cypriot abattoirs, aiming to fill a critical gap in understanding the epidemiology of these endoparasites within the local industry. A total of 37 lung specimens were collected from dairy goats slaughtered at the main abattoir across Cyprus, over six months period. Samples were examined for the presence of lungworms using macroscopic and microscopic pathological approaches. The identification of the parasites genus was performed with microscopical examination of the helminths derived from the lung specimens. Lungworm infections were detected in 8% of the goats, predominantly caused by *Muellerius capillaris*. Histopathological analysis revealed mild to moderate pulmonary damage in infected animals, potentially affecting long-term productivity. This study highlights the presence of lungworm infections in Cypriot dairy goats, emphasizing the need for targeted parasite control measures. Effective pasture management and regular anthelmintic treatments are recommended to mitigate the risk of lungworm infections and ensure sustainable production in the Cypriot dairy goat industry.

Improving the ante-mortem diagnosis of tuberculosis in goats: the imdiTBap project.

Velasco C ^{1,2}, Roy A ^{1,3}, Ortega J ¹, Boniotti M B ⁴, Domínguez M ⁵, Gormley E ⁶, Jones G ⁷, Martucciello A ⁸,
Mazzone P ⁹, Moreno I ⁵, Or M E ¹⁰, de Juan L ^{1,2}, Domínguez L ^{1,2}, Romero B ^{1,2}, Álvarez J ^{1,2} and
Bezos J ^{1,2} jbezosa@ucm.es.

1 VISAVET Health Surveillance Centre, Complutense University of Madrid, Madrid, Spain.

2 Department of Animal Health, Complutense University of Madrid, Madrid, Spain.

3 Centro Nacional de Epidemiología, Instituto de Salud Carlos III, Madrid, Spain.

4 Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, Brescia, Italy.

5 Unidad de Inmunología Microbiana, Centro Nacional de Microbiología, Instituto de Salud Carlos III, Madrid, Spain.

6 School of Veterinary Medicine, University College Dublin, Dublin, Ireland.

7 TB Immunology and Vaccinology, Department of Bacteriology, Animal and Plant Health Agency, New Haw, Addlestone, Surrey, UK.

8 Istituto Zooprofilattico Sperimentale del Mezzogiorno, Salerno, Italy.

9 Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche, Perugia, Italy.

10 Department of Internal Medicine, Faculty of Veterinary Medicine, Istanbul University-Cerrahpasa, Avcılar, Istanbul, Türkiye

KEY WORDS: GOAT, TUBERCULOSIS, DIAGNOSIS, IMMUNOLOGY, ANTIGENS

Ante-mortem diagnosis of tuberculosis (TB) in goats relies on cell-based techniques such as the single/comparative intradermal test (SIT/CIT) and occasionally the interferon-gamma release assay (IGRA). These techniques could have a limited performance due to the using of Purified Protein Derivatives (PPDs) as reagents for antigenic stimulation. In this sense, the imdiTBap project aims to evaluate experimental antigens (DST-F and P22) to replace PPDs for TB diagnosis under field conditions.

DST-F, P22, and CIT showed similar specificity (Sp) (4mm cut-off; 99.0%, 99.0%, and 100.0%, respectively) in TB-free herds and significantly higher than SIT (89.9%), while a DST-F 2mm cut-off (90.3%) led to significant differences compared the P22 and CIT. Applying the DST-F 2mm cut-off in TB-infected herds led to a significantly higher reactivity (46.1%) compared with SIT (32.3%), CIT (18.5%) and P22 (23.3%). Reactivity to IGRA was lower than intradermal tests regardless the reagent used and no significant differences were found in the reactivity between the DST-F, bovine PPD (bPPD) and P22 in TB-infected herds (13.1%, 13.7% and 17.9%, respectively) and TB-free (1.0%, 0.0% and 2.5%, respectively) applying the 0.1 cut-off.

In conclusion, although the DST-F applying the 2mm cut-off could maximize sensitivity (Se), CIT would be recommended to maximize the Sp of the intradermal test. However, the performance of DST-F and P22 in the IGRA in terms of Se and Sp was similar compared to bPPD.

Milk excretion of doxycycline and tildipirosin in lactating goats.

Elena Badillo ebp2@um.es, José Martínez, M^o Teresa Yuste, Elisa Escudero, Pedro Marín

Department of Pharmacology. Faculty of Veterinary Medicine, University of Murcia. 30100 Espinardo. Murcia.

KEY WORDS: GOATS, MACROLIDES, TETRACYCLINES, PHARMACOKINETIC, MILK.

Contagious agalactia (CA) is a disease with significant economic consequences for farming and dairy industry. The pathogenic agents from *Mycoplasma spp.* proliferate in mammary tissue, affecting both milk production and quality. The pharmacological treatment of CA involves various antimicrobial agents, which must reach effective concentrations in the mammary gland like macrolides and tetracyclines. Doxycycline exhibits a broad spectrum of activity, including effectiveness against intracellular pathogens such as *Mycoplasma spp.* Tildipirosin is also effective against *Mycoplasma spp.*, showing favorable pharmacokinetic (PK) characteristics. The aim of this study is to compare the PK of doxycycline and tildipirosin after intramuscular administration in lactating goats.

Tildipirosin exhibited a significantly longer half-life (3 times higher) and higher C_{max} compared to doxycyclin (130 vs 0.95 µg/ml) considering the different doses. The t_{max} values were similar for both antibiotics, doxycycline and tildipirosin, which shows a comparable rate of penetration into milk. Its penetration into mammary gland was superior, as reflected by the AUC_{milk}/AUC_{plasma} and C_{max}-milk/C_{max}-plasma ratios. Based on these findings, tildipirosin appears to be a more favorable option, considering the pathogen's susceptibility and the extended withdrawal period required.

Comparison of plasma pharmacokinetics of doxycycline and tildipirosin after intramuscular administration in lactating goats.

Elena Badillo ebp2@um.es, M^o Teresa Yuste, José Martínez, Elisa Escudero, Pedro Marín

Department of Pharmacology. Faculty of Veterinary Medicine, University of Murcia. 30100 Espinardo. Murcia.

KEY WORDS: GOATS, PHARMACOKINETIC, RESPIRATORY DISEASE, ANTIMICROBIAL RESISTANCE.

Respiratory tract infection (RTI) is considered as one of the most common illnesses in goats, which increase mortality and reduce the profit of farmers. Its can be caused by various bacteria include *Pasteurella multocida* and *Mannheimia haemolytica*. Antimicrobial resistance of bacteria causing RTI in goats is a very common issue in today's world. Identifying antimicrobial agents with optimal pharmacokinetic profiles and efficacy against these bacteria is essential in this context. This study aims to compare the pharmacokinetic characteristics of doxycycline and tildipirosin following intramuscular administration in lactating goats.

The mean half-life was longer for doxycycline (33.36 h vs 8.6 h), which would facilitate dosing. Doxycycline showed slower and incomplete absorption (45.60%) compared to tildipirosin, which exhibited complete absorption (F 107.5%). Considering the different doses, both antibiotics showed similar C_{max}. On the other hand, doxycycline caused more pain at the injection site and transient lameness, which was not observed with tildipirosin. Based on the results obtained, tildipirosin has a favorable pharmacokinetic and safety profile compared to doxycycline.

Pharmacokinetics of macrolides after intramuscular administration in goats

Elena Badillo ebp2@um.es, M^o Teresa Yuste, José Martínez, Elisa Escudero, Pedro Marín

Department of Pharmacology. Faculty of Veterinary Medicine, University of Murcia. 30100 Espinardo. Murcia.

KEY WORDS: GOATS, MACROLIDES, PHARMACOKINETIC, INTRAMUSCULAR.

The macrolides are a class of antibiotics used to treat many different infections. The pharmacokinetics of macrolides differs drastically from that of other antimicrobial agents, and there are also important differences between the different drugs of the same group. The pharmacokinetics of erythromycin, tildipirosin and tulathromycin have been studied in lactating goats after intramuscular (IM) administration. The objective of this study was to compare the pharmacokinetics of these three different macrolides in lactating goats after IM administration. The longest plasma half-life was found with tulathromycin (99 h), much longer than those obtained with tildipirosin (8.64 h) and erythromycin (3.89 h). The bioavailabilities obtained after IM administration were close to 100% for all three macrolides, indicating complete absorption in goats. The tulathromycin study does not publish pharmacokinetic parameters in milk. If we compare tildipirosin and erythromycin, much higher concentrations (20 times higher) were obtained in milk with tildipirosin than with erythromycin as reflected by the ratios $t_{1/2z}$, $C_{max\ milk}/C_{max\ plasma}$ and AUC_{milk}/AUC_{plasma} . Based on these results, tulathromycin and tildipirosin would have the advantage of requiring less frequent administration, but would require longer suppression times.

Challenges and opportunities for the Australian goat industry

Hoffman, LC^{1,2} louwrens.hoffman@uq.edu.au and Cozzolino, D².

1. Department of Animal Sciences, Faculty of Agrisciences, University of Stellenbosch, South Africa.

2. Centre for Nutrition and Food Sciences, Queensland Alliance for Agriculture and Food Innovation (QAAFI), The University of Queensland, Australia.

KEY WORDS: RANGELLAND GOATS, ELECTRONIC IDENTIFICATION, PRODUCTION PERFORMANCE INDICATORS

Although Australia is a relatively small goat producer, it is the world's leader in goat meat export. In 2024 Australia exported 51,488 tonnes of meat; from January to September 2024, 2.55 million goats were slaughtered. Most meat is exported as whole frozen (skin-on, -off) or frozen six-cuts in a box. Australia's goat enterprises can be classified into unmanaged rangeland goats and managed goats. The former are typically found on large properties and can number thousands. The only management regime is an annual muster when the goats are brought into yards, and all bucks are loaded and slaughtered whilst the does and young kids are released. Managed goats have production intervention(s) during their life cycle. All goats bred in 2025 onwards in a managed system must have individual electronic (eID) tags. Unmanaged rangeland goats only need a farm identity code. Using eID allows producers to collect more production-orientated data to help management decisions. This data could include animal age, weights at strategic time points, medicine use, etc. The managed herds also apply a shorter joining period (6 wks), allowing for more uniform-aged kids at weaning, better planned marketing according to weight, etc., thereby creating more productive enterprises. Challenges include large properties, which make a clean muster challenging, resulting in bucks escaping and breeding out of cycle, cost of mustering (helicopter, motorbikes, labour) and processing of the goats.

Effect of litter size on growth of Boer goat kids

Hoffman, LC^{1,2} louwrens.hoffman@uq.edu.au Cozzolino, D².

1. Department of Animal Sciences, Faculty of Agrisciences, University of Stellenbosch, South Africa.

2. Centre for Nutrition and Food Sciences, Queensland Alliance for Agriculture and Food Innovation (QAAFI), The University of Queensland. Australia.

KEY WORDS: LITTER SIZE, BOER GOATS, GROWTH RATES.

It is common for goats to birth more than one kid, with twins and larger litter numbers. However, information on the effect of litter size on the kids' growth pre- and post-weaning is lacking in Australia. The data presented in this study is from a small teaching Boer goat herd maintained on irrigated pastures. Although not a stud, over generations, the genetic composition has become more pure, as a pedigree Boer goat buck has been used in each breeding cycle. Boer goat kids born to 17 does (August 2023) were weighed at birth and at weaning (November 2023), and their post-weaning growth (January 2024) was determined. Two of the quadlets and one triplet were born dead (weights not determined); all the other kids survived during the growth period reported, no single females born. The data is too limited to do any statistical comparison, thus trends are reported and discussed. The single births were heavier than the multiples, although the birth weights of twins and triplets at birth were similar. The average birth weight of the does (4.15 ± 0.815 kg) was heavier than the bucks (3.70 ± 1.164 kg). The kids were weaned at an average age of 74 days. The weaner does weighed 22.7 ± 4.288 kg, and the weaner bucks weighed 25.5 ± 5.615 kg. On average the young bucks (222.0 ± 31.351 g/day) grew faster than the young maidens (194.6 ± 35.532 g/day), though a doe (twin birth) had the highest ADG of 291.4 g/day.

Validation of Digital and Optical Brix Refractometers for Assessing Passive Immunity in Goat Kids

Leao JM¹ juliana.merghleao@scl.com and Renaud DL²

¹ The Saskatoon Colostrum Company Ltd., Saskatoon, Saskatchewan, Canada S7K 6A2.

² Department of Population Medicine, University of Guelph, Guelph, ON, Canada, N1G 2W1.

KEY WORDS: COLOSTRUM, GOAT KIDS, IgG TRANSFER

The objective of this study was to validate digital and optical Brix refractometers for assessing passive immunity in goat kids. Blood samples were collected 30 hours post-colostrum from 145 kids fed either bovine colostrum replacer (CR) or goat colostrum enriched with CR. Serum IgG, determined by radial immunodiffusion, served as the gold standard, with <15 g/l indicating failed transfer of passive immunity (FTPI). Brix % was measured twice using a digital refractometer and once with an optical refractometer on the same serum samples. Pearson correlation coefficients (*r*) assessed relationships between IgG, digital Brix %, and optical Brix %, while regression models evaluated differences by colostrum type. Mean (\pm SD) IgG, digital Brix % (first and second measurements), and optical Brix % were 19.8 ± 5.9 g/L, $8.8 \pm 0.9\%$, $8.6 \pm 0.8\%$, and $8.2 \pm 1.0\%$, respectively. Repeated digital Brix % measurements were highly correlated ($r=0.84$), as were digital and optical Brix % ($r= 0.83$). Both refractometers showed moderate correlations with IgG (digital: $r= 0.62$; optical: $r= 0.65$), with no differences in correlation identified by colostrum type fed ($p > 0.30$). Overall, 17.9% of kids had FTPI. Youden's index, which maximizes combined sensitivity and specificity, identified a Brix % cutpoint of 7.9%, but sensitivity (28–56%) and specificity (10–25%) were poor. Digital and optical Brix refractometers moderately correlated with IgG in goat kids but had limited diagnostic accuracy for FTPI.

Effect of Enriched Maternal Colostrum Versus Bovine Colostrum Replacer on Passive Immunity, Health, and Growth in Goat Kids

Leao JM¹ juliana.merghleao@scl.com and Renaud DL²

1 The Saskatoon Colostrum Company Ltd., Saskatoon, Saskatchewan, Canada S7K 6A2.

2 Department of Population Medicine, University of Guelph, Guelph, ON, Canada, N1G 2W1.

KEY WORDS: COLOSTRUM, BRIX %, IMMUNOGLOBULIN

The objective of this study was to evaluate differences in goat kids fed bovine colostrum replacer (CR) alone or maternal colostrum enriched with CR. At birth, kids were randomly assigned to CR (14% IgG) or maternal colostrum enriched with CR (ENR) to 30% Brix; both groups received 500 mL of colostrum within a mean (\pm SD) of 66 ± 40 minutes after birth. Blood samples at 30 hours after colostrum feeding measured serum IgG, and weekly weights and health scores were recorded along with antimicrobial treatments and mortalities. Mixed linear regression models assessed passive immunity and growth, while mixed logistic regression models evaluated health differences, with pen as a random effect. A total of 73 kids were enrolled in ENR and 69 in CR. Kids in ENR had higher birth weights (3.6 ± 0.6 kg vs. 3.2 ± 0.5 kg; $p < 0.001$), so birth weight was controlled as a confounder. CR-fed kids had lower serum IgG (-3.6 g/L; 95% CI: -5.7 to -1.5 ; $p = 0.001$) and higher odds of FTPI (< 15 g/l IgG) [Odds Ratio (OR): 6.8; 95% CI: 1.6 to 28.6; $p = 0.009$] and diarrhea at weekly weighing (OR: 5.0; 95% CI: 1.8 to 13.6; $p = 0.002$) compared to ENR. However, no differences were observed in average daily gain ($p = 0.15$), antibiotic treatments ($p = 0.30$), mortality ($p = 0.47$), respiratory disease ($p = 0.41$), and joint inflammation ($p = 0.17$). Enriching maternal colostrum with CR improved passive immunity and reduced diarrhea in goat kids, with no impact on growth or other health outcomes.

Somatic cell counts and causative agents of mastitis in dairy goats

Gancárová B¹ xgancarova@uniag.sk, barboragancarova@gmail.com, Mažuhová J³, Uhrinová M², Tvarožková K¹,
Mažuhová L², Tančin V^{1/2}

¹ Slovak University of Agriculture in Nitra, Faculty of Agrobiological Sciences, Tr. A. Hlinku 2, 94976 Nitra, Slovakia

² National Agriculture and Food Centre, Research Institute of Animal Production, Hlohovecká 2, 95141 Lužianky, Slovakia

³ Institute for Agricultural Engineering and Animal Husbandry, Vöttinger Str. 36, 85354 Freising, Germany

KEY WORDS: GOAT MILK, MASTITIS, SOMATIC CELLS, PATHOGENS.

The aim of the study was to investigate the relationship between somatic cell count (SCC) and mastitis pathogen presence in goat milk. Milk samples were collected in June (n= 198) and October (n= 110) at the half udder level from the dairy goat farm in Slovakia. SCC was measured using Fossomatic 7, and transformed into somatic cell score (SCS= $\log_2(\text{SCC}/100\,000) + 3$) to normalize the data. Pathogen presence was determined by bacterial culture, and colonies were identified by MALDI-TOF MS. A linear mixed model (PROC MIXED, SAS 9.4) was used to test the fixed effects of pathogen presence and udder half on SCS, separately for each month. The goat was treated as a random subject to account for the correlation between udder halves. Pathogen presence had a significant effect on SCS ($p < 0.0001$) in June, whereas no significant effect was observed in October ($p > 0.05$). Of the total, 12.6% (June) and 24.5% (October) of samples were bacteriologically positive. The most common pathogens were *Staphylococcus spp.*, especially *non-aureus staphylococci* and *mammaliococci* (NASM), with *Staphylococcus (S.) caprae* being the most prevalent. Only three samples were tested positive for *S. aureus*. In conclusion, monitoring SCC and conducting bacteriological examinations of milk with high SCC are key tools to reduce mastitis risk and ensure quality milk production in goats. However, the causes of high SCC variability, especially in late lactation goats, remain unclear and are under investigation.

A complex neurological case in an extensive goat farm

Quílez P^{1,2} pquilez@unizar.es, Villanueva-Saz S^{1,2}, Ortín A^{1,2}, Lopez M³, Climent M^{2,4}, Lacasta D^{1,2}, Gómez A^{1,2}, Ruiz de Arcaute M^{1,2}.

1 Animal Pathology Department, Veterinary Faculty, University of Zaragoza, Miguel Servet 177, 50013 Zaragoza, Spain.

2 Small Ruminant Clinical Service, Veterinary Faculty, University of Zaragoza, Miguel Servet 177, 50013 Zaragoza, Spain.

3 Department of Anatomy, Embryology, and Animal Genetics. Veterinary Faculty, University of Zaragoza, Miguel Servet 177, 50013 Zaragoza, Spain

4 ADS La Pebralbina, cheste, nº 5, 6 6 46164, Pedralba, Spain.

KEY WORDS: GOATS, PLANT INTOXICATION, SPARTIUM JUNCEUM , COENURUS CEREBRALIS.

A complex neurological syndrome was investigated in a goat herd under extensive farming in Sot de Chera, Valencia, Spain. Two goats were referred to the Ruminant Clinical Service at the University of Zaragoza after recurrent seasonal outbreaks of neurological signs, including prostration, tremors, and convulsions in spring. Historical cases included similar mortalities.

One goat exhibited severe neurological signs, such as head tilt, seizures, and abnormal menace responses, suggesting paradoxical vestibular syndrome. CT imaging revealed a well-demarcated cerebellar lesion, confirmed post-mortem as *Coenurus cerebralis* with forebrain axonal degeneration. The second goat showed milder symptoms, with lab results indicating hepatic damage. Necropsy revealed granulomatous pneumonia, hepatobiliary parasitic nodules, and intact *Spartium junceum* seeds in the digestive tract.

Findings implicated *Taenia multiceps* larvae as the primary cause of neurological signs in the first goat, while plant toxicosis (*Cistus spp.* and *Spartium junceum*) was widespread in the flock. Recovery following grazing adjustments supported toxicity involvement. This study emphasizes integrated diagnostics for neurological syndromes in extensive farming, considering parasitic and toxic causes.

Detection of antibodies against *Mycobacterium avium* subsp. *paratuberculosis* by ELISA - do cut-offs for cattle work in goats?

Köhler H¹ heike.koehler@fli.de, Burkert B¹, Pickrodt C¹, Klassen A²

¹ National Reference Laboratory of Paratuberculosis, Institute of Molecular Pathogenesis, Friedrich-Loeffler-Institut, Jena, Germany.

² Thuringian Animal Diseases Fund, Jena, Germany.

KEY WORDS: ANTIBODIES, ELISA, GOAT, *MYCOBACTERIUM AVIUM SUBSP. PARATUBERCULOSIS*, TEST CHARACTERISTICS

In Germany, four different ELISA test kits for the detection of antibodies against *Mycobacterium avium* subsp. *paratuberculosis* (MAP) have a marketing authorization. The cut-off values of these ELISAs for goats are derived from cattle. In this study we checked whether they need to be modified for the examination of goat sera.

Altogether, 291 sera from adult goats (156 MAP-negative and 135 MAP-positive) were examined. The animals paratuberculosis status was defined based on herd tests and detection of MAP in fecal samples taken in parallel. Antibodies against MAP were determined with four different ELISAs (A, B, C, D).

When the criteria for test interpretation defined in the instructions for use were applied, three of the ELISAs achieved already a diagnostic specificity (Sp) of 100 % (ELISA A, B, D), while ELISA C reached 99.4 %. The diagnostic sensitivity (Se) ranged from 45.2 % (A) to 52.6 % (D). Receiver operator curve (ROC) characteristics and area under the curve (AUC) values indicated, that the four ELISAs had different test characteristics. The highest AUC, i.e. the best balance between Se and Sp, was found for ELISA C. Optimization of the cut-off values by ROC analysis resulted in a slightly increased Se of ELISA A, B and D while maintaining the Sp of 100 %. In contrast, adjustment of Sp of ELISA C to 100 % resulted in a slightly reduced Se.

Altogether, application of the optimized cut-off values would result in an improved test performance of the ELISAs in goat sera.

Enhancing CO₂-based ventilation estimates in goat barns: introducing a day-night activity parameter

Celozzi S stefania.celozzi@unimi.it, Mattiello S, Farimbella S, Rapetti L and Finzi A.

Department of Agricultural and Environmental Sciences, University of Milan, Via Celoria 2, 20133 Milano, Italy.

KEY WORDS: GOAT ACTIVITY PARAMETER, CO₂ BALANCE METHOD, BARN VENTILATION FLOW

Gas emissions in naturally-ventilated barns are usually estimated from ventilation rates, with the CO₂ balance as indirect method for daily estimates. Adding an animal activity parameter improves hourly accuracy. This study addresses the current gap on day and night activity parameters for estimating barn ventilation flow in goat farms, based on indoor CO₂ concentrations, and provides new insights into goat activity patterns. Animal activity was indirectly monitored by video recording on three dairy goat farms in northern Italy. The videos were analysed every 15 minutes using a scan sampling method, to compile an ethogram of the main states and point behaviours. The percentage of active animals (i.e., performing feeding, moving, and drinking behaviours) was calculated for each scan and normalized to the daily average, to obtain an hourly activity value. The average, minimum, and maximum annual hourly activity levels were then determined separately for daytime (06:00–20:00) and nighttime (21:00–05:00). The mean annual activity parameters (i.e., variation of maximum and minimum activity from average) for day and night was 0.46 and 0.70, respectively. These parameters were included as constants in the sinusoidal dromedary model (which also includes a sine function to represent the periodic daily cycle, and a parameter to account for the time of day when activity is at its minimum) to estimate the relative animal activity.

The effect of somatic cells, farms and breeds on milk yield and its composition in dairy goats

Tanin V^{1,2} vladimir.tancin@uniag.sk, Gancárová B¹, Mauhová J³, Uhrinová M², Tvarožková K¹, Mauhová L².

1 Slovak University of Agriculture in Nitra, Faculty of Agrobiological Sciences and Food Resources, Tr. A. Hlinku 2, 94976 Nitra, Slovakia.

2 National Agriculture and Food Centre, Research Institute of Animal Production, Hlohovecká 2, 95141 Lužianky, Slovakia.

3 Institute for Agricultural Engineering and Animal Husbandry, Vöttinger Str. 36, 85354 Freising, Germany.

KEY WORDS: GOAT, SOMATIC CELLS, MILK, COMPOSITION,

Mastitis in dairy goats affects milk yield, composition, and even technological properties for dairy production. The number of somatic cells (SCC) in milk indicates udder health, and the use of SCC in goat farm management is still debated. This study investigated the possible relationship between SCC, milk quantity, its composition, and the effect of different farms and breeds. Eleven farms, with three breeds - White Shorthaired goat (WSH), Anglo-Nubian (AN) and Alpine goat (AL) were included, in total 1511 test days records (565 goats) from 2021 to 2023. Milk yield per day, milk components (fat, protein, lactose), and SCC were evaluated. Based on SCC, goats were divided into four SCC groups from lowest (SCC1-up to 0.5×10^6 ml⁻¹) to highest (SCC4 - above 2×10^6 ml⁻¹). SCC and milk composition were measured using Fossomatic 7 and MilcoScan, with SCC transformed into somatic cell score ($SCS = \log_2 (SCC / 100\,000) + 3$). SCC groups significantly influence milk yield (SCC1: 3.76 ± 1.43 kg to SCC4: 2.88 ± 1.06 kg), fat (SCC1: $3.86 \pm 1.32\%$ to SCC4: $4.02 \pm 1.46\%$), protein (SCC1: $3.32 \pm 0.62\%$ to SCC4: $3.43 \pm 0.78\%$) and lactose (SCC1: $4.46 \pm 0.34\%$ to SCC4: $4.15 \pm 0.35\%$). The AL and AN had significantly lower SCS than WSH. The significant effect was also calculated for farms (SCS from 5.55 ± 1.87 to 7.15 ± 1.06). In conclusion, regular SCC monitoring should be incorporated into dairy goat management to improve udder health, milk production efficiency, and goat welfare.

Quantification of visual responses of goats using deep learning-based image analysis

Iwai K iwai.kouhei.84h@st.kyoto-u.ac.jp, Sawada R, Setoguchi A, Kumagai H, Tsukahara Y and Oishi K.

Laboratory of Animal Husbandry Resources, Division of Applied Biosciences, Graduate School of Agriculture, Kyoto University, Kyoto 606-8502, Japan.

KEY WORDS: ANGLE OF SIGHT, BEHAVIOR, DEEP LEARNING, IMAGE ANALYSIS.

Methods for analyzing image data to evaluate animal behavioral status remotely are widely investigated. Such methods can offer advantages over traditional visual observation which is often labor-intensive and prone to bias by observers. In particular, deep learning-based image analysis is an effective way to quantify animal behavior. In farm animals such as goats, vision plays a key role in cognition, which might determine their behavioral responses when they face to other subjects. Therefore, the angle of sight evaluated through image analysis can be a useful indicator for assessing the changes in their vision. In this study, we developed a method to quantify the angle of sight of goats using a deep learning-based tracking tool in order to evaluate visual responses to their visual subject. Three goats, each faced with a companion in different pairs in a test area, were video recorded, and their key body parts were tracked by image analysis. Then, the angle of sight was quantified based on their head orientation. We evaluated the degree of agreement between classified vision categories by image analysis and visual observation, resulting in a high degree of agreement with an overall accuracy exceeding 90%. Moreover, the angle of sight varied by different pairings, suggesting that social relationships among individuals may relate to their visual responses. These results highlighted the potential of the image analysis method to understand visual cognitive responses in animals.

Somatic cells in goat milk: milk production and its composition

Mauhová L¹ lucia.macuhova@nppc.sk, Gancárová B², Mauhová J³, Uhrina M¹, Tvarožková K², Tanin V^{1,2}

1 National Agriculture and Food Centre, Research Institute of Animal Production, Hlohovecká 2, 95141 Lužianky, Slovakia.

2 Slovak University of Agriculture in Nitra, Faculty of Agrobiological Sciences and Food Resources, Tr. A. Hlinku 2, 94976 Nitra, Slovakia.

3 Institute for Agricultural Engineering and Animal Husbandry, Vöttinger Str. 36, 85354 Freising, Germany.

KEY WORDS: GOAT, MILK YIELD, MILK COMPOSITION.

Udder disease, specifically mastitis in dairy goats, affects milk yield, composition, and even the technological properties important for dairy production. The aim of this study was to evaluate somatic cell counts (SCC) in milk and assess their effects on milk yield and composition. The study was conducted on a dairy goat farm (N= 99; breeds: White Shorthair, Brown Shorthair). Milk yield recording and milk sample collection were performed in June during morning milking. SCC was measured using Fossomatic devices. Based on the individual SCC in milk, samples were divided into four groups: G1: $<500 \times 10^3$ cells/ml, G2: 501 – 1000×10^3 cells/mL, G3: 1001 – 2000×10^3 cells/ml, G4: $>2001 \times 10^3$ cells/ml. The fixed effect of the SCC group on milk yield and composition was tested using a linear mixed model (PROC MIXED, SAS 9.4; SAS Institute Inc., Cary, NC, USA). The distribution (%) of samples among the groups was 51:22:19:8 (G1:G2:G3:G4; respectively). Although SCC groups did not significantly affect milk yield and composition, a negative effect was observed, with milk yield decreasing from 582 mL (G1) to 358 mL (G4), as well as a reduction in lactose content. Fat and protein content showed a slight increase. In conclusion, although the effect of somatic cells on milk yield and composition was not statistically significant, SCC should still be considered an important source of regular information for farmers to manage effective milk production.

Molecular epidemiology of cryptosporidiosis on goat farms in Gran Canaria, Canary Islands (Spain)

Del Río MC¹ mariacristina.delrio@ulpgc.es, Martín S¹, Quílez J², Molina JM¹, Ferrer O¹, Molina JA¹, Melián A³ and Ruiz A¹

¹ Department of Animal Pathology, Faculty of Veterinary Sciences, University of Las Palmas de Gran Canaria (ULPGC), 35413 Arucas, Las Palmas, Spain;

² Department of Animal Pathology, Faculty of Veterinary Sciences, University of Zaragoza, 50013 Zaragoza, Spain;

³ Instituto Universitario de Investigaciones Biomédicas y Sanitarias (IUIBS), University of Las Palmas de Gran Canaria (ULPGC), 35016 Las Palmas, Spain

KEY WORDS: CRYPTOSPORIDIUM, SHEEP, GOAT, ZONOSIS, QUESTIONNAIRE, RISK FACTORS

The aim of this study was to analyse and characterize *Cryptosporidium spp.* in goats in Gran Canaria (Spain), and to identify risks and economic factors related to the disease. During sampling a semistructured survey was conducted with farmers, and faecal samples were collected from goat kids and adult goats from a total of 15 farms. Adult samples were examined microscopically for the presence of *Cryptosporidium spp.* oocysts, with only one positive samples being found in goats. PCR of the SSU rRNA gene was performed on all juvenile and adult samples, and positive samples from kids (23.3%) and goats (2.5%) were subjected to sequencing, detecting three of the most important species in small ruminants: *C. parvum*, *C. xiaoi* and *C. ubiquitum*. By sequencing GP60 PCR products, two subtypes of *C. parvum* belonging to the IId family were identified, IIdA16G1 and IIdA23G1, with the latter being the most frequent. Although the prevalence of the disease was not very high, the zoonotic potential of *C. parvum* and the limited awareness of the parasite among farmers make surveillance and health education focused on the control of this Apicomplexa necessary.

Colostrum quality and bacterial contamination in pooled samples from commercial dairy goat farms

Fernanda Zamuner fernanda.zamuner@unimelb.edu.au

The University of Melbourne, Faculty of Science, Parkville Campus, Victoria 3010 Australia.

KEY WORDS: COLOSTRUM MANAGEMENT, COLOSTRUM COMPOSITION, COLOSTRUM MICROBIAL LOAD, RUMINANT NEONATES, COLOSTRAL BRIX.

Pooling colostrum from multiple goats helps balance nutritional and immunological variability, but careful selection is crucial to maintain quality and prevent bacterial contamination. This study analyzed colostrum pools over six days from four commercial farms. Goats were grouped based on individual colostrum Brix (<21%= LB, 21%= HB) to form two distinct pools, sampled in both AM and PM sessions. Pooled colostrum samples (n= 83) were analysed for Brix, protein, fat, lactose, and bacterial contamination.

Mean Brix was higher in HB than LB (19.9 vs. 16.1%, $p < 0.001$), yet only 63% of HB pools met the 21% Brix target. Brix showed strong correlations with protein ($r = 0.96$, $p < 0.001$) and fat ($r = 0.72$, $p < 0.001$). HB pools had higher protein (12.4 vs. 9.4%, $p < 0.001$) and fat (7.1 vs. 6.0%, $p < 0.01$) but lower lactose than LB pools (3.2 vs. 3.5%, $p < 0.01$). No significant differences were observed between AM and PM pools; however, farm significantly affected Brix and nutritional content.

Although few samples exceeded coliform (2.4% >10 CFU/mL) and *E. coli* (7.3% $>10^3$ CFU/ml) thresholds, all surpassed the total bacterial count threshold ($>10^3$ CFU/ml). This suggests that while fecal pathogens are relatively controlled, overall bacterial contamination remains a concern. Further studies are needed to identify the bacterial species contributing to the high total counts and assess their potential impact on neonatal health.

Suitability of an infrared thermometer and a finger pulse oximeter to assess animal welfare in dairy goats

B. Sosa-Marrero, A. Morales-de la Nuez, A. Argüello, N. Castro, L.E. Hernández-Castellano and M. González-Cabrera marta.gonzalezcabrera@ulpgc.es.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: HEALTH MONITORING, WELFARE, PRECISION FARMING, NON-INVASIVE, ON-FARM TOOLS.

Heart and respiratory rates provide relevant information about the animal health and welfare. These parameters are commonly recorded using a stethoscope which requires animal handling leading to stress. Given the importance of these physiological parameters, the present study aimed to validate a non-invasive method for measuring heart and respiratory rates using a human finger pulse oximeter. This study used 56 healthy Majorera dairy goats between the fifth and sixth month of lactation. Heart and respiratory rates were recorded using simultaneously a stethoscope and a finger pulse oximeter placed in the right teat. The Pearson correlation coefficient was determined using the CORR procedure of SAS 9.4 and the statistical significance was set as $p < 0.05$. Results showed a high correlation between the pulse oximeter heart rate and stethoscope heart rate ($r = 0.829$; $p < 0.001$). However, the finger pulse oximeter was not able to record the respiratory rate and consequently no correlation was established. In conclusion, this study demonstrates that the pulse oximeter technology is a promising tool for measuring heart rate in dairy goats. Future research should focus on developing an appropriate non-invasive tool to accurately determine respiratory rate in these animals and to assess its practical applications and suitability for health and welfare status monitoring.

Small Ruminant Hoof Inspection as an Animal Welfare Indicator: A Study in Gran Canaria

M.A. Pérez-Santana, M. González-Cabrera marta.gonzalezcabrera@ulpgc.es, J.F. de la Nuez-Socorro,
L.E. Hernández Castellano, A. Morales-de-la-Nuez, M. Betancor-Sánchez, N. Castro, A. Argüello.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: HOOF CONFORMATION, GOATS, SHEEP, INFRARED THERMOGRAPHY, SLAUGHTER.

Hoof conformation in small ruminants is a critical yet often overlooked factor influencing welfare and productivity. This study evaluates hoof morphology and temperature in 81 adult female sheep (n= 49) and goats (n= 32) from different farms in Gran Canaria. Parameters assessed include claw shape, claw splay, toe length, heel shape, fetlock shape, interdigital temperature, and joint temperature. Data were analyzed using Kruskal-Wallis and ANOVA tests. Significant species-related differences ($p < 0.05$) were observed in claw shape, claw splay, age, and interdigital temperature. Sheep exhibited better hoof conformation than goats, with fewer twisted claws (16.3% vs. 32.8%). Animals slaughtered under Halal protocols had a better hoof structure compared to those in conventional systems ($p < 0.01$), with reduced overgrowth and claw deformities. Infrared thermography revealed higher interdigital temperatures in sheep ($T= 4.1^{\circ}\text{C}$) and conventionally slaughtered animals ($T= 3.4^{\circ}\text{C}$), possibly suggesting the presence of inflammation. These findings underscore hoof morphology as a key welfare indicator, highlighting management and selection practices as critical factors in welfare optimization. Future research should refine scoring methodologies and explore the relationship between hoof conformation and locomotor pathology.

Colour and Shape Preferences in Goat Kids: Implications for Environmental Enrichment, preliminary results

Moreno Santana, G., González Cabrera, M., Morales de la Nuez antonio.moralesdelanuez@ulpgc.es, A.,
Hernández Castellano L.E., Betancor Sánchez, M., Castro, N., Argüello, A.

IUSA-ONEHEALTH 4, Animal Production and Biotechnology group, University Institute of Animal Health and Food Safety (IUSA), Universidad de Las Palmas de Gran Canaria, Campus Montaña Cardones, 35413 Arucas, Spain.

KEY WORDS: GOAT BEHAVIOR, ENVIRONMENTAL ENRICHMENT, ENVIRONMENTAL PREFERENCE, ANIMAL WELFARE, NOVEL OBJECT TEST

Environmental enrichment plays a crucial role in promoting natural behaviors and improving welfare in farm animals. This study investigates the colour and shape preferences of Majorera goat kids (*Capra aegagrus hircus*) to enhance enrichment strategies. Six goat kids (five females, one male) underwent a novel object test using six 3D-printed objects combining two colours (green, purple) and three shapes (sphere, cube, cylinder). Behavioral responses were recorded in an 8×2 m pen, measuring time spent in the No Interest and Interest Zones, contact duration, and frequency of interactions. Statistical analyses, including the Kruskal-Wallis test and Mann-Whitney U test, identified significant preferences for purple objects ($p= 0.027$) and spherical shapes ($p= 0.001$). Goat kids spent more time in the Interest Zone with spheres than with cubes or cylinders ($p < 0.05$). However, neither colour nor shape significantly affected contact duration or interaction frequency ($p > 0.05$). These findings highlight the potential of incorporating spherical, purple objects in goat enrichment programs. Future research should explore the impact of these preferences on cognitive stimulation and welfare outcomes in larger populations.

Comparative antimicrobial activity of goat cathelicidins SC5 and Bactenecin 3.4 against *E. coli*

Reyes-delMoral, A.¹, Floren Zabala, L.², Velázquez Miranda, D.², Martel Benítez, C.³, Hernández Castellano, L.E.¹, Castro N.¹, Argüello, A.¹, Morales de la Nuez antonio.moralesdelanuez@ulpgc.es, A.¹, Martín Barrasa, J.L.^{3,4}

1 IUSA-ONEHEALTH 4, Animal Production and Biotechnology group, University Institute of Animal Health and Food Safety (IUSA), Universidad de Las Palmas de Gran Canaria, Campus Montaña Cardones, 35413 Arucas, Spain.

2 Servicio de microbiología, Hospital Universitario de Gran Canaria Dr. Negrín. Instituto de Investigación Sanitaria de Canarias. Barranco de la Ballena s/n, 35019, Las Palmas de Gran Canaria, Spain.

3 Group of Fish health for aquaculture and wild species, Infectious diseases and Food safety, University Institute of Animal Health and Food Safety (IUSA), University of Las Palmas de Gran Canaria, 35416, Arucas, Spain.

4 Animal Facility, Research Unit, Hospital Universitario de Gran Canaria Dr. Negrín, Fundación Canaria del Instituto de Investigación Sanitaria de Canarias (FIISC), Barranco de La Ballena s/n, 35019, Las Palmas de Gran Canaria, Spain.

KEY WORDS: CATHELICIDIN, HOST DEFENCE PEPTIDE, INNATE IMMUNITY

The innate immune system is the first line of defence against pathogens. Among these, host defence peptides (HDP) play a crucial role as they have direct antimicrobial activity and modulate the immune response. Cathelicidins are a well-known HDP found in most vertebrates, including goats. These peptides contribute to the immune system by targeting a broad spectrum of microorganisms and are involved in immune regulation. Cathelicidins are structurally diverse and are classified according to the secondary structure of their mature peptides, including -helices, -hairpin structures, and elongated forms rich in proline-arginine or tryptophan. Their genes are typically organised in genomic clusters. The goat has seven cathelicidins, several of them have been tested as antimicrobial agent. For example, the bactenecin 3.4 showed an activity against several microorganisms. However, no information is available about the antimicrobial activity of SC5 goat cathelicidin. The aim of this study was to test the cathelicidin SC5 and compare it with the Bactenecin 3.4. These two peptides have been tested against a panel of forty-eight *E. coli* isolated from human urine system. The SC5 showed a MIC₅₀ of 3.125 µM and a MIC₉₀ of 50 µM, while Bactenecin 3.4 have 25 and 50 µM, respectively. The SC5 presented a MBC₅₀ of 3.125 µM and a MBC₉₀ of >50 µM, while Bactenecin 3.4 have 25 and >50 µM, respectively.

Goats' Sensory Responses to Colour and Shape: Preliminary results

Gutierrez Exposito, YN; Morales de la Nuez, A; González-Cabrera, M; Hernández-Castellano, LE; Castro, N noemi.castro@ulpgc.es and Argüello, A

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: SENSORY DEVELOPMENT, ENVIRONMENTAL ENRICHMENT, BEHAVIOUR

Goat's adaptation to the environment is well known due to their sensory development. In the wild, these animals face numerous stimuli and challenges that require them to have strong adaptive capacities. However, in captivity, they may experience boredom or frustration, which can lead to stereotypic behaviors.

The objective of this study was to observe and provide a comprehensive analysis of the preferences shown by adult goats towards different colours and shapes used as environmental enrichment. To do that, 17 multiparous lactating dairy goats were used to test six enrichment designs consisting of three shapes (cylinder, cube and sphere) of two different colours (green and purple). Each design was introduced in the barn for three minutes and video was recorded to measure the number of contacts and time spent by the goats in the different areas (low, medium and high interest). Despite the longer interaction with the purple shapes, the goats spent more time in the high interest area of the pen when the green shapes were introduced. Thus, it cannot be concluding a clear preference or rejection towards the colour or shape used. However further research using a larger number of animals for a longer time and different shapes and colours would be necessary to improve the knowledge and apply it to the environmental enrichment in caprine farms.

Assessing IgG Concentration in Goat Colostrum: A Comparative Analysis of Techniques

García Guillén, A; González Cabrera, M; Argüello, A; Hernández Castellano, LE;
Morales de la Nuez, A; Castro, N noemi.castro@ulpgc.es.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: IGG CONCENTRATION, REFRACTOMETRY, ELISA,

The quality of colostrum is essential to ensure effective transfer of passive immunity (TPI) in goat kids. Colostrum composition, including immunoglobulin G (IgG) concentration, can vary between herds and individuals. Therefore, determining IgG concentration is key to assessing colostrum quality. Various laboratory techniques, such as Radial Immunodiffusion and ELISA (considered the gold standard), are commonly employed to measure IgG levels. However, these methods have limitations, including the need for specialized equipment, significant time requirements, and high costs.

This study aimed to compare different methods for determining IgG concentration in goat colostrum and assess their suitability for on-farm application. Forty colostrum samples obtained from Majorera dairy goats were analyzed using ELISA, Clinical Refractometer (CR), Brix Refractometer (BR), and Instrumental Color (IC). Pearson and Spearman correlation tests were applied to variables with normal and non-normal distributions, respectively. Statistical significance was set at $p < 0.05$.

Results showed a strong correlation between BR and CR (0.91; $p < 0.001$). However, none of the studied methods demonstrated a satisfactory correlation with the ELISA results. Further testing with more samples would be needed to determine if any of the evaluated techniques can be used as alternative to the gold standard.

Chlorine Dioxide as an Alternative Sanitization Method for Goat Colostrum

Barrio García; P¹; Alayón Afonso, R²; Castro, N¹ noemi.castro@ulpgc.es; Martín Barrasa, JL^{2,3}; Hernández Castellano, LE¹; Morales de la Nuez, A¹

¹ IUSA-ONEHEALTH ⁴ Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

² Group of Fish health for aquaculture and wild species, Infectious diseases and Food safety, University Institute of Animal Health and Food Safety (IUSA), University of Las Palmas de Gran Canaria, 35413, Arucas, Spain.

³ Animal Facility, Research Unit, Hospital Universitario de Gran Canaria Dr. Negrín, Fundación Canaria del Instituto de Investigación Sanitaria de Canarias (FIISC), Barranco de La Ballena s/n, 35019, Las Palmas de Gran Canaria, Spain.

KEY WORDS: CHLORINE DIOXIDE, BACTERIAL GROWTH, SANITATION, IMMUNOGLOBULIN G.

Early intake of colostrum is essential for newborn goat kids to ensure the transfer of passive immunity, which is crucial to obtain protection against pathogens. To minimize the risk of pathogen transmission through colostrum sanitization treatments are needed. Heat treatments are widely used; however, it causes immunoglobulin G (IgG) reduction. This study approaches the efficacy of chlorine dioxide (ClO₂) at two different doses as an alternative to conventional sanitization methods. The objective was to assess the effect of ClO₂ on bacterial growth and (IgG) concentration in goat colostrum. To do that, 15 colostrum samples obtained from Majorera dairy goats were divided into four groups: untreated colostrum (control), colostrum heated at 56 °C for 1 hour, colostrum treated with chlorine dioxide at 400 g/l, and colostrum treated with ClO₂ at 800 g/l. The main bacterial groups and the IgG concentration were analysed. Heat treatment (56 °C for 1 hour) significantly reduced the bacterial population, while bacterial counts in untreated colostrum and colostrum treated with chlorine dioxide at either studied dose were similar. In addition, the IgG concentration was reduced in all treated samples compared to those untreated. The findings suggest that the addition of chlorine dioxide at 400 or 800 g/l to goat colostrum is ineffective in reducing bacterial populations or maintaining optimal IgG concentration.

Ozone as a Sanitizing Agent for Goat Colostrum: Microbiological and Immunological Impact

R. Alayón Afonso^{1,2}, González Cabrera M.³, Morales de la Nuez A.³, Hernández Castellano L.E.³, Argüello A.³, Castro N.³, Martín Barrasa J.L.^{1,2} tacho@ulpgc.es.

1 Univ Las Palmas Gran Canaria, Univ Inst Anim Hlth & Food Safety IUSA, Grp Fish Hlth aquaculture & wild species, Infect Dis & Food safety, Arucas 35416, Spain.

2 Hosp Univ Gran Canaria Dr Negrin, Res Unit, Anim Facil, Barranco Ballena S-N, Las Palmas Gran Canaria 35019, Spain.

3 IUSA-ONEHEALTH 4, Animal Production and Biotechnology group, Instituto de Sanidad Animal y Seguridad Alimentaria, Universidad de Las Palmas de Gran Canaria, Campus Montaña Cardones, 35413 Arucas, Spain.

KEY WORDS: GOAT COLOSTRUM, OZONE TREATMENT, THERMIZATION, BACTERIAL LOAD, IMMUNOGLOBULIN G, PASSIVE IMMUNITY

Passive transfer of immunity via colostrum is essential for neonatal goat survival, but bacterial contamination poses health risks. This study evaluates the efficacy of ozonated sunflower oil (600 and 1200 mM/ml) compared to thermal treatment (56 °C, 60 min) in reducing bacterial load while preserving immunoglobulin G (IgG) concentrations. Colostrum samples (n= 15) from Majorera goats were divided into four groups: untreated (ST), thermized (PAST), ozonated at 600 mM/ml (O600), and 1200 mM/ml (O1200). Microbial analysis was performed on selective and non-selective media, while IgG levels were assessed via ELISA. Thermization significantly reduced total bacterial counts ($p < 0.01$), whereas ozonation showed only partial effectiveness (non statistical effects). Enterobacteria and Staphylococcus spp. were significantly lower in PAST compared to ST, O600, and O1200 ($p < 0.05$). IgG concentrations were similar in treated groups (PAST: 30.9 mg/ml, O600: 33.2 mg/ml, O1200: 31.3 mg/ml) but lower than ST (45.3 mg/ml, $p < 0.001$). These results suggest that while ozonation preserves IgG levels, it lacks sufficient bactericidal efficacy, making thermization the preferred method for colostrum sanitization. Further research should refine ozonation protocols for improved microbial control.

Morphological, Genetic and Population Characteristics of *Haemonchus* species isolated from Goats in Nigeria

Makun HJ^{1,2,3*} hmakun@abu.edu.ng; hussainamakun@gmail.com, Abdulganiyu K.³, Periasamy K.⁴, Woziri, AO.⁵, Ajanusi, JO.³, Sani, I.², Alawa CBI.⁶ and Pichler, R.⁴

1 National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Zaria Nigeria.

2 Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology (ACENTDFB), Ahmadu Bello University, Zaria Nigeria.

3 Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria - Nigeria.

4 Animal Production and Health Laboratory, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, International Atomic Energy Agency, Vienna, Austria.

5 Department of Veterinary Microbiology, Ahmadu Bello University, Zaria - Nigeria.

6 Faculty of Veterinary Medicine, University of Abuja, Abuja-Nigeria* Corresponding author: hussainamakun@gmail.com

KEY WORDS: HAEMONCHUS SPP, GOATS, DEOXYRIBONUCLEIC ACID, POPULATION STRUCTURE, NIGERIA.

Haemonchus species are major gastro-intestinal helminths affecting the health of ruminants, with negative socioeconomic impacts on people globally. Despite its burden of infection of in ruminants, there is a dearth in knowledge of the diversity of *Haemonchus* circulating in livestock. This study therefore aimed to genetically characterize the population structure of *Haemonchus* species in goats in Nigeria. Adult worms were collected from abomasa of slaughtered goats in 14 selected abattoirs across all the agroecological zones (AEZ) of Nigeria to determine their morphological characteristics. Total gDNA was extracted to study the genomic characteristics of the cytochrome oxidase I (COX1), internal transcribed spacer 2 and beta tubulin genes, respectively. Sequences were used to elucidate the haplotype, diversity and genetic relationships of the *Haemonchus* species.

Morphologically, the helminths had Knobbed (52%), Linguiform (31%) and Smooth (16%) vulvar types ($p < 0.05$). The frequency of alleles associated with benzimidazole resistance was highest in *Haemonchus spp.* isolates in northern Nigeria, with low genetic differentiation and high gene flow among circulating *H. contortus* in Nigeria. Also, there was high genetic variability of the COX1 gene loci, with high intra-population nucleotide and haplotype diversity across the sampled AEZ in Nigeria. This study detailed the morphometric characteristics, genetic diversity and population structure of *Haemonchus spp.* in goats in Nigeria.

In vivo study on the preventive effect of a plant extract (Polifam™) against coccidiosis in goats

Molina, J.A. adrian.molinaferrer@outlook.es, Molina, J.M., Ferrer, O., Muñoz, M.C., Del Río, M.C., Guedes, A.C., and Ruiz, A.

Departamento de Patología Animal, Facultad de Ciencias Veterinarias, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, España.

KEY WORDS: ANTICOCCIDIAL ACTIVITY, PLANT EXTRACT, *E. NINAKOHLIYAKIMOVAE*, COCCIDIOSIS.

The aim of the present work was to evaluate the in vivo anticoccidial activity of a plant extract (Polifam) against *E. ninakohlyakimovae*, one of the most pathogenic goat *Eimeria* species causing coccidiosis. The animals included in the study (n= 20) were divided into experimental groups (G) (n= 5): G1, treated with Polifam and infected; G2, treated with decoquinate and infected; G3, non-treated and infected; G4, non-treated and non-infected. Polifam and decoquinate were given orally at doses of 150 mg/kg and 0.5 mg/kg BW, respectively. Treatments were daily administered since the reception of the animals (2-5 days of life) until the end of the study. Experimental infections were carried out orally at 4 weeks of life (day 0 of the experiment) with 1×10^5 sporulated oocysts of *E. ninakohlyakimovae*. Body weight and blood parameters were determined weekly for 5 consecutive weeks. Faecal samples were collected daily from day 0 until the end of the study (week 4 post-infection) for oocyst counts and determination of faecal consistency. The administration of Polifam had a slight preventive effect on *Eimeria* infection, which resulted in reduced oocysts excretion and faecal consistency, with this effect being more prominent in the decoquinate-treated group. No correlation with haematological results and body weight was found. Taken together, the results of the present study suggest that administration of Polifam to goat kids could be used as prophylactic against coccidiosis.

Impact of dietary copper levels on growth performance, blood profiles, and mineral deposition in French Alpine goats.

Sobrevilla-Hernández G¹, López-Puga JC², Pérez-Medina EB¹, Méndez-Zamora G³, Ramos-Zayas Y^{1,2}, and Kawas JR^{1,3*} jorge.kawasgr@uanl.edu.mx

1 MNA de México S.A. de C.V., Investigación y Desarrollo, Carretera Huinalá-Villa Juárez, km 59.6. Juárez, C.P. 67250, Nuevo León, México.

2 Universidad Autónoma de Nuevo León, Facultad de Medicina Veterinaria y Zootecnia, Av. Francisco Villa s/n, Colonia Ex-Hacienda El Canadá, General Escobedo, C.P. 66050, Nuevo León, México.

3 Universidad Autónoma de Nuevo León, Facultad de Agronomía, Av. Francisco Villa s/n, Colonia Ex-Hacienda El Canadá, General Escobedo C.P. 66050, Nuevo León, México.

KEY WORDS: GOATS, COPPER, HEALTH, BLOOD, MINERALS.

The aim of this study was to evaluate the effect of Cu levels in the diet of male goat kids at doses higher than those recommended by the NRC (2007) on productive and hematologic parameters, as well as mineral concentrations in the liver and feces. A total of 36 six-month-old French Alpine male kids were randomly assigned to one of six treatments: 0, 10, 20, 40, 80, and 160 ppm dietary Cu. Dry matter intake (DMI) exhibited a quadratic effect ($p=0.04$), with kids supplemented with 40 ppm of Cu achieving the highest DMI (915 g/day) on day 50. Quadratic effects were also observed in hematological parameters ($p<0.05$) on day 100. Blood triglyceride levels depended on Cu concentrations in the diet ($p=0.05$) on day 50. Albumin exhibited quadratic effects ($p=0.05$) on day 100. The deposition of Cu, Zn, Fe, and Mn in the liver increased ($p<0.05$) as dietary Cu supplementation increased. Copper excretion in the feces was dependent ($p<0.01$) on Cu concentrations in the diet. Supplementing high levels of Cu in male goat kids did not improve productive parameters; however, it had an effect on neutrophils and lymphocytes. The higher deposition of Cu, Zn, Mn, and Fe in liver may benefit the health of goat kids. Hepatic Cu accumulation and fecal Cu excretion increased proportionally with dietary intake, indicating that fecal Cu levels could serve as an early diagnostic tool for Cu intoxication in goats.

Salmonellosis in small ruminants in the Netherlands

SNIJERS-VAN DE BURGWAAL N.¹, HARKEMA L.¹, DIJKSTRA E.¹, TER BOGT- KAPPERT C.¹, VAN ENGELEN E.², VELLEMA P.¹,
VAN DEN BROM R.¹

KEY WORDS: SALMONELLOSIS, SMALL RUMINANTS, PATHOLOGY, ZONOSIS.

Since spring 2016, serious outbreaks of salmonellosis have occurred in dairy goat kids in the Netherlands. This study describes the clinicopathological characteristics of salmonellosis in small ruminants in the ten preceding years as a reference.

Salmonella spp. can cause disease in humans and several animal species, including sheep and goats. This analysis was conducted, since no overview was available of salmonellosis in small ruminants in the years preceding the outbreaks in kids.

Post-mortem examinations at Royal GD are performed according to standard operating procedures. Necropsy results were available of 8,246 small ruminant submissions over the period 2006-2016. Submissions in which salmonella was detected were further analysed.

Salmonella spp. were detected in 17 and 25 sheep and goat submissions, respectively. In sheep cases, various ages and organs were affected, and gastrointestinal disorders were the most common (44%), followed by abortion (36%). Key causal agents included *S. Typhimurium*, *S. Dublin*, and *S. diarizonae*. In goats, no cases were found between 2006 and 2013. From 2013 to 2016, 17 cases were diagnosed, and 15 of them involved kids with acute mortality and gastrointestinal disorders (88%) as the main findings. The main causal agent was *S. Typhimurium*.

Salmonellosis was only diagnosed in 0.5% of small ruminant submissions in the period 2006-2016. Severe outbreaks such as those that have occurred since 2016, should be carefully investigated.

NUTRITION AND PHYSIOLOGY

Use of agro-industrial byproducts rich in polyphenols in goat nutrition

Anna Nudda

Dipartimento di Agraria, University of Sassari, Viale Italia 39a, 07100 Sassari, Italy

Various nutritional practices can markedly impact the performance and the health status of goats. In recent years, there has been a growing interest in the use of locally produced agro-industrial by-products (AIBP) in animal nutrition because still contain important amounts of nutrients and are also source of bioactive compounds, such as polyphenols. These compounds can interact with rumen microbiota, biohydrogenation of unsaturated fatty acids, and carbohydrate and protein fermentation. Some studies highlighted antioxidant, anti-inflammatory and anti-microbial effects, and immunomodulatory activities, as well as anti-methanogenic properties. In this presentation, we analyze the latest scientific results on the use AIBP in dairy goat diets as those from industrial processing of grape, tomato, pomegranate, coffee, citrus, and beer production. The effects on milk production, on milk fatty acid profile, antioxidant parameters are discussed. Effect of AIBP on animal health status by monitoring hematological and biochemical parameters and milk somatic cells, as indicator of udder discomfort, will be also reported. The potential role of the AIBP to reduce methane production is considered. The expected beneficial effects of dietary polyphenols in animal diets could vary because the large variability in chemical composition, nutrient content, and storage issues. However, owing to the large quantities of local products available at low prices, the use in goats nutrition offers a convenient solution to the valorization of residues arising from agricultural activities, reducing feed costs for farmers, and conferring added value to dairy products, in a sustainable way.

Impact of indoor forage feeding strategies on utilisation in dairy goats: a collaborative effort between research and practitioners

Bluet B¹ bertrand.bluet@idele.fr, Caillat H², Boyer C¹, Puillet L³, Fanca B¹, Delagarde R⁴

1 French Livestock Institute, Institut de l'Élevage, 149 rue de Bercy, 75012 Paris, France.

2 INRAE, FERLus, Les Verrines, 86600 Lusignan, France.

3 Université Paris-Saclay, INRAE, AgroParisTech, UMR Modélisation Systémique Appliquée aux Ruminants, 91120 Palaiseau, France.

4 INRAE Institut Agro, PEGASE, 16 Le Clos, F-35590 Saint-Gilles, France.

KEY WORDS: FEEDING, REFUSALS, INTAKE, BEHAVIOUR.

In France, most goat farmers house their animals indoors for at least part of the year, feeding them often self-produced forages, variables in quality. Goats are sensitive to forage feeding methods, prompting farmers to seek guidance suited to diverse systems. To address this, a project combining research and farmers collaboration was undertaken. It included 2 online surveys and 8 focus group sessions with farmers and advisors to assess and update current recommendations. To support these updates, 11 trials evaluated the effects of various forage feeding strategies—frequency, order, and proportion of refusals—on goat behaviour and performance. Additionally, earlier studies were analysed to explore the impact of refusal proportion. Surveys revealed that farmers generally believe that increasing feeding frequency or proportion of refusals increases intake and production, while no consensus emerged on the optimal order when two forages are fed daily. The trials confirmed that greater refusal proportion enhances intake and diet quality, depending on the forage type. Feeding frequency had no impact on intake and production. Goats showed strong forage preference when two forages are fed daily, being able to wait for the preferred forage during hours every day. These findings encourage farmers to revisit their practices, showing that simplified management can align with technical performance.

Effects of Cysteine and methionine on Secondary Hair Follicle Growth and Hair Dermal Papilla Cell Proliferation in vitro in Yanshan Cashmere Goats

Ao Li, Jia Kang, Yingjie Zhang, Yueqin Liu, 15032109803@163.com

College of Animal Science and Technology, Hebei Agricultural University, Baoding 071000, China.

KEY WORDS: GOAT; CYSTEINE; METHIONINE; SECONDARY HAIR FOLLICLES.

Cysteine (Cys) and methionine (Met) have been reported to affect hair follicle growth in vitro. However, their effects on secondary hair follicle (SF) growth and periodicity in cashmere goats are rarely studied. The aim of this study was to investigate the effects of Cys and Met on the development of secondary hair follicles (SF) and the growth, proliferation, apoptosis, and the mRNA and protein expression of the keratin and related genes in cultured Yanshan cashmere goat hair papilla cells (DPCs). Secondary hair follicles were isolated from one-year-old goats, and DPCs were extracted, purified, and identified by enzyme digestion. DPCs were divided into control, Cys (20-100 g/ml), and Met (2-10 g/ml) groups. After 2 h of incubation, optimal concentrations for proliferation were determined using the CCK-8 kit. The mRNA and protein expression of genes related to proliferation, apoptosis, differentiation, keratin, and growth were analyzed by qPCR and Western blot. Results showed that Cys and Met significantly promoted DPC proliferation (up-regulated PCNA, CCND1, and CDK4; $p < 0.05$) and inhibited apoptosis (up-regulated Bcl-2 and down-regulated Bax, caspase-3, P21, and P53; $p < 0.05$). The optimal anti-apoptotic concentrations were 40 g/mL for Cys and 6 g/mL for Met. In conclusion, Cys and Met promote SF growth and DPC proliferation while inhibiting apoptosis in Yanshan cashmere goats, with potential applications in improving cashmere production.

Nutritional value of some shrub species as feed resource for goats in mountainous region of Tunisia

Ammar Hajer¹ hjr.mmr@gmail.com, Halimeh Zoabi², Soha Ghzayel², Bassam Abou Aziz².

¹ High School of Agriculture of Mogrnae, 1121, Mogrnae-Zaghouan Tunisia.

² High Agriculture School of Le Kef, University of Jendouba, Tunisia.

KEY WORDS: FODDER SHRUBS, FEED, LIGNIN, CONDENSED TANNINS, ANTIOXIDANT ACTIVITY, RUMINAL FERMENTATION, DIGESTIBILITY, IN VITRO

This research aims to determine the nutritional value of 5 fodder shrubs (*Pistacia lentiscus*, *Pistacia terebinthus*, *Phillyrea angustifolia*, *Phillyrea latifolia*, *Erica multiflora*), present in abundance in the mountain of Zaghouan, based on their chemical composition, anti-nutritional factors and measuring digestibility and gas production in vitro. The crude protein (CP) content varies from 5.4% (*E. multiflora*) to 8.1% (*Ph. latifolia*). The leaves of these shrubs have a high cell wall content. *Ph. latifolia* is characterized by the highest contents of neutral detergent fiber (NDF) and crude cellulose (6.4%) while *P. terebinthus* is characterized by the highest contents of acid detergent fiber (ADF) (47.5%) and lignin (43%). The results indicate that these shrubs show high tenures in secondary metabolites in particular total polyphenols (539 mg EAG/g MS in *P. terebinthus*), total flavonoids (121.7 ml EQ / g MS in *Ph. angustifolia*) and condensed tannins (11.7 mg EC/g MS in *P. lentiscus*). Moreover, it can be deduced that the most important AA is demonstrated by the leaves of *P. terebinthus* (50 µg/ml). Finally, the monitoring of the ruminal fermentation of these shrubs by the in vitro gas production technique shows that the values of metabolizable energy, digestibility of organic matter, total volatile fatty acids and volume of gas produced after 24 hours are higher in *Ph. latifolia*, making it the most digestible by ruminal microorganisms and with a faster rate.

Goats as model animals for neuroregenerative research. Invitation to discussion

Mikhailov A. mikhailov.andrey.fp@u.tsukuba.ac.jp

Center for Cybernetics Research, University of Tsukuba, Japan.

KEY WORDS: STEM CELLS, NEURONAL PROGENITORS, SPINAL CORD, POST MORTAL, CELL HARVESTING

Evolutionary information on species divergence times places pigs, goats and dogs at the same level of ~94 MYA from humans, but pigs are more readily accepted by research animal facilities than other human-sized animals. Rodent/Lagomorpha models are slightly closer to humans genetically (~87 MYA), but have clear disadvantages compared to goats in terms of body size, organ size and life expectancy, as well as metabolic, physiological and behavioural differences. The goat model is as balanced as we can get to humans without the major ethical constraints of primate models. In spinal cord research, the porcine spine has often been utilized for studies of degeneration and surgical approaches, whereas the caprine spine has mainly been used for fusion and TDR. In our laboratory, we study the post-mortem survival of neural progenitor cells in cadaveric goat spinal cords. We use an animal sharing approach with local farmers because it saves the lives of laboratory animals (in line with Replacement, Reduction and Refinement), as many tissues from farm animals that are inevitably sacrificed for food production are not normally used for food. It also allows us to work with a mature adult animal model without excessive husbandry and to increase farmers' profits, as goat spine has little commercial value otherwise. In this presentation, we discuss the applicability of the goat model for neuroregenerative research and provide estimates for optimal animal/breed selection.

The use of integrated Omics to understand Seasonal Weight Loss Tolerance in Dairy Goats

Almeida AM. aalmeida@isa.ulisboa.pt

1LEAF-Linking Landscape, Environment, Agriculture and Food Research Centre, Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa, Portugal

KEY WORDS: SEASONAL WEIGHT LOSS TOLERANCE, MAJORERA, PALMERA, DAIRY GOAT.

Seasonal weight loss (SWL) is a pressing issue in animal production. Animals selected in arid areas are adapted to SWL. Understanding the molecular mechanisms of SWL adaptation is important for animal selection. We studied the effect of SWL, in Dairy goats. In this presentation, a retrospective of the work conducted over the last 15 years is presented, highlighting major findings. We studied the mammary gland secretory tissue proteome, transcriptome and metabolome in two goat breeds from the Canary Islands with different levels of tolerance to SWL: Majorera (tolerant) and Palmera (susceptible). Goats of both breeds, same age and stage of lactation were divided into 2 groups (n=5): control and underfed. At day 22, mammary gland biopsies were extracted. An integrated Omics (Proteomics, Transcriptomics and Metabolomics) analysis was conducted. We found 96 proteins, 82 transcripts and 21 metabolites with differential accumulation. Omics integration separated nutritional groups and breeds. Metabolites served as hub molecules interacting with genes and proteins. Control goats upregulated protein synthesis, arginine catabolism and adipogenesis pathways linked to increased anabolism. In restricted goats, several biochemical pathways concurred to use alternative sources of energy other than glucose, particularly fatty acid and amino acids. Restricted Palmera upregulated expression of PEBP4 and GPD1 genes highlighting their role as biomarkers to SWL susceptibility.

The inclusion of coffee by-products in the diet of dairy goats: the carry-over of bioactive compounds and the oxidative stability of milk

Carta S¹ scarta2@uniss.it, Tsiplakou E², Correddu F¹, Lunesu M¹, Casula M³, Caboni P³, Pulina G¹, Nudda, A¹.

¹ Department of Agricultural Science, University of Sassari, Italy.

² Department of Animal Science, University of Athens, Greece.

³ Department of Life and Environmental Sciences, University of Cagliari, Italy.

KEY WORDS: COFFEE BY-PRODUCT, GOAT NUTRITION, ANTIOXIDANT STATUS.

Spent coffee (SC) by product obtained by coffee beverage preparation, was included in the diet of dairy goats and the carryover of bioactive compound from feed to milk and the antioxidant status of milk and blood were evaluated. For the experiment, twenty-four Saanen goats were divided into 3 groups: control group without supplementation (CON), SC50 group, supplemented with 50 g/d of SC, and SC100 group, supplemented with 100 g/d of SC. The experiment lasted 6 weeks. Milk samples were collected weekly, while blood samples were collected at the middle and at the end of the trial. The SC did not affect milk production and the main composition of the milk, except for the urea that decreased with the increase dose of SC. SC supplementation had a positive effect on the blood antioxidant status, as evidenced by an increase in ferric reducing antioxidant power and a decrease in malondialdehyde. The caffeine was detected in all samples from SC50 and SC100. The overall mean concentration of caffeine in milk was significantly higher in the SC100 group ($59 \pm 20 \mu\text{g}/100 \text{ ml}$) when compared to the SC50 group ($33 \pm 16 \mu\text{g}/100 \text{ ml}$). The inclusion of up to 100 g/d of SC in the diet of dairy goats did not affect milk yield and milk quality but it can modulate oxidative stress in goat. However, it should be noted that the inclusion of SC into the goat diet may cause the carryover of caffeine into the milk. The research was funded by NextGenerationEU; PNRR M4C2, CN00000022 AGRITECH.

Evaluation of nutrient intake and selectivity in dairy goats fed with grass-dominated forage – a pilot study

Haus A alina.haus@uni-goettingen.de, Requardt A and Hummel J.

Department of Animal Sciences, University of Göttingen, Germany Presenting author: Haus A

KEY WORDS: SELECTIVE BEHAVIOR, SELECTION CRITERIA, GOAT NUTRITION, GRASS FORAGE.

Among domesticated ruminants, goats have a reputation to be particularly selective. The study aimed to quantify selection and choice criteria in dairy goats fed grass forage. Seven lactating goats (German Improved Fawn) were offered 2000 g fresh matter (744 ± 134 g dry matter, DM) of cut, grass-dominated meadow forage. Feeding sessions lasted for two hours each day over five consecutive days. Beyond this daily test session, the goats had ad libitum access to grass forage and received an additional 800 g DM concentrate daily. Samples of the offered forage and refusals were collected for chemical analysis, including ash, crude protein (CP), and neutral detergent fiber (NDFom). Botanical composition was also assessed by determining the proportions of grasses and herbs. Intake was 489 ± 146 g DM per portion and goat (mean \pm standard deviation), while CP and NDFom in feed offered were 102 ± 24 g/kg organic matter (OM) and 703 ± 30 g/kg OM, respectively. There were no significant indications for differences in the nutrient concentrations between the offered portion, consumed forage and refusals for CP and NDFom ($p > 0.05$, Friedman test). Biomass composition for offered forage and refusal was $96 \pm 0.9\%$ and $98 \pm 1.0\%$ for grasses, respectively, while herbs accounted for $4 \pm 0.9\%$ and $2 \pm 1.0\%$. In this trial, it is likely that the goat's capability to select nutrient concentrations in the organic matter was impaired due to the advanced senescence of the grass-dominated sward.

Precision Weaning: Optimizing Protein Levels for Beetal Kids' Growth Efficiency

Kashif I¹ drkashif@uaar.edu.pk, Younas M² and Riaz M²

1 Department of Livestock Production & Management, PMAS-Arid Agriculture University Rawalpindi, Pakistan.

2 Institute of Animal & Dairy Science, University of Agriculture Faisalabad, Pakistan.

KEY WORDS: STARTER RATION, WEANING AGE, PROTEIN LEVELS, GROWTH PERFORMANCE, FEED EFFICIENCY.

Poor pre-weaning feeding management can hinder the growth performance of Beetal kids raised for meat. This study aimed to determine the optimal dietary protein level based on weaning age in a high-input feeding system. A total of 42 male Beetal kids, categorized into three age groups —30 (G30), 60 (G60), and 90 (G90) days— were gradually weaned onto pelleted starter rations with varying protein levels: R1 (16% CP), R2 (20% CP), and R3 (26% CP). A control group was maintained on maize fodder. Over six weeks, growth performance indicators, including average daily gain (ADG), feed intake, feed efficiency, body measurements, and blood metabolites, were evaluated using a factorial (3×3) plus control design. Statistical analysis revealed significant interactions ($p < 0.05$) between protein level and weaning age for ADG, Kleiber ratio, feed intake, and blood urea nitrogen, while serum creatinine and feed conversion were non-significant. Quadratic trend analysis showed that kids weaned at 30 or 60 days performed best on R2 (46.8 g/day and 87.06 g/day ADG, respectively), while those weaned at 90 days achieved the highest ADG (127 g/day) on R1. Findings suggest that Beetal kids weaned at 30-60 days require 20% CP for optimal growth, whereas those weaned at 90 days perform best with 16% CP.

Valorization of agricultural by-products as alternative feed resources for a sustainable goat farming in Northern Morocco

El Ftouh H.^{1,2} houda.elftouh@etu.uae.ac.ma, Chebli Y.¹, Chentouf M.¹, El Amrani A.², El Otmani S.¹

¹ Regional Center of Agricultural Research - Tangier, National Institute of Agricultural Research, Avenue Ennasr, BP 415 Rabat Principale, 10090 Rabat, Morocco.

² Faculty of Science and Technology of Tangier, Ancienne Route de l'Aéroport, Km 10, Ziaten. BP: 416. Tangier-Morocco.

KEY WORDS: AGRICULTURAL BY-PRODUCTS, NUTRITIONAL VALUE, GOAT FARMING, ALTERNATIVE FEED RESOURCE, NORTHERN MOROCCO.

The use of agricultural by-products as alternative feed resources for livestock is a promising approach to enhancing sustainability and reducing production costs. This study investigates the nutritional characteristics of agricultural by-products from Northern Morocco, including two types of potatoes (Nicola and Désirée), pumpkin, cucumber, eggplant, and tomato, to assess their potential in improving goat farming productivity. Key parameters such as dry matter (DM), mineral matter, organic matter, and fiber content were analyzed. Results showed that Nicola and Désirée potatoes had the highest DM content (65% and 64%), while pumpkin (27%) and cucumber (29%) had significantly lower values, indicating a high-water content. Organic matter was high in potatoes (82% and 80%), but cucumber had the highest proportion (94%). Since mineral matter content is inversely related to organic matter, it was more pronounced in potatoes and pumpkin (18%-21%) compared to cucumber and tomato. Fiber analysis revealed that eggplant had the highest levels, suggesting a greater fiber content than other by-products. These findings highlight the nutritional potential of these agricultural by-products as alternative feed resources, offering opportunities for more sustainable and cost-effective strategies to improve goat production in Northern Morocco.

Effect of breed and plane of nutrition on growth performance and carcass characteristics of male goats

Cheng MC and Pan CC blueboy7023@gmail.com

Southern Region Branch, Taiwan Livestock Research Institute, Ministry of Agriculture, Pingtung 946004, Taiwan.

KEY WORDS: NUBIAN, BREED, GROWTH PERFORMANCE.

The Nubian goat is the primary breed of meat goat preferred in Taiwan. The average slaughter weight and rearing period for goats in Taiwan are approximately 60 kg and up to 14 months, respectively. This study aims to investigate the growth performance of F1 hybrid goats produced from the crossbreeding of Boer goats and Nubian goats. The experiment involved twenty-four newly born male goats, including F1 Boer × Nubian (BONU), F1 Kenting (87.5% Boer) × Nubian (KTNU), and Nubian (NUNU) goats. The goat kids were nursed by their dams, and all breeds were provided with the same nutritional standards until they reached the age of 5 months. At 6 months of age, the goats were fed high (85%) and low (50%) concentrate diets within the same breed for a duration of 210 days. The results indicated that BONU goats from the high-concentrate diet group reached a weight of 60 kg at approximately 10 months of age, while the BONU goats in the low-concentrate diet group achieved the same weight at around 11 months of age. In contrast, the NUNU wethers from the high-concentrate diet group reached the same market weight at 12 months of age. The BONU goats in the high-concentrate diet group incurred the lowest feed costs to reach 60 kg compared to the other groups, as their rearing period was shorter. In conclusion, the Boer × Nubian cross, when fed a high-concentrate diet, can shorten the rearing period and reduce feeding costs, ultimately increasing farmers' income.

Effects of physiology and blood traits of Taiwan black goat at various temperatures

Pan C. C.^{1,2} ccpan888@gmail.com, Cheng M. C.¹, Wu J. H.¹, Wu H. H.^{2,3} and Chang H. L.³

1 Southern Region Branch, Livestock Research Institute, Ministry of Agriculture, Taiwan, R. O. C.

2 Graduate Institute of Bioresources, National Pingtung University of Science and Technology, Taiwan, R. O. C.

3 Department of Animal Science, National Pingtung University of Science and Technology, Taiwan, R. O. C.

KEY WORDS: BLOOD TRAITS, HEAT STRESS, TAIWAN BLACK GOAT, HOT SEASON, PHYSICAL TRAITS.

The experiment was to select heat-resistant Taiwan Black Goats suitable for the local climate. Rectal and eye temp., respiration and heart rate were measured during the cool and hot season, along with blood samples for analysis. In the hot season, the eye temp. and respiration rate were significantly higher at $36.7 \pm 0.4^\circ\text{C}$ and 44.1 ± 1.2 breaths/min. compared to the cool season's $35.3 \pm 0.4^\circ\text{C}$ and 23.5 ± 1.1 breaths/min. Blood TP, ALB, CRE, Hb, and MCHC were all significantly higher in the hot season, with values of 7.2 ± 0.1 and 6.8 ± 0.1 g/dl, 3.4 ± 0.1 and 3.2 ± 0.1 g/dl, 0.9 ± 0.04 and 0.8 ± 0.04 mg/dl, 13.2 ± 0.4 and 11.9 ± 0.4 g/dl, and 71.5 ± 11.2 and 27.1 ± 10.2 g/dl, respectively. Conversely, blood TG, Ca, AlkP, ALT/GPT, and MCV were significantly lower in the hot season, with values of 23.3 ± 3.2 and 34.4 ± 2.9 mg/dl, 9.9 ± 0.2 and 10.4 ± 0.2 mg/dl, 259.1 ± 63.7 and 483.3 ± 57.6 U/L, 9.3 ± 1.1 and 12.9 ± 0.9 U/L, and 63.6 ± 7.0 and 98.1 ± 6.4 fl, respectively. The results indicate that in a hot environment, the decrease in blood oxygen partial pressure in goats leads to an increase in respiration rate and eye temp., while the body's mechanism for maintaining RBC levels was activated, resulting in higher RBC counts and Hct levels. When heat stress cannot be alleviated, the Ca content in the blood decreases, while continuous evaporation and heat dissipation increase TP and Hb levels in the blood. These basic data also aids in the subsequent in-depth study of heat adaptation in Taiwan black goats.

Meta-Analysis of Dietary Tannins in Small Ruminant Diets: Effects on Growth Performance, Serum Metabolites, Antioxidant Status, Ruminal Fermentation, Meat Quality, and Fatty Acid Profile

Al Rharad A¹, El Aayadi S², Avril C³, Souradjou A⁴, Sow F⁵, Camara Y⁶, Hornick JL⁴ and Boukrouh S^{7*} Soumaya.boukrouh@gmail.com; soumaya.boukrouh@um6p.ma

1 Laboratory of Physical-Chemistry of Materials, Natural Substances and Environment, Department of Chemistry, Faculty of Science and Technology, Abdelmalek Essâadi University, Tangier 90000, Morocco; alharadasma@gmail.com

2 Animal Production Department, Institut Agronomique et Veterinaire Hassan II, Medinat Al Irfane, Rabat BP6202, Morocco; elaayadi.s@gmail.com

3 Haute École Provinciale de Hainaut Condorcet, 7800 Ath, Belgium; claire.avril@condorcet.be

4 Department of Veterinary Management of Animal Resources, Faculty of Veterinary Medicine, University of Liège, 4000 Liège, Belgium; alsourath@gmail.com (A.S.); jlhornick@uliege.be (J.-L.H.)

5 Senegalese Institute for Agricultural Research (ISRA), Dakar PB 3120, Senegal; sowvet2002@yahoo.fr

6 Gaston Berger University, Saint-Louis PB 234, Senegal; younouss.camara@isra.sn

7 African Sustainable Agriculture Research Institute (ASARI), Mohammed VI Polytechnic University (UM6P), Laâyoune 70000, Morocco

KEY WORDS: TANNINS; SHEEP; GOAT; INTAKE; DIGESTIBILITY; ANTIOXIDANT; MEAT QUALITY; FATTY ACID PROFILE.

Tannins are secondary metabolites naturally present in various plants as a defense mechanism. In animal nutrition, they play a dual role, acting as both antinutritional factors and bioactive agents, with potential benefits in nutrient metabolism and product quality. This meta-analysis aimed to evaluate the effects of dietary tannin on nutrient intake and digestibility, blood serum metabolite levels, growth performance, carcass characteristics, and meat quality in small ruminants. Ninety-seven studies were included in this meta-analysis. The effects of tannins were analyzed using a random-effects model to determine the weighted mean difference between treatments with tannins and the control (without tannins). Publication bias and heterogeneity between studies were explored, and meta-regression and subgroup analyses were performed. The results indicated that tannin significantly increased the intake of dry matter, crude protein, and nitrogen (N), fecal N, and meat fatty acids (FA), such as C18:2 6, C18:3 3, C20:4 6, C20:5 3, total 3 and 6 FA, and total polyunsaturated FA (PUFA). However, NH₃-N, urinary N, blood urea nitrogen, cold carcass weight, subcutaneous fat thickness, drip loss, and nutrient digestibility decreased. In conclusion, tannin in small ruminants did not affect animal productivity and antioxidative status, but mainly modified nitrogen metabolism and improved the fatty acid profile of meat.

Dry matter consumption of native forages in lactating goats under extensive grazing in Wayuu indigenous communities in Colombia

Rúa Bustamante CV^{1,4}, Grajales H², Barahona R³ crua@agrosavia.co

1 Corporación Colombiana de investigación agropecuaria- Agrosavia. Centro de investigación Motilonia, Agustín Codazzi, Cesar. Colombia.

2 Facultad de Medicina Veterinaria y Zootecnia, Universidad Nacional de Colombia sede Bogotá.

3 Universidad Nacional de Colombia sede Medellín.

4 Estudiante Doctorado Producción Animal, Universidad Nacional de Colombia, sede Bogotá. Presenting author: Rúa Bustamante CV.

KEY WORDS: GOATS, NUTRITION, FEEDING, FORAGE, GRAZING, GRAZING.

Goats under extensive grazing conditions in northern Colombia have little information in general and even less information related to forage and nutrient intake and possible dietary balance. A knowledge management methodology and an information system were implemented in six indigenous Wayuu pastoral communities of Alta Guajira in order to obtain baseline information on goats. The Small Ruminant Nutrition System (SRNS) model was used to estimate dry matter intake and dietary balance, a literature review was carried out on the chemical composition, fat and protein percentages in milk from lactating goats under tropical conditions. We assumed 100% of the diet of four forage species, knowing their nutritional content through the free information system Alimento. The live weight data of 89 goat females between three and four years of age with an average of 36.63 +/- 7.48 kg, 1 liter of milk/d, 4.5% fat and 37% protein in milk were recorded together with the shepherds and shepherdesses. The dry matter intake of lactating goats was 1.44 kg DM/day, equivalent to 3.93% of live weight in goats, for the four leguminous forage species with high protein content, *Acacia farnesiana* (14.6%), *Caesalpinia coriaria* (14.7%), *Prosopis juliflora* (18.87%) and *Pithecellobium* sp. (21.8%). It was possible to demonstrate the low energetic contribution of the forages evaluated.

Concentrate feed management in a semi-extensive goat production system

Betancor Y^{1,2}, Camacho A², Álvarez S¹ salvarez@icia.es

1 Animal Production Unit. Instituto Canario de Investigaciones Agrarias, Tenerife. Spain.

2 Departamento de Ingeniería Agraria y del Medio Natural. Universidad de La Laguna. Spain.

KEY WORDS: FEEDING STRATEGY, CONCENTRATE, MILK PRODUCTION, FEEDING COSTS.

The increase in feeding costs, especially the feed concentrate, reduces the profitability of livestock farms. This study evaluates how to reduce these costs in a semi-extensive dairy goat farm, adjusting the concentrate to the specific animals' requirements. Fourteen females of the Tinerfeña Norte breed were distributed in two homogeneous groups. CG received a fixed amount of concentrate, following the empirical feeding management of the farmer, while EG received the concentrate corresponding to their specific nutritional needs, according to INRA recommendations. The forage supply was provided by grazing. The nutritional requirements of EG were recalculated fortnightly based on the average milk production and the live weight of the goats. Daily milk production was monitored for 6 months, and milk nutritional and sanitary quality analyses were carried out.

The results showed that the average amount of concentrate fed to EG was significantly lower ($p < 0.05$) than CG (0.96 vs 1.10 kg per animal and day). This difference in consumption resulted in an economic saving of 12.7% on this farm. The lower concentrate intake of EG did not result in significant differences in milk production, milk and sanitary quality or animal weight ($p > 0.05$). Average daily milk production and quality was within the range of values defined for the breed. Moreover, all the goats were able to regain their lost body weight and body condition, reaching mating period in good physical condition.

Use of dehydrated palm prunings pellets as feed for goats

Fumero L^{1,2}, Mata J², Menéndez M³, Álvarez S¹ salvarez@icia.es

1 Unidad de Producción Animal, Pastos y Forrajes. Instituto Canario de Investigaciones Agrarias, Tenerife.Spain.

2 Departamento de Ingeniería Agraria y del Medio Natural. Universidad de La Laguna. Spain.

3 Servicio Regional de Investigación y Desarrollo Agroalimentario (SERIDA), Asturias, Spain.

KEY WORDS: PALM PRUNING, WASTE, PALATABILITY, NUTRITIVE VALUE.

Palm pruning waste is very abundant in the Canary Islands. Farms make direct use of this feed resource, collecting and offering it to goats as fresh, but its nutritional value is low, and its management and preservation is deficient. It is necessary to explore alternatives that allow efficient management, improve its nutritional quality and facilitate its conservation for periods when the availability of other feeds is scarce. In this study, the possibility of pelletizing palm pruning waste alone or in combination with cereals (corn and bran) was evaluated.

For this purpose, the pellet quality, palatability and nutritional value of different combinations (25/75, 50/50, 75/25) were evaluated. The best combinations in terms of consistency were the 50%/50% mixes, which generated solid and well-formed pellets. The average daily intake of the palm-bran pellets was 657 g/animal, while for the palm-corn pellets was 372 g/animal. Although, in theory, corn grain is more palatable to goats, the lower consumption is probably due to the fact that the pellet was less compact and generated a greater amount of dust, a fraction not so appreciated by goats. In terms of nutritional composition, the palm-corn pellets were more energetic and digestible, but lower in protein than those with bran, while those made only with 100% palm had the lowest relative forage value of all the pellets evaluated. The use of palm pellets allows savings in the ration by incorporating low-cost raw materials.

Silage potential of *Tecia solanivora*-infected potato waste for goat feed purposes

Álvarez S¹ alvarez@icia.es, Díaz C^{1,2}, Valdivia I², Menéndez M³, Ríos D².

1 Unidad de Producción Animal, Pastos y Forrajes. Instituto Canario de Investigaciones Agrarias (ICIA), Tenerife. Spain.

2 Servicio Técnico de Agricultura del Cabildo de Tenerife. Spain.

3 Servicio Regional de Investigación y Desarrollo Agroalimentario (SERIDA), Asturias, Spain.

KEY WORDS: POTATO, SILAGE, ENSILABILITY, FERMENTATION QUALITY, NUTRITIVE VALUE.

The increase in cereal prices is affecting the profitability of livestock farms. The use of agricultural by-products can partly compensate for the increase in feed costs.

Guatemalan potato moth (*Tecia solanivora*) has become the most significant pest of this traditional crop in the Canary Islands, resulting in losses over 50%. Affected potatoes can be used as an alternative feed by using silage techniques that preserve them and improve their nutritional quality.

In this trial, the ensilability, fermentative quality, nutritional value and ingestion rate for goats of *Tecia*-infected potato silage was studied. Fresh waste potatoes are not suitable for silage. They showed low dry matter content, soluble sugars and fermentability coefficient. Although the initial sugar/protein ratio (2.67) as well as the buffering capacity is adequate. The fermentation quality of silages with improving additives (bran + molasses and beet pulp + molasses) is good both at 35 and 70 days. Potato waste silage can be considered as an energy concentrate (1.05-1.30 UFL), with moderate DM (40-48%), high OM (93-97%) and very good digestibilities (OMD and DMD). The nutritional quality was better in combinations with additives due to a more than two-fold increase in the PB content compared to the control. Finally, although in preliminary tests, potato palatability was low due to its high moisture content, silage ingestion rate in goat's diet was high, exceeding 1 kg of fresh matter per goat per day.

Fermented *Opuntia*: an alternative protein feed for small ruminants

Fumero L^{1,2}, Cabrera P², Camacho A², Méndez P¹, Perdomo A², Álvarez S¹ salvarez@icia.es

1 Unidad de Producción Animal, Pastos y Forrajes. Instituto Canario de Investigaciones Agrarias, Tenerife. Spain.

2 Departamento de Ingeniería Agraria y del Medio Natural. Universidad de La Laguna. Spain.

KEY WORDS: OPUNTIA SPP, FERMENTATION PROCESS, PROTEIN CONTENT, PALATABILITY, SMALL RUMINANTS.

Cactus (*Opuntia spp.*) is used as a forage in several regions of the world. It is cultivated in arid areas with soil erosion to combat desertification. Due to its low protein content it must be combined in diets with other ingredients, although it shows high concentrations of water, ash, soluble carbohydrates and calcium. The protein fraction is the most expensive and generally difficult to guarantee in a ruminant's diet.

Two trials were carried out where prickly pear cactus was processed in order to increase the protein content by using a six-hour aerobic fermentation technique with yeast, molasses, urea and ammonium sulphate. The optimum degree of dehydration of the cladodes and different cactus varieties were compared. Nutritive value, palatability and ingestion rate in Canarian goats and sheep were tested. An economic study was developed to determine the profitability of this process.

High CP values (14%-45%) were determined from the second hour of processing with highest contents corresponding to fresh cladodes. When comparing the dehydration degree of the cactus, the most palatable combination for both goats and sheep was the 100% dried cladodes. No differences in intake and palatability were detected according to cactus varieties. Goats are more selective with this fermented feed, while sheep showed greater acceptance in their different textures. The fermented cactus cost ranged between 0.24-0.29 €/kg, resulting in a high quality feed at an affordable cost.

Improvement of the fatty acid profile in the meat of canary goat kids through dietary inclusion of *Echium plantagineum* oil.

Villora J, Torres A, Álvarez S, Fresno M, Pérez J.A., Acosta N.G., Ceriello G, Rodríguez C.

1 Universidad de La Laguna, Departamento de Biología Animal, Edafología y Geología, Grupo NUTRAHLIPIDS, 38206 San Cristóbal de La Laguna, Spain.

2 Unidad de Producción Animal, Pastos y Forrajes, Instituto Canario de Investigaciones Agrarias (ICIA), 38200 San Cristóbal de La Laguna, Spain.

3 Università degli Studi di Napoli "Federico II", Dipartimento di Agraria, 80055 Portici, Italia.

KEY WORDS: OMEGA-3, POLYUNSATURATED FATTY ACIDS, NUTRITION, SENSORY ANALYSIS, MEAT QUALITY.

In preruminant animals, dietary fatty acid (FA) composition significantly influences muscle tissue FA profiles. Goat kids may have the potential to serve as a sustainable source of omega-3 (n-3) polyunsaturated fatty acids (PUFA): eicosapentaenoic acid (EPA, 20:5n-3) and docosahexaenoic acid (DHA, 22:6n-3), through the desaturation and elongation of dietary γ -linolenic acid (ALA, 18:3n-3) and stearidonic acid (SDA, 18:4n-3). *Echium plantagineum* oil (EO) is particularly noteworthy due to its high SDA content. This study evaluated the effect of three fat sources on the FA composition and sensory profile of goat kid's longissimus dorsi muscle. 24 kids of Canarian local breeds, were assigned to three dietary groups at 8 weeks of age and fed goat skimmed milk supplemented with soy oil (SO, rich in linoleic acid (LA, 18:2n-6), linseed oil (LO, rich in ALA), or EO, which provides a balanced LA/ALA ratio along with SDA and γ -linolenic acid (GLA, 18:3n-6). After four weeks of feeding, LO and EO diets significantly increased muscle total n-3 PUFA levels (5.07% and 4.67%, respectively) compared to SO (2.32%). Sensory evaluations revealed no significant differences in odour, flavour, or texture among dietary treatments. These findings suggest that a balanced dietary C18 n-6/n-3 ratio can improve the FA profile in goat muscle by increasing the amount of n-3 PUFA without compromising sensory quality, highlighting *Echium* oil as a promising alternative fat source for livestock nutrition.

Using saliva to determine passive immune transfer in goat kids

Muñoz-Quirós-Manjavacas J, Hernández-Castellano LE, lorenzo.hernandez@ulpgc.es, Morales-delaNuez A, Argüello A, Castro N, González-Cabrera M.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: SALIVA, IMMUNITY, NEWBORN, COLOSTRUM,

Newborn goat kids rely on colostrum intake early after birth to achieve a correct passive immunization. Contrary to blood sampling, saliva can be collected by non-invasive methods. This study aimed to investigate the suitability of saliva immunoglobulin G (IgG) concentration as a non-invasive method to estimate blood IgG concentration in goat kids during the first month of life. Seven goat kids were immediately separated from the dams at birth and bottle fed colostrum (10% of the birth BW) divided in two meals (i.e., at 2 h and 12 h relative to birth). Thereafter, animals were fed goat milk twice a day during the first month of life. Saliva and blood samples were collected on day 0 (i.e., before colostrum intake) and on day 1, 2, 3, 5, 10, 15 and 30 relative to birth. Plasma and saliva IgG concentrations were determined using commercial ELISA kits. Pearson correlation coefficient was determined using Jamovi 2.3 software and the statistical significance was set as $p < 0.05$. Results showed no correlations between plasma and saliva IgG concentrations, suggesting that saliva does not reflect circulating IgG concentrations during the first month of life. However, given the limited sample size, the present findings should be taken cautiously. This study represents a preliminary assessment of salivary immunoglobulins, which could potentially promote the development of non-invasive on-farm tools to assess acquired immunity in newborn goat kids.

Evolution of white and red blood cells in dairy goats around parturition

Muñoz-Quirós-Manjavacas J, Hernández-Castellano LE, lorenzo.hernandez@ulpgc.es, Morales-de-la-Nuez A, Argüello A, Castro N, González-Cabrera M.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: SALIVA, IMMUNITY, NEWBORN, COLOSTRUM,

This study investigated changes in white and red blood cells around parturition to identify those periods with higher susceptibility to infectious diseases. Thus, 31 multiparous and pregnant Majorera dairy goats were used. Plasma collection tubes containing EDTA (9 ml) were used to collect blood samples from the jugular vein on day -21, -15, -7, 0, 1, 2, 3, 5, 10, 15 and 30 relative to parturition. Blood samples were analysed with an Automatic Haematology Analyzer to determine white and red blood cell concentrations. The data was analysed using the PROC MIXED procedure of SAS and the significance was set as $p < 0.05$. The results showed increased leucocyte concentration at parturition (d 0; $p < 0.001$), although lymphocyte concentrations were not affected ($p = 0.24$) during the entire experimental period. Monocyte concentrations increased on d -3 relative to parturition, decreasing on d 1 and 2 postpartum ($p = 0.002$). Granulocyte concentration increased at d 0 ($p < 0.002$). Therefore, it seems that increased leukocyte concentrations at parturition are caused by increased concentrations of monocytes and granulocytes around this period. In addition, red blood cells as well as hemoglobin concentration and hematocrit decreased constantly from d-21 to d 30 relative to parturition ($p < 0.001$). In conclusion, it seems that the activity of the cellular immune response is increased around parturition in dairy goats.

PRECISION GOAT FARMING, PRODUCTION SYSTEMS AND PRODUCT QUALITY

Precision goat farming-current opportunities and future challenges

Maria-Anastasia Karatzia

Hellenic Agricultural Organization, Greece

Goats hold a special role within the livestock ecosystem for various reasons. As a species where animals are considered to have a lower individual value or a limited economic interest due to the low input systems they are usually reared in, precision technologies are not yet readily applied. Yet, goats are the predominant ruminant animals bred in transhumant systems and goat milk is the main raw material utilized in the manufacturing of high-quality dairy products with wide acceptance from consumers. Under this scope, the introduction of precision technologies in goat farming, even at a small scale, has revolutionized the creation of a blueprint of the production chain, and has shown light on managerial aspects of flocks, that otherwise were unnoticed until previously. The mapping of grazing routes and the interconnection between plants grazed and product characteristics has provided a source of recognition and a method of establishing quality characterization with quantifiable results in favour of both farmers and food market. As welfare is often overlooked in goats, especially those in extensive systems, the incorporation of precision technologies provides for a framework of frequent observation, improvement of health and alignment with EU policies. The most important trade-off of using precision technologies in goat farming is the connection of goat production systems to their environment, as they have the capability of acting as sentinels of climate change effects and biodiversity status.

Zootechnical Biodiversity in the Campania Region - Goat Breeds and Native Genetic Type (NGTs)

Gianni Ruggiero¹ gianni.ruggiero@regione.campania.it, Michele Cerrato², Subrahmanyam Thotakura² and Annamaria Di Serio³

¹ Regione Campania-Direzione Generale per le Politiche Agricole Alimentari e Forestali, UOD 20 Valorizzazione Tutela e Tracciabilità del Prodotto Agricolo, Servizio Sviluppo Produzioni Animali, Centro Direzionale Isola A/6, 80132 Napoli, Italy; gianni.ruggiero@regione.campania.it

² Degree Course of Agriculture, DIFARMA, Università degli Studi di Salerno, Via Giovanni Paolo II 132, 84084 Fisciano, Italy.

³ Chemistry and Biology Department, University of Salerno, Via Giovanni Paolo II 132, 84084 Fisciano, Italy.

KEY WORDS: QUALITY; SUSTAINABILITY; VALORISATION OF NATIVE SPECIES; BIODIVERSITY CONSERVATION; SUPPLY CHAIN MANAGEMENT.

The Campania Region hosts a significant livestock genetic heritage, including native goat breeds such as the Cilentana (black, grey, and tawny), Napoletana, and the Native Genetic Type (NGT) Fulva goat from the Monti Picentini. These goats are primarily raised in extensive farming systems, producing traditional cheeses like “*Cacioricotta*”. The regional agriculture department has promoted initiatives for the protection of these breeds, which are listed in the Genealogical Registers, through a multisystemic project. Since its inception in 2020, the project has involved universities, research institutes, and farmers, with activities such as population censuses, biological sampling, and certification of farms with the “*Custodian Farm*” label. Analyses focused on the microbiological and nutritional parameters of products, promoting quality and sustainability. This comprehensive approach integrates biodiversity conservation, extensive farming practices, and supply chain certification, increasing the valorisation of indigenous breeds and their products, while offering a replicable model for other territories.

Development of a mathematical model to predict the production of South African Boer goats

T S Brand^{1,2} Tertius.Brand@westerncape.gov.za

1 Directorate: Animal Sciences, Department of Agriculture Western Cape, Muldersvlei Road, Elsenburg, South Africa.

2 Department of Animal Science, University of Stellenbosch, Stellenbosch, South Africa.

KEY WORDS: BOER GOATS, MATHEMATICAL MODEL, PRODUCTION.

The Boer goat, developed by South African farmers for its rapid growth as a meat breed, is renowned for its resilience in harsh environments and reproductive capabilities. It also excels in controlling intruder tree species and is now widespread across South Africa. Besides its unique characteristics, it produces high-quality meat. Due to these favorable genetic and production traits, Boer goats are now found worldwide. At Elsenburg, within the Department of Agriculture Western Cape, a research initiative aimed to quantify production and meat characteristics of Boer goats under unrestricted feeding conditions. This study formed the basis for developing a mathematical model to forecast Boer goat production. Growth relative to age was modeled using the Gompertz function, fat depth was described by a logarithmic equation in relation to age, and cumulative feed intake relative to body weight was estimated using a linear model. Dressing percentage in relation to live weight was predicted using an exponential function. The final model integrates these predictive functions, derived from various research projects, to forecast animal performance based on specified input parameters. These performance predictions may then be linked to user-provided monetary values to assess the profitability of a Boer Goat enterprise.

Proteome changes in goat *Longissimus thoracis et lumborum* muscle: impact of dry ageing and cooking

André MV¹, Prista C^{1,2}, Vítor A^{1,2}, Ribeiro DM^{1,3}, Pedro MF¹, Sacarrão-Birrento L¹, Osório H^{4,5,6}, Almeida AM^{1,2} aalmeida@isa.ulisboa.pt and Matos TJS^{1,2}

1 LEAF-Linking Landscape, Environment, Agriculture and Food Research Centre, Instituto Superior de Agronomia, Universidade de Lisboa, Tapada da Ajuda, 1349-017 Lisboa, Portugal.

2 Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa, Tapada da Ajuda, 1349-017, Portugal.

3 Present address: Foof4Sustainability - Associação para a Inovação no Alimento Sustentável. Centro Empresarial de Idanha-a-Nova, Zona Industrial, 6060-182 Idanha-a-Nova, Portugal.

4 i3S - Instituto de Investigação e Inovação Em Saúde, Universidade Do Porto, 4200-135, Porto, Portugal.

5 IPATIMUP - Institute of Molecular Pathology and Immunology of the University of Porto, Universidade Do Porto, 4200-135, Porto, Portugal.

6 Departamento de Patologia, Faculdade de Medicina, Universidade Do Porto, 4200-319, Porto, Portugal.

KEY WORDS: GOAT MEAT; SERPENTINA BREED; THERMAL PROCESSING; PROTEOMICS, DRY AGEING IN BAG

Goat meat, particularly from Serpentina breed, is known for its nutritional benefits, including low fat and cholesterol contents. In Southern Portugal's traditional production systems, certified Serpentina kid meat is highly valued. However, meat from older goats is less favored due to its toughness and flavor. This study explores innovative dry ageing in bag to enhance the organoleptic properties of older goat meat. The effects of dry ageing in bag for 46 days and thermal processing on the proteome of Serpentina chevon were evaluated. Four females aged 8-12 years were used. The *Longissimus thoracis et lumborum* muscle was vacuum-packed in water vapor-permeable bags and aged at 2 °C with 60-90% humidity, while a non-aged meat reference was frozen at -80°C. Both samples were cooked at 150°C to an internal temperature of 68°C. Proteomic analysis was carried out by label-free quantification. In total, 1264 proteins were identified and analysed across four comparisons: non-aged cooked vs non-aged, aged cooked vs aged, aged cooked vs non-aged and aged vs non-aged. Actin (ACTA1) was identified as a potential ageing and cooking stability indicator. Cooked aged meat showed higher collagen protein abundance compared to aged meat. Cooking at 68°C enhanced collagen solubilization, affecting meat tenderness. The results showed clear differences between the aged and non-aged meat samples, highlighting the potential of ageing processes in improving meat quality and valorisation.

Comparative sensory and other meat quality characteristics of Boer goat and Dohne Merino meat

T.S. Brand^{1,2} Tertius.Brand@westerncape.gov.za, J.P. van der Westhuyzen², J Marais³,
P.E. Strydom² and J.H.C. van Zyl²

1 Department of Agriculture: Western Cape, Directorate Animal Sciences: Elsenburg, Private Bag x1, Elsenburg 7607, South Africa

2 Department of Animal Sciences, University of Stellenbosch, Merriman Street, 7607 Stellenbosch, South Africa

3 Department of Food Science, Stellenbosch University, Private Bag X1, Matieland, Stellenbosch 7602, South Africa

KEY WORDS: BOER GOATS, SHEEP, SENSORY ANALYSIS, MEAT QUALITY.

A descriptive sensory and meat quality analysis compared the palatability and chemical attributes of chevon from 20 yearling Boer goats and meat from 20 Dohne Merino sheep, both finished in a feedlot on an identical diet (10.5 MJ ME/kg feed and 14.8% protein) up to 370 days of age. All measurements, including Warner-Bratzler shear force, proximate composition, and descriptive sensory analysis were conducted on the Longissimus lumborum. No significant differences ($P > 0.05$) were found between the species in terms of physical measurements or chemical composition of the meat. Sheep meat tended ($p < 0.08$) to be more tender than the goat meat. Boer goat meat exhibited significantly stronger herbaceous aroma ($p = 0.03$), saltier taste ($p < 0.01$) and more pronounced residue ($p = 0.02$) compared to sheep meat. No off-odours or -flavours associated with goat meat were detected during the investigation. Sheep meat aroma and flavour were noted as predominant characteristics, with only faint traces of goat-like aroma and flavour detected in both species. These findings suggest that Boer goat meat compares favourably to sheep meat in terms of sensory qualities, chemical composition, physical attributes and shear force values. Overall, the study concluded that the characteristics and quality of Boer goat and Dohne Merino meat were nearly indistinguishable in terms of sensory quality and texture.

Evaluating meat production traits in South African Boer Goats and Dohne Merino sheep

T.S. Brand^{1,2} Tertius.Brand@westerncape.gov.za, J.P. van der Westhuyzen¹, R Swart²,
P.E. Strydom¹ and J.H.C. van Zyl¹

¹ University of Stellenbosch, Animal Sciences, Merriman Street, 7607 Stellenbosch, South Africa.

² Department of Agriculture: Western Cape, Directorate Animal Sciences: Elsenburg, Private Bag x1, Elsenburg 7607, South Africa.

KEY WORDS: BOER GOATS, SHEEP, MEAT PRODUCTION TRIATS.

Sheep farming plays a crucial role in South Africa's small stock industry, while goat products are predominantly marketed through informal channels. This study aimed to evaluate and compare how species and gender influence carcass composition, meat quality, and fat depth in Boer goats and Dohne Merino sheep raised under identical conditions from birth to slaughter at 12 months of age. Upon weaning at 120 days, the kids and lambs were transitioned to a feedlot environment. There was no significant difference observed in slaughter and cold carcass weights between Boer goats (63.8 kg; 32.4 kg) and Dohne Merinos (61.6kg; 30.9 kg). However, castrated males (65.3 kg; 33.2 kg) showed notably higher weights than females (60.1 kg; 30.1 kg) ($p= 0.01$). Dressing percentages for Dohne Merinos (50.1%) and Boer goats (49.5%) fell within the expected range for sheep and goats (42.7% to 55.4%). Boer goat castrates exhibited a dressing percentage (51.0%) similar to Dohne Merino wethers (50.0%), while Boer goat females (47.9%) and Dohne Merino ewes (49.9%) differed slightly. Dohne Merinos (8.3 mm) deposited significantly more fat on the longissimus lumborum compared to Boer goats (4.6mm) ($p<0.01$), attributed to their earlier maturation and distinct fat deposition patterns. These findings suggest that Boer goats could be a promising choice for feedlot production due to their higher lean muscle yield and lower fat and bone content compared to sheep.

Fermented milk produced with milk from goats fed extruded linseed

Mangia N, Carta S scarta2@uniss.it, Correddu F, Murgia M, Montanari L, Nudda A.

Department of Agricultural Science, University of Sassari, Italy

KEY WORDS: EXTRUDED LINSEED, FERMENTED MILKS, MILK QUALITY.

The aim of the study was to evaluate the effect of the use of extruded linseed in the diet of dairy goats on milk quality and the suitability of the milk to produce fermented milk using beneficial lactobacilli. Twenty-four Saanen goats were randomly divided into two groups: one group received a basal diet (CTR) and one group received the same basal diet plus 200 g/d of extruded linseed cake (ELC). Bulk milk samples were collected and analyzed for chemical composition and fatty acid (FA) profile. Fermented milk was produced using CTR and ELC goat milk and using *Lacticaseibacillus* spp (*L. paracasei* Shirota, *L. rhamnosus* and *L. paracasei* FS109). The ELC supplementation determined an increase in PUFA-n3 and a decrease in SFA in milk from ELC compared to milk from CTR. ELC milk was also richer in C18:2cis9, trans11, and C18:1 trans11 than CTR milk. Regarding the microbiological analysis, all lactobacilli tested grew well in both CTR and ELC milk and reached high numbers during fermentation. The colony counts were 8-10 Log CFU/ml. On the other hand, undesirable post-acidification occurred, which was more pronounced in CTR milk than in ELC milk. In conclusion, this research showed that goat milk enriched in PUFA had no negative effect on the viability of the probiotic Lactobacilli tested.

Effect of short-term cooling on milk production and physiological response of lactating Saanen goats during the summer season

Lunesu MF mflunesu@uniss.it, Carta S, Caratzu MF, Battacone G and Nudda A.

Dipartimento di Agraria, University of Sassari, Sassari, Italy.

KEY WORDS: HEAT STRESS, COOLING, GOAT, MILK PRODUCTION, OXYGEN SATURATION.

This study aimed to assess the effect of cooling system on milk production and physiological parameters of lactating Saanen goats during summer. Twenty Saanen dairy goats at 120 days in milk were exposed to cooling (COO; n= 10 goats; temperature humidity index: THI <80) or to heat stress (HS; n= 10 goats; THI >80) conditions for 1 month. The goats were fed a total mixed ration ad libitum, and water was continuously available. Feed and water intake, rectal temperature, heart rate, oxygen saturation (SpO₂) and milk production were measured. Environmental data, blood and milk samples were collected. The cooling did not affect dry matter intake and tended to reduce water consumption (5.52 vs. 6.14 ± 0.35 kg/d; p= 0.08). Milk yield, milk composition and milk coagulation properties were not affected by the treatment. The fatty acid (FA) profile of milk fat was not affected by cooling except for C18:2n6, C18:3n-6, PUFA_{n6} and BCFA, which were lower in the HS than in the COO groups. Rectal temperature and heart rate did not differ between groups (p > 0.05). The COO goats had highest blood MCH values (6.19 vs. 5.88 ± 0.15 pg; p= 0.049); COO vs. HS group, respectively) and SpO₂ (74.22 vs. 71.55 ± 1.29 %; p < 0.05). In conclusion, a one-month period of cooling during summer did not modify milk production traits but slightly alleviated heat stress improving physiological response. However, a longer treatment period may be useful to evaluate the effect on milk production and animal health status.

Exploring the effects of white grape pomace in goat diets on kefir's physicochemical and microbiological properties: preliminary results

Khazzar S¹ sara.khazzar@phd.unipd.it, Montes R², Galvez M.³, Beltran MC¹, Molina MP.¹

¹ Instituto de Ciencia y Tecnología Animal (ICTA), Universitat Politècnica de València, Camino de Vera, s/n. 46022 Valencia, España.

² Departamento de Biotecnología. Universitat Politècnica de València, Camino de Vera, s/n. 46022 Valencia, España.

³ Investigación e Innovación Agroalimentaria y Agroambiental (CIAGRO), Universidad Miguel Hernández, 03312 Orihuela, Alicante, España.

KEY WORDS: DAIRY GOATS, KEFIR, WHITE GRAPE POMACE, BYPRODUCTS

This study investigated the effect of feeding dairy goats white grape pomace silage on kefir production and quality. Two groups of Murciano Granadina goats were used, one receiving a control diet (C) and the other a diet supplemented with 12% white grape pomace silage (WGP). Kefir was produced with pasteurized milk and commercial starting cultures. Kefir's physicochemical and microbiological properties were analysed after 1, 14, and 28 days of cold storage. Diet had no significant impact on kefir production. Neither the WGP implementation on diet had significant effect on most of kefir's properties, except for fat content and dry matter, both of which were higher in WGP group ($p < 0.05$), also the a^* colour coordinate was higher ($p < 0.001$) than the control group. Regarding kefir storage significant variations in acidity ($p < 0.001$) were observed, with a decrease in pH and an increase in Dornic acidity during the first 14 days of refrigeration, with no differences in the last two weeks. Furthermore, the a^* coordinate increased on day 28 ($p < 0.05$). Microbial counts were not influenced by diet, however a significant decrease in *Lactobacillus* and *Lactococcus* spp. was observed over 28 days, while yeast populations increased during storage ($p < 0.001$). These results suggest that incorporating WGP in goat diets could be beneficial, as it did not negatively affect kefir's production and quality. Additionally, it may help reduce feed costs and optimize waste management in the winery industry

Fatty acid profiles of milk from Murcian-Granadina goats fed with white grape pomace silage

Gálvez-López M.¹ marina.galvezl@umh.es, Beltrán M.C.², Sendra E.¹, Fernández N.², Romero G.¹, Díaz J.R.¹

¹ Institute of Agri-Food and Agro-Environmental Research, Miguel Hernández University of Elche, Spain.

² Institute of Animal Science and Technology, Polytechnic University of Valencia, Spain.

KEY WORDS: CIRCULAR ECONOMY, BYPRODUCT, GOAT, MILK YIELD, HEALTH.

As the third-largest wine producer worldwide, Spain generates approximately 1.4 million tons of grape pomace annually. Utilizing these by-products in animal feed aligns with the sustainability goals outlined in the European 2030 Sustainable Development Goals. This practice lowers dairy production costs and supplies bioactive compounds beneficial to animal health, enhancing the production of high-quality, biologically valuable, and safe animal-derived food products for human consumption, at the same time it contributes to reducing the environmental impact of livestock. However, the nutritional quality of milk needs to be assured under these production conditions. This work aimed to evaluate the effect of three inclusion levels (5%, 10% 15% DM) of white grape pomace silage (WGP) in dairy goat diets on milk yield and fatty profiles. The unsaturated fatty acids significantly increased proportionally to the higher proportion of WGP in the diet. Monounsaturated fatty acids increased more than polyunsaturated fatty acids. Saturated fatty acids decreased in an inverse proportion to the percentage of WGP inclusion. 15% WGP milk had the highest n6/n3 ratio. The sum of trans fatty acids was significantly lower in the control milk than in WGP diet. The health human indices indicated a positive effect of WGP intake, as reflected in lower atherogenicity index, thrombogenicity index and hypocholesterolemia/hypercholesterolemia ratio.

Effect of marine algae supplementation on chemical and fatty acid composition of goats' milk and cheese

Pajor F pajor.ferenc@uni-mate.hu, Póti P, Egerszegi I, Bodnár Á

Institute of Animal Sciences, Hungarian University of Agriculture and Life Sciences, H-2100, Gödöllő, Páter Károly 1.

KEY WORDS: FATTY ACIDS; MILK; CHEESE; WHEY; DOCOSAHEXAENOIC ACID; SCHIZOCHYTRIUM LIMACINUM.

The aim of this study was to assess the effects of the daily 5 g per animal of *Schizochytrium limacinum* marine algae supplementation on the chemical composition of milk and cheese, and whey and fatty acid profile of milk and cheese. Thirty Alpine goats were randomly divided into two groups: the control group (n= 15) fed grass with daily 600 g concentrate and the experimental group (n= 15) who received the same diet supplemented with 5 g/head/day marine algae. The investigation period lasted 52 days, including the first six weeks as the period of adaptation and the last 10 days as the treatment period. During this period, bulk milk samples from each group were taken every day, moreover cheese samples were processed from bulk milk each day from both groups. Marine algae supplementation had no negative effect on milk composition, in contrast, it had significantly effect on the whey and cheese composition, in this group, the fat and protein content of whey were higher, the protein content of cheese, as well as the recovery of fat and protein in the curd were lower compared to control group. The marine algae supplementation significantly increased the docosahexaenoic acid and the rumenic acid concentrations and decreased the n-6/n-3 ratio in the milk and cheese. It can be concluded that the milk obtained from goats given daily supplementation of 5 g of marine algae has a fatty acid profile more beneficial to human health, with any negative effects on the cheese processing.

Effect of the inclusion of black grape pomace in the diet of dairy goats on the quality characteristics of yogurt: preliminary results

García-Teruel R¹, Khazzar S¹, Andrade JC¹, Diaz JR², Beltrán MC¹, Molina MP¹ pmolina@dca.upv.es

¹ Instituto de Ciencia y Tecnología Animal (ICTA), Universitat Politècnica de València, Valencia, España.

² Investigación e Innovación Agroalimentaria y Agroambiental (CIAGRO), Universidad Miguel Hernández, Orihuela, Alicante, España.

KEY WORDS: GOATS' MILK, YOGURT, BLACK GRAPE POMACE, BYPRODUCTS.

The aim of this work was to study the effect of the inclusion of black grape pomace in the diet of dairy goats on the production process and the characteristics of yogurt. For this purpose, two groups of Murciano-Granadina goats were used, which were fed respectively with a standard diet (Control) and another supplemented with 12% black grape pomace silage (BGP). Three batches of yogurt were produced, whose characteristics were determined at different storage times (1, 14 and 28 days). The production process and most of the characteristics of the yogurts were not affected by the diet ($p > 0.05$). Significant differences were only detected related to a^* and b^* coordinates, with the yogurt from the BGP diet showing higher redness (-2.73 vs -2.77; $p < 0.05$) and lower yellowness (4.77 vs 5.06; $p < 0.001$) values. In all case, chromatic differences calculated were irrelevant (< 1). Increased acidity of the yogurts was also observed during the first 14 days of storage, with lower pH values ($p < 0.001$) and higher Dornic acidity ($p < 0.01$). The rest of the variables analyzed were not affected by time. No significant interactions were found for most variables analyzed. The results indicate that the incorporation of black grape pomace silage in the diet of dairy goats not compromising the quality features of yogurts. Therefore, the valorization of grape pomace for feeding dairy goats could be a beneficial practice, contributing to reducing feed costs and optimizing the management of this waste.

Fatty acids profile of kefir produced from goat's milk feeding by a diet including black grape pomace byproduct

Andrade J.C.¹ jazanvil@etsiarn.upv.es, Khazzar S.¹, Romero G.², Rodríguez M.¹, Molina M.P.¹

¹ Animal Science and Technology Department, Universitat Politècnica de València, Valencia, Spain.

² Investigación e Innovación Agroalimentaria y Agroambiental (CIAGRO), Universidad Miguel Hernández, 03312 Orihuela, Alicante, España.

KEY WORDS: GOAT MILK, KEFIR, FATTY ACIDS PROFILE, GRAPE POMACE, BYPRODUCTS.

The fatty acids profile (FAs) is in part responsible for some healthy characteristics of milk and dairy products. The main goal of this work was to study the impact of the use of winery byproduct (black grape pomace) in the diet of goats on the FAs amount in milk, and kefir. For this, 2 groups of 20 Murciano Granadina goats were used, which were fed with a standard diet (Control) and another one supplemented with 12% black grape pomace silage (BP). Three batches of kefir were produced using pasteurized milk and a commercial starter, which characteristics were determined after 1, 14 and 28 days of cold storage. FAs were analyzed by gas chromatography.

Variations in the FA profile were found in kefir samples from the different diets, especially with regard to medium and long-chain FFAs, as well as in CLA (1.36 vs 1.66, $p < 0.01$) and the n-6/n-3 ratio (10.43 vs 14.84, $p < 0.01$) being higher in the BP diet. Differences were also observed in milk samples, mainly in CLA (1.04 vs 1.45, $p < 0.01$) and the n-6/n-3 ratio (10.43 vs 14.88, $p < 0.01$) as already observed in kefir.

The results indicate that the inclusion of black grape pomace in the diet of dairy goats could be beneficial as it increases CLA and Omega 3 considered as functional components in milk and kefir, with a possible positive effect on public health.

Effects of *Sulla flexuosa* Hay as Alternative Feed Resource on Goat's Milk Production and Quality

Boukrouh S^{1,2*} Soumaya.boukrouh@gmail.com; soumaya.boukrouh@um6p.ma, Noutfia A², Moula N¹, Avril C³,
Hornick JL¹, Chentouf M², and Cabaraux JF

¹ Department of Veterinary Management of Animal Resources, FARAH Center, Faculty of Veterinary Medicine, University of Liège, 4000 Liège, Belgium.

² Regional Center of Agricultural Research of Tangier, National Institute of Agricultural Research, Rabat 10090, Morocco.

³ HEPH Condorcet, Agronomy Category, 7800 Ath, Belgium.

KEY WORDS: HEDYSARUM FLEXUOSUM; LEGUME; MILK YIELD; FATTY ACID; ANTIOXIDANT.

Sulla flexuosa (*Hedysarum flexuosum* L.) is an endemic legume growing in some Mediterranean areas in rainfed and cold mountainous conditions. It could be used in goat diets as an alternative feed resource to supplement forest rangeland. This study aimed to test the effects of incorporating *Sulla flexuosa* (SF) hay into the diet of Beni Arouss goats on their milk production and quality. The hay was introduced at two levels, i.e., 35 or 70% (SF70), on a DM basis; it partially or totally replaced the alfalfa hay in the control diet. *Sulla flexuosa* incorporation did not affect milk production or physicochemical composition (pH, acidity, protein, fat, ash, solids non-fat, total solids, and net energy of milk). However, milk FA content varied in proportion to the SF incorporation percentage. The SF70 diet was associated with increased milk levels of healthier FA, such as oleic (C18:1n-9), linolenic (C18:2n-6), γ -linolenic (C18:3n-3), docosahexaenoic (C22:6n-3), and total monounsaturated, polyunsaturated, and omega-3 fatty acids, which was mainly due to the inhibition of ruminal biohydrogenation. As a consequence, atherogenic and thrombogenic indices improved. Additionally, the incorporation of *Sulla flexuosa*, reaching 70 % DM, improved milk polyphenols, which probably increased the antioxidant capacity (FRAP and DPPH) of milk. Therefore, *Sulla flexuosa* can be used as an interesting alternative forage in goat diets.

Seasonal variations of goat milk casein and their relationship to cheese production

Marcinkoniene L liga.marcinkoniene@gmail.com and Ciprovica I.

Faculty of Agriculture and Food Technology, Latvia University of Life Sciences and Technologies, Riga Street 22a, LV-3004, Jelgava, Latvia.

KEY WORDS: GOAT MILK, CASEIN, SEASON, CURD FIRMNESS, CASEIN TO FAT RATIO.

Milk renneting properties are important in cheese production, influencing cheese yield, protein release in whey, sensory properties. This study aimed to analyze the changes in casein content during lactation and their connections with goat milk renneting properties. Individual goat milk samples were collected from goats kept at organic goat farm Licisi Ltd, Latvia. In total, 117 individual milk samples were analyzed. Chemical composition, somatic cell score and freezing point were measured by Fourier-transform infrared spectroscopy, casein to fat ratio and casein to whey proteins ratio were calculated. Renneting properties were analysed by Texture Analyser TA.HD.plus (Stable Micro Systems, UK).

Milk renneting properties depend on the composition and quantity of casein in milk, fat content and the ratio of casein to fat. The study showed that fat content varied from 3.00 to 4.09 and protein content from 3.03 to 3.98%. The highest fat, protein and casein contents were found in late lactation milk in October. Casein content ranged from 73% at the beginning of April to 76% at the end of July and then decreased to 74% (October) in samples analyzed. Casein to fat ratio ranged from 0.73 to 0.85 and curd firmness from 1.55 to 2.12 N. Goat milk casein to whey proteins ratio was 74:22, which alter the physical properties of casein gel formed during renneting. A close correlation was found between the casein content and the firmness of the casein gel ($p < 0.05$). Funding 3.2.-10/253(AF29).

Enhancing circular economy in goat farming production systems: biogas generation from cheese whey

J.L. Ramos-Suárez¹ ramossu@ull.edu.es, S.J. Álvarez-Méndez^{1,2}, A. Ritter³, J. Mata González¹, A. Camacho Pérez¹

KEY WORDS: CIRCULAR ECONOMY, BIOGAS PRODUCTION, GOAT CHEESE WHEY, ANAEROBIC DIGESTION, BYPRODUCT MANAGEMENT.

Cheese whey (CW) is an agro-industrial by-product produced during the cheese manufacturing process. CW is rich in terms of nutritional value, but with a high pollution potential (Chatzipaschali *et al.*, 2012). In the Canary Islands around 80,000 m³ of CW is produced annually, most of it at small, artisan industries [6]. Only a small fraction of this is properly treated or used for feeding animals and for agricultural purposes. On the other hand, a large part of this CW is discharged to the sewage system or into the ground, with negative effects to local water treatment system and to the environment. Goat CW samples, CW from mixtures of goat and sheep milk, and goat, sheep and cow milk were collected at various cheese factories and cheese producing farms, evaluating its biogas production as a mean of energy generation and waste management. Complete characterization of these samples was performed in terms of physical and chemical composition, followed by Biochemical Methane Potential (BMP) tests where potential biogas production was estimated. Results showed that Goat CW can produce 42.3 (\pm 6.2) m³CH₄/t, whereas CW made of milk mixtures oscillated between 32.1 (\pm 5.3) m³CH₄/t for cow and goat CW and 38.2 (\pm 6.0) m³CH₄/t for goat and sheep CW. Consequently, anaerobic digestion of CW in small, medium and large-scale cheese producers can generate renewable energy while promoting circular economy in goat farming.

Relationship between somatic cell count and some milk quality parameters in Alpine goats

Pajor F pajor.ferenc@uni-mate.hu, Póti P, Egerszegi I, Bodnár Á

Institute of Animal Sciences, Hungarian University of Agriculture and Life Sciences, H-2100, Gödöllő, Páter Károly 1.

KEY WORDS: MILK; SOMATIC CELL COUNTS; MILK QUALITY; MILK COMPOSITION.

The aim of this study was to evaluate the chemical composition, somatic cell counts and bacteriology quality of the multiparous Alpine goats' milk. Milk samples from each goats (n= 38) were taken aseptically after the first three milk jets were discarded at four sampling times during their lactation period (DIM: 56, 118, 196 and 224 days) at the evening milking, thus 152 milk samples were collected. Somatic cell counts, milk constituents (fat, protein, lactose, dry matter), electrical conductivity and the prevalence of udder pathogen bacteria species were investigated from milk samples. Samples were divided into two groups by somatic cell count: below 400.000 somatic cells/ml (n= 51) and above 1.000.000 somatic cells/ml (n= 41). The udder health has significant effects on milk composition, conductivity and the presence of udder pathogens of the milk. Milk quality parameters have gradually changed in the samples above 1.000.000 cells/ml. Concentrations of the milk fat content and electrical conductivity increased ($p < 0.05$), while the lactose content decreased. Furthermore, the udder health had great effect on presence of the obligate udder pathogens bacterium species. In the high somatic cells group the ratio of the identified obligate udder pathogens bacterium species was higher (12%) compared with another group (2%; $p < 0.05$). These results suggest that the high somatic cell count is associated with disadvantageous milk properties, which significantly reduced the milk quality.

Enhancing Goat Breeding Season Using CIDRs® to Synchronize Estrus Cycles for Efficient Kidding Planning and Targeting Peak Chèvon Demand for Farmer Profitability

Escobar, E.N. enescoabar@umes.edu and Kassa, E. (*in memoriam*).

UMES Extension - University of Maryland Eastern Shore.

KEY WORDS: GOATS, ESTRUS SYNCHRONIZATION, KIDS, FARMER PROFITABILITY,

Goats are seasonal breeders, which challenges farmers to plan effectively to ensure the survival of newborns and farm profitability. This is especially true in the Mid-Atlantic States of the USA, where goats are strong seasonal breeders. Farmers must carefully plan to target seasonal chèvon demand and achieve top prices. A prolonged kidding season is exhausting, reduces newborn survival, and affects the recovery time of does. For the past decade, the management team at the UMES Small Ruminant Farm has used CIDRs (EAZI-BREED™ CIDR®, Zoetis, Kalamazoo, Michigan, USA) to synchronize estrus cycles. Basic research studies were conducted over three consecutive years. Crossbred meat-type does (n=183) were divided into two groups: synchronized (CIDR) and control (CONTROL), for fall breeding protocols. During each breeding event, CIDRs® were inserted for 12 to 18 days, based on original CIDRs® goat registration protocols. After CIDRs® removal, does were grouped for 10 to 12 days into breeding groups of up to 12 does per pasture with one buck. Data was analyzed using chi-square and ANOVA (SAS) to assess the effect of synchronization on pregnancy rates (PR= pregnant does/exposed does). PRs were significantly different ($p < 0.03$) during the fall/estrus periods between the CIDR and CONTROL groups (60.8% and 39.1%, respectively). At this farm, CIDRs® were also used during the anestrous cycle with some success, showing that out-of-season goat breeding is possible using CIDRs®.

Analysis of Immunoglobulin G in Goat Colostrum Using Data Science and Colour-Based Techniques

Betancor-Sánchez M manuel.betancor105@alu.ulpgc.es, González Cabrera M, Morales de la Nuez A, Hernández Castellano LE, Argüello A, Castro N.

IUSA-ONEHEALTH 4, University of Las Palmas de Gran Canaria, Las Palmas, Spain.

KEY WORDS: MACHINE LEARNING, DEEP LEARNING, IGG PREDICTION

In 2005, Anastasio Argüello et al. discovered that the concentration of IgG in goat colostrum could be predicted using multiple regression analysis based on colour samples (DOI:10.3168/jds.S00220302(05)72849-6). This discovery is highly relevant, as newborn kids must ingest colostrum for passive immunity, since maternal antibody transfer does not occur during gestation. The present study builds upon the data gathered in the previous research by applying Data Science techniques to evaluate potential improvements over the traditional statistical methods used in the original study. The dataset consisted of colostrum samples collected from Majorera goats, which were examined for their colour properties using the CIE LCh colour space, alongside measurements of IgG concentration. To assess predictive performance, two regression models, a decision tree and a neural network, were developed and trained on these data. By applying these new techniques, we improved performance across all the metrics established in the original study, achieving an accuracy of 98.16%. Additionally, new metrics were incorporated in this study, which show that the predicted values align closely with those obtained using ELISA in laboratory settings, resulting in a mean absolute error of just 0.32. The models developed could be easily implemented in the sector through mobile phones or low-cost devices in the future, ensuring an affordable and accurate method to estimate IgG concentration.

An agroecological strategy for forage production in arid regions

María Mora Armas¹ mmora@fg.ull.es, Raquel Pérez Reverón¹, Adolfo Perdomo González¹, Nuria Macías Hernández¹, Carlos Ruiz Carreira¹, Sofía Rodríguez Nuñez², Carlos Samarín Bello², Francisco Javier Díaz Peña^{1*}

¹ Departamento de Biología Animal, Edafología y Geología, Universidad de La Laguna.

² Consejería de Transición Ecológica y Energía. Gobierno de Canarias.

KEY WORDS: ARTHROPODOS DIVERSITY, PRODUCTION SYSTEM INNOVATION, RECYCLED WASTE WATER.

BioIslet Systems (BIS) are proposed as an agroecological strategy to enhance forage production in arid regions, addressing water scarcity, soil degradation, and biodiversity loss. BIS consist of multi-species plantings designed to optimize soil and water use, promote biodiversity, and increase biomass. These areas can serve as refuges for various species, particularly arthropods, fostering ecosystem resilience. Ten BIS of 36 m² were established in Fuerteventura, containing 52 specimens of four plant species (*Bituminaria bituminosa*, *Cenchrus ciliaris*, *Echium decaisnei*, and *Lotus lancerottensis*), grown in two soil types under reclaimed water irrigation. Biodiversity impacts on epigeic arthropods and pollinators were assessed, comparing BIS with unmanaged natural systems in the surrounding area. Three sampling methods were used: pitfall traps, pan traps, and butterfly nets, followed by taxonomic identification. Arthropod abundance was 5 to 14 times higher, respectively, in BIS compared to controls. Additionally, there was a 60% increase in pollinator richness. Arthropod community composition differed from controls and was influenced by soil type. Regarding species origin, BIS had fewer endemic species, more native species, and a similar proportion of introduced species (~10% of the total) compared to unmanaged systems. These findings suggest BIS foster plant-soil interactions that enhance wildlife persistence.

Effects of a simplified milk production method on the estimation of milk yield and genetic evaluations in the Florida goat breed

Ziadi C¹ z72zizic@uco.es, Muñoz-Mejías E², Sánchez M³, Dolores-López M⁴ and Molina A¹.

1 Department of Genetics, University of Córdoba. Córdoba, Spain.

2 Department of Animal Pathology and Animal Production, University of Las Palmas de Gran Canaria. Arucas, Spain.

3 Department of Animal Production, University of Córdoba. Córdoba, Spain.

4 ACRIFLOR. Department of Animal Production, University of Córdoba. Córdoba, Spain.

KEY WORDS: MILK RECORDING DESIGN, SIMPLIFICATION, ACCURACY, DAIRY GOATS.

This study aimed to assess the impact of simplified designs based on spacing records on performances and genetic evaluations of milk yield. The dataset included 53,397 daily milk records from 180 Florida dairy goats, collected by an automatic milking system that recorded all milkings. Different simplified designs were simulated from the available milking data, including A4, A6, AT4, AC4m, and AC6m. Milk yields per lactation were estimated using the Fleischmann method. The adequacy of the simplified strategies was determined based on the loss of precision and the genetic correlations (r_g) between real lactation and the different simplified designs. All estimated performances from simplified designs were included in the genetic evaluation with real milk production. EBVs obtained were compared to the EBVs of real milk production. Losses of precision between observed and estimated milk yields were 18.21% for A4, 28.60% for AT4, 28.94% for AC4m, 27.30% for A6, 40.82% for AT6, and 40.73% for AC6m. The r_g between real lactation and simplified designs were 0.92 for A4, 0.88 for AT4, 0.88 for AC4m, 0.89 for A6, 0.85 for AT6, and 0.85 for AC6m, indicating a low-medium impact of simplified designs on EBVs. The results suggested that using performances computed from a simplified design for practical and economic reasons is reliable. Milk production was estimated more accurately with information from A4, followed by the A6 method, compared to other single-daily milk recording systems.

Pairing goat's cheese with different types of wines

Ruiz Morales FA¹ franciscoa.ruiz@juntadeandalucia.es, Colombo S, López Infante MI,
López Ruiz AL² and Ureña Cámara LP².

¹ Andalusian Institute of Agricultural Research and Training (IFAPA), Granada & Cordoba, Spain.

KEY WORDS: MARKETING, CONSUMERS, GASTRONOMY, SENSORY ANALYSIS.

Knowledge of the pairing of goat's cheese with wine is very limited, and is limited to white wine, without specifying much more. There is currently a wide range of wines and goat's cheese on the market, so it is necessary to go deeper into this pairing and not just stick to the goat's cheese and white wine binomial.

This study shows the results of the evaluation of the organoleptic preference of end consumers for different pairings of goat's cheese and red, white and sweet wines.

For the sensory evaluation, a 7-point linear or hedonic scale was used, which measures the degree of acceptance of the proposed pairing. This scale ranges from Point 1 '*I don't like it at all*' to Point 7 '*I like it very much*'.

The five best pairings valued by consumers are: 1st Goat cheese cured in olive oil with Young white wine; 2nd Goat cheese cured in olive oil with "*Fino*" wine; 3rd Goat cheese cured in olive oil with Red reserva wine; 4th Goat cheese cured in olive oil with Red crianza wine and 5th Blue goat cheese with Pedro Ximénez wine.

Of the five best pairings, we find that the first two are with white wines, followed by two red wines. Furthermore, looking at the average ranges within each group (according to the type of wine), it sees that the scores of the different pairings, for the same wine, generally improve if the cheese is more mature or has a stronger flavour (as in the case of blue cheese).

Prospective of the organic dairy goat sector in Europe

Castro Arvelález JA¹, Ureña Cámara LP², López Ruiz AL³ and Ruiz Morales FA² franciscoa.ruiz@juntadeandalucia.es.

1 Andalusia International University, Baeza, Spain.

2 Andalusian Institute of Agricultural Research and Training (IFAPA), Granada & Cordoba, Spain.

KEY WORDS: PRODUCTION SYSTEMS, EVOLUTION, SWOT ANALYSIS.

The main objective of this work has been the construction of a starting point from which to generate a prospective reflection of the organic dairy goat sector in Europe, with emphasis on three goat regions considered representative of France (Nouvelle Aquitaine), Italy (Sardegna) and Spain (Andalusia).

A literature review and analysis of the evolution of organic goat population and production in Europe was carried out. In addition, three questionnaires were created for cheesemakers, technicians and consumers in the three regions studied, which were carried out during the year 2024.

From the information generated, a SWOT matrix of the dairy goat sector in Europe was constructed.

Within certified organic livestock farming there is a great diversity of models, with Greece being the most extensive and traditional. In contrast, organic goat farming in the Netherlands is the most intensive (higher milk production per goat).

By region, Nouvelle Aquitaine (France) has seen the highest conversion to organic production; in Andalusia (Spain) conversion is lower but steadily increasing and in Sardinia (Italy) conversion to organic production is zero.

Abundance of Mediterranean-type ecosystems and/or advance of feeding autonomy, presence of indigenous breeds, proximity of pastoral to organic management, need to preserve the environment and growing awareness of animal welfare (mentioned in the questionnaires), make organic dairy goat farming in Europe a model for the future.

Milking frequency and melatonin implants affect milk yield but not chemical composition during the dry-off period in pregnant dairy goats.

González-Cabrera M¹, Morales-delaNuez A¹, Argüello A¹, Muñoz-Quirós-Manjavacas J¹, Torres A², Castro N¹, Hernández-Castellano LE¹ lorenzo.hernandez@ulpgc.es.

¹ IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

² Unit of Animal Production, Pasture, and Forage in Arid and Subtropical Areas. Canary Islands Institute for Agricultural Research, Cno El Pico, s/n, 38260 La Laguna, Spain.

KEY WORDS: DRY PERIOD, DRY-OFF STRATEGIES, HEALTH, MAMMARY GLAND.

This study aims to evaluate the use of different dry-off strategies based on melatonin implants and milking frequency on production parameters before the onset of the dry period. Thus, this study used 24 pregnant dairy Majorera dairy goats. On day -75 relative to expected parturition, goats were subcutaneously treated with a 1 mL of saline (SAL1/1 and SAL1/2 groups) or with a melatonin implant (MEL1/1 and MEL1/2 groups). From day -75 to -60 relative to expected parturition, animals were either milked every day (SAL1/1 and MEL1/1 groups) or every two days (SAL1/2 or MEL1/2 groups). During this period, milk yield was recorded and milk samples collected to determine protein, lactose, fat and total solids percentage. The data was analysed using the PROC MIXED procedure of SAS was used, and the significance was set as $p < 0.05$. The results showed faster milk yield reduction in those animals treated with the Melatonin implant compared to those receiving saline ($p < 0.001$). In addition, milk yield decreased faster in those animals milked once every two days than those milked once daily. Milk chemical composition (i.e., fat, protein and lactose) was not affected by either the melatonin administration or the milking frequency ($p > 0.05$). This study was funded by the project PID 2020-113056RA-I00/AEI/10.13039/501100011033.

Evaluating the Suitability of Subcutaneous Loggers for Measuring Temperature, Activity, and Heart Rate Variability in Dairy Goats. Preliminary results

N. Castro¹ tacho@ulpgc.es, J.L. Martín-Barrasa^{2,3}, M. González-Cabrera¹, A. Morales-de-la-Nuez¹, L.E. Hernández Castellano¹, M. Betancor-Sánchez¹, A. Argüello¹.

¹ IUSA-ONEHEALTH 4, Animal Production and Biotechnology group, Instituto de Sanidad Animal y Seguridad Alimentaria, Universidad de Las Palmas de Gran Canaria, Campus Montaña Cardones, 35413 Arucas, Spain.

² Univ Las Palmas Gran Canaria, Univ Inst Anim Hlth & Food Safety IUSA, Grp Fish Hlth aquaculture & wild species, Infect Dis & Food safety, Arucas 35416, Spain.

³ Hosp Univ Gran Canaria Dr Negrin, Res Unit, Anim Facil, Barranco Ballena S-N, Las Palmas Gran Canaria 35019, Spain.

KEY WORDS: GOAT WELFARE, SUBCUTANEOUS LOGGER, HEART RATE VARIABILITY, PHYSIOLOGICAL MONITORING, DAIRY GOATS, STAR-ODDI®, ANIMAL BEHAVIOUR.

Animal welfare assessment is a critical concern in livestock production, yet existing methodologies are often time-consuming, insufficiently informative, or poorly adapted for goats. This preliminary study evaluates the suitability of a subcutaneous logger (Star-Oddi®) for continuous monitoring of physiological and behavioural parameters in dairy goats. A logger was implanted subcutaneously in a Majorera dairy goat and programmed to record subcutaneous temperature (ST), activity, and heart rate variability (HRV) at 15-minute intervals over three days. Electrocardiograms were performed before implantation and prior to extraction for validation. ST stabilized 24 hours post-implantation, with a mean \pm SD of 27.54 ± 1.69 °C, exhibiting a circadian rhythm. Activity levels averaged 20.75 ± 30.13 mg, with peaks at 08:00 (milking, 100-150 mg) and 12:00 (feeding, 100-127 mg). Mean HR after stabilization was 74.50 ± 15.07 bpm. HRV analysis showed SDNN (Standard Deviation of NN intervals) of 120.66 ± 77.58 ms and RMSSD (Root Mean Square of Successive Differences) of 177.01 ± 112.64 ms. These findings suggest that subcutaneous loggers are a viable tool for welfare monitoring in dairy goats, enabling real-time physiological and behavioural assessments with minimal intervention. Further research should validate its long-term applicability across different management conditions. Funded by Fundación CajaCanarias and Fundación Bancaria La Caixa (Ref. 2023DIG29).

Relationship Between Thermography and Rectal Temperature in Goat Kids

C. Mateo-Díaz, M. González-Cabrera, A. Morales-de-la-Nuez, L.E. Hernández Castellano, M. Betancor-Sánchez, N. Castro, A. Argüello. tacho@ulpgc.es

IUSA-ONEHEALTH 4, Animal Production and Biotechnology group, Instituto de Sanidad Animal y Seguridad Alimentaria, Universidad de Las Palmas de Gran Canaria, Campus Montaña Cardones, 35413 Arucas, Spain.

KEY WORDS: INFRARED THERMOGRAPHY, GOAT KIDS, RECTAL TEMPERATURE, OBSERVER EFFECT, ANIMAL WELFARE.

Infrared thermography (IRT) is a non-invasive method for measuring surface temperature and has potential applications in livestock monitoring. This study evaluates the correlation between rectal temperature, measured with a digital thermometer, and surface temperature obtained via IRT in Majorera goat kids. Temperature data were collected over three days from 11 animals, using a thermographic camera and digital thermometer. Measurements were taken at multiple body regions, including the perineal area, which is anatomically close to rectal measurements. Statistical analyses, including Spearman's correlation and non-parametric tests, were performed using Jamovi software. Results indicate a significant correlation between rectal and perineal temperatures ($p < 0.05$), supporting the validity of IRT as a potential alternative for monitoring body temperature in goat kids. However, no strong correlations were observed between rectal temperature and other body regions. Observer variability significantly influenced results, likely due to inconsistencies in camera distance. Standardization of measurement protocols is recommended to enhance reliability. Future research should include febrile animals to expand the temperature range and validate IRT for health assessments in goat farming.

Acceptance of aged adult goat meat by consumers

Betancort Y¹, Torres A², Fumero L¹, Schatenhoffer, D³, Álvarez S² and Fresno M² mfresno@icia.es.

1 Instituto Canario de Investigaciones Agrarias (ICIA), Master's student, Santa Cruz de Tenerife, Spain.

2 Instituto Canario de Investigaciones Agrarias (ICIA), Santa Cruz de Tenerife, Spain.

3 Restaurante Taste 1973 (Hotel Villa Cortés****), Santa Cruz de Tenerife, Spain.

KEY WORDS: AGED MEAT, CONSUMER TASTING, SENSORY CHARACTERISTICS, DESCRIPTORS.

The main objective of this paper was to determine consumer's product acceptance of a new product: aged meat from adult canary goat after the end of its life as a milk producer. An innovative product with potential for new market niches and diverse culinary preparations. Meat from 30 goats subjected to dry maturation for 2, 30 and 60 days under controlled conditions of temperature (0-2 °C) and relative humidity (85 ± 5 %) have been evaluated. Tests were conducted in different settings, always following a standardized protocol to ensure consistency in the results. Each participant was offered three mini-burgers made from leg and shoulder meat, each corresponding to a different maturation period. All samples had the same culinary preparation. These untrained judges (n= 98) were provided with an evaluation form that included general data, a preference scale, and a list of descriptors (obtained from the sensory profile conducted by a panel of experts) to select the ones they observed in each sample. Results in average scores reflect a good level of consumer acceptance for all ripen times. This suggests that all samples were well-rated, especially those that underwent maturation. As the meat aged, a greater number of participants were able to identify and differentiate the proposed descriptors indicating that ripen enhances the perception of these sensory attributes. Consumer response shows that the maturation of meat under these conditions modifies the sensory profile towards a more highly valued product.

Effect of dry maturation on the instrumental quality of goat meat.

Fumero L¹, Torres A², Betancort Y¹, Schatenhoffer, D³, Álvarez S² and Fresno M² mfresno@icia.es.

1 Instituto Canario de Investigaciones Agrarias (ICIA), Master's student, Santa Cruz de Tenerife, Spain.

2 Instituto Canario de Investigaciones Agrarias (ICIA), Santa Cruz de Tenerife, Spain.

3 Restaurante Taste 1973 (Hotel Villa Cortés****), Santa Cruz de Tenerife, Spain.

KEY WORDS: GOAT MEAT, DRY MATURATION, TEXTURE, COLOUR, LIGHTNESS.

The maturation of meat is a complex enzymatic process that improves its organoleptic and functional characteristics, being especially valued in high quality meats. In particular, dry ageing is a technique that allows a more precise control of environmental conditions, such as temperature and humidity, favouring the breakdown of proteins and fats, which contributes to improving the texture, flavour and juiciness of the meat. This process has been widely used in beef and pork, but its application in goat meat is relatively recent. The aim of this study was to evaluate how dry ripen affects the instrumental parameters of colour and texture in goat meat. For this purpose, these parameters were evaluated in goat meat subjected to three maturation periods (2, 30 and 60 days). The results showed a significant decrease in the a (redness) of the meat with maturation time, while the b (yellowness) value increased, reflecting a shift towards warmer shades as maturation progressed. On the other hand, lightness (L) remained constant throughout the process. In terms of texture, the meat became progressively more tender. This study highlights the potential of dry maturation to improve the instrumental properties of goat meat, positioning it as a product with differentiated organoleptic characteristics that could offer significant added value to gastronomy. However, further research is needed on other aspects to optimise this process and ensure its implementation on a larger scale.

Effect of ageing on physicochemical characteristics of adult goat meat

Fumero L¹, Torres A², Betancort Y¹, Schatenhoffer, D³, Álvarez S² and Fresno M² mfresno@icia.es.

1 Instituto Canario de Investigaciones Agrarias (ICIA), Master's student, Santa Cruz de Tenerife, Spain.

2 Instituto Canario de Investigaciones Agrarias (ICIA), Santa Cruz de Tenerife, Spain.

3 Restaurant Taste 1973 (Hotel Villa Cortés****), Santa Cruz de Tenerife, Spain.

KEY WORDS: DRY MATURATION, FUNCTIONAL PROPERTIES, MEAT QUALITY, WATER HOLDING CAPACITY.

For centuries, goats have been an essential part of the livestock heritage of the Canary Islands. Traditionally, goat meat has been considered a by-product of dairy production, however, it offers a high potential for its revalorisation as a high-quality gastronomic ingredient. In this context, changes in the physicochemical characteristics of meat from 30 goats subjected to dry ageing for 2, 30 and 60 days under controlled conditions of temperature (0-2 °C) and relative humidity (85 ± 5%) have been evaluated. For this purpose, different physicochemical parameters were analysed, showing a significant increase in pH and a reduction in water content throughout the maturation process. Simultaneously, an increase in fat, protein and ash contents was recorded, while the percentage of collagen remained constant. Lipid oxidation, measured by the TBARs index, increased significantly between 1 and 30 days and stabilised thereafter. These changes have direct implications for meat quality. The increase in pH contributes to a higher water holding capacity, resulting in juicier meat. The reduction in water content favours a concentration of nutrients and aromatic compounds, while the increase in protein and fat improves the texture, flavour and perceived quality of the product. Thus, it is confirmed that dry maturation produces physicochemical changes that improve the functional properties of the meat, positioning it as a differentiated and high-quality product.

Effect of potato waste silage use on production and quality of milk and goat cheeses

Álvarez S¹ salvarez@icia.es, González A^{1,2}, Valdivia I², Ríos D², Betancor Y¹, Méndez P¹, Torres A¹, Fresno M¹.

¹ Unidad de Producción Animal, Pastos y Forrajes. Instituto Canario de Investigaciones Agrarias, Tenerife. Spain.

² Servicio Técnico de Agricultura del Cabildo de Tenerife. Spain.

KEY WORDS: POTATO, AGROINDUSTRIAL BY-PRODUCTS, SILAGE, MILK PRODUCTION, CHEESE QUALITY.

The use of agro-industrial by-products in goat diets could reduce feeding costs. Ensiling can be considered the most efficient way of preserving high moisture by-products. In Canary Islands, potatoes residues infected with Guatemalan potato moth (*Tecia solanivora*) can be used for high quality silage feed.

In this experiment, two groups of Canarian goats (n= 10) were used to study the effect of feeding with potato silage on milk and cheese production and quality. High quality potato silage was selected from previous studies (potato 59%, bran 29% and molasses 12%). Two different diets were supplied to lactating goats: SD composed by lucerne hay, corn, cereal-legume mixture and PD, where 17% DM of potato silage replacing 18% of cereal-legume mixture in order that diets were isoenergetic and isoproteic.

The potato silage was fully consumed by the PD goats (1 kg per animal daily) and thus highly palatable. There were no differences in milk yield although milk quality (fat and protein) was better in PD ($p < 0.05$). This resulted in a better cheese yield ($p < 0.001$) for PD cheeses (12%). No differences were found in sensorial profile, texture and colour characteristics. None of the cheeses studied, showed unpleasant odours, aromas or flavours that did not correspond to those usually found in Canarian goat's cheeses made from raw milk. Using potato silage in PD to replace part of the concentrate fraction was more cost-effective because of better milk quality and cheese yield.

Sensory properties of an ice cream made from goat or cow milk: preliminary results

Colonna MA¹, Tarricone S¹, Fortunato M¹, Salerno A², Giannico F³, Carbonara C⁴, Ragni M¹ marco.ragni@uniba.it

1 Department of Soil, Plant and Food Sciences, University of Bari Aldo Moro, Bari, Italy.

2 Gruppo Gelaterie S.R.L., Oria (Br), Italy.

3 Department of Veterinary Medicine, University of Bari Aldo Moro, Valenzano (BA), Italy.

4 Department of Medical and Surgical Sciences, University of Foggia, Italy.

KEY WORDS: GOAT MILK, COW MILK, ICE CREAM, AUTOCHTHONOUS BREED, SENSORY PROPERTIES.

Processed goat milk products can serve as functional foods, making them particularly suitable for individuals with cow milk allergies. The structure of goat milk fat globules enhances its suitability for ice cream production, yielding a softer texture and desirable melting characteristics. To assess consumer acceptability, a blind sensory evaluation was conducted on 75 participants who tasted two 'fior di latte' ice creams made with goat or cow milk. Both formulations contained the same proportions of ingredients: 2 l of milk, 400 g of sugar, and 300 g of carob seed flour. Evaluations were based on a nine-point hedonic scale, assessing attributes such as color, taste, sweetness, barny off?flavour, creaminess, freshness, graininess, spoon resistance, flavor persistence, and overall appreciation. The results revealed a higher ($p < 0.05$) preference for the goat milk-based ice cream, which achieved an average hedonic score of 7.39 compared to 6.85 of the cow milk counterpart. This outcome is particularly noteworthy as it challenges the common belief that goat dairy products are less palatable to consumers. These findings highlight the potential of goat milk as a premium raw material, suggesting that its use in ice cream production could be a strategic approach to enhancing local breeds. In the broader context of increasing awareness of biodiversity and sustainability, investing in these regional dairy supply chains may offer valuable opportunities for the development of the sector.

Inference of the Classical Carcass Cutting of Goats from Gastronomic Butchering Methods

Betancort Y¹ , Fresno M² , Clemente J.C³ , Marcelino D⁴ , Betancort I⁵ , Torres A² atorresk@icia.es , Argüello A⁶

1 Instituto Canario de Investigaciones Agrarias (ICIA), Master student, Santa Cruz de Tenerife, Spain.

2 Instituto Canario de Investigaciones Agrarias (ICIA), Santa Cruz de Tenerife, Spain.

3 Asesor Gastronómico, Santa Cruz de Tenerife, Spain.

4 Chef ejecutivo de El Secreto de Chimiche.

5 Universidad de Las Palmas de Gran Canaria (ULPGC), Undergraduate student, Las Palmas de Gran Canaria, Spain.

6 Universidad de Las Palmas de Gran Canaria (ULPGC), Las Palmas de Gran Canaria, Spain.

KEY WORDS: CARCASS, BUTCHERING, GASTRONOMIC, CUTTING, INFERENCE.

The integration of animal production into gastronomic sciences is a well-established fact. The objective of this study is to infer the classical carcass cutting proposed by Colomer, Fehr, and Kirton in 1987 based on the butchering practices commonly used in kitchens that process goat carcasses. Four carcasses from one-year-old male goats (two North Tenerife and two Palmera breeds) were utilized. First, no differences were observed between the two butchering methods regarding the neck and shoulder cuts. Regarding the leg, both methods followed the same cutting pattern, except that the hip bone (Ilium, Ischium, and Pubis) was separated from the whole leg in the gastronomic approach. The most significant differences were found in the rib and lower cuts. In the gastronomic method, the sternum area and the lower strip of cartilaginous ribs, along with the abdominal wall musculature, were separated. Additionally, the Psoas major, Psoas minor, and Iliacus muscles (tenderloin) were also isolated. The weights of the two half-carcasses were equalized by proportionally distributing the differences across each cut. Using the standardized proportions of the ribs and lower cuts, their values were estimated by combining the three previously described sections, resulting in a mere 3% difference between actual and estimated weights. This minimal discrepancy allows us to infer the standardized butchering method from the gastronomic approach.

Using saliva to determine passive immune transfer in goat kids

Muñoz-Quirós-Manjavacas J, Hernández-Castellano LE, lorenzo.hernandez@ulpgc.es, Morales-delaNuez A, Argüello A, Castro N, González-Cabrera M.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: SALIVA, IMMUNITY, NEWBORN, COLOSTRUM,

Newborn goat kids rely on colostrum intake early after birth to achieve a correct passive immunization. Contrary to blood sampling, saliva can be collected by non-invasive methods. This study aimed to investigate the suitability of saliva immunoglobulin G (IgG) concentration as a non-invasive method to estimate blood IgG concentration in goat kids during the first month of life. Seven goat kids were immediately separated from the dams at birth and bottle fed colostrum (10% of the birth BW) divided in two meals (i.e., at 2 h and 12 h relative to birth). Thereafter, animals were fed goat milk twice a day during the first month of life. Saliva and blood samples were collected on day 0 (i.e., before colostrum intake) and on day 1, 2, 3, 5, 10, 15 and 30 relative to birth. Plasma and saliva IgG concentrations were determined using commercial ELISA kits. Pearson correlation coefficient was determined using Jamovi 2.3 software and the statistical significance was set as $p < 0.05$. Results showed no correlations between plasma and saliva IgG concentrations, suggesting that saliva does not reflect circulating IgG concentrations during the first month of life. However, given the limited sample size, the present findings should be taken cautiously. This study represents a preliminary assessment of salivary immunoglobulins, which could potentially promote the development of non-invasive on-farm tools to assess acquired immunity in newborn goat kids.

Evolution of white and red blood cells in dairy goats around parturition

Muñoz-Quirós-Manjavacas J, Hernández-Castellano LE, lorenzo.hernandez@ulpgc.es, Morales-de-la-Nuez A, Argüello A, Castro N, González-Cabrera M.

IUSA-ONEHEALTH 4 Animal Production and Biotechnology Group, Institute of Animal Health and Food Safety, Universidad de Las Palmas de Gran Canaria, (Campus Montaña Cardones, s/n, 35413, Arucas) Spain.

KEY WORDS: SALIVA, IMMUNITY, NEWBORN, COLOSTRUM,

This study investigated changes in white and red blood cells around parturition to identify those periods with higher susceptibility to infectious diseases. Thus, 31 multiparous and pregnant Majorera dairy goats were used. Plasma collection tubes containing EDTA (9 ml) were used to collect blood samples from the jugular vein on day -21, -15, -7, 0, 1, 2, 3, 5, 10, 15 and 30 relative to parturition. Blood samples were analysed with an Automatic Haematology Analyzer to determine white and red blood cell concentrations. The data was analysed using the PROC MIXED procedure of SAS and the significance was set as $p < 0.05$. The results showed increased leucocyte concentration at parturition (d 0; $p < 0.001$), although lymphocyte concentrations were not affected ($p = 0.24$) during the entire experimental period. Monocyte concentrations increased on d -3 relative to parturition, decreasing on d 1 and 2 postpartum ($p = 0.002$). Granulocyte concentration increased at d 0 ($p < 0.002$). Therefore, it seems that increased leukocyte concentrations at parturition are caused by increased concentrations of monocytes and granulocytes around this period. In addition, red blood cells as well as hemoglobin concentration and hematocrit decreased constantly from d-21 to d 30 relative to parturition ($p < 0.001$). In conclusion, it seems that the activity of the cellular immune response is increased around parturition in dairy goats.

Characterization of grazing activities of goats using precision tools

Chebli Y, youssef.chebli@inra.ma, El Otmani S, Chentouf M

Regional Center of Agricultural Research of Tangier, National Institute of Agricultural Research, Avenue Ennasr, BP 415 Rabat Principale, Rabat 10090, Morocco

KEY WORDS: GPS COLLARS, GRAZING BEHAVIOR, ACCELEROMETERS, SEASONAL ACTIVITY, REMOTE SENSING

Novel remote monitoring technologies, such as global positioning systems (GPS) and three-axis accelerometers, now allow for the fine-scale observation and analysis of animal behavior across temporal and spatial scales. This study integrated GPS collars, calibrated accelerometers, and satellite remote sensing to classify various behavioral activities of grazing goats. The study was performed on a traditional goat farm in Northern Morocco, located in the mountainous forest rangelands. To study their grazing habits over the seasons, researchers outfitted eight local goats with leg sensors and GPS collars. A calibration study and classification analysis were used to predict their behaviors in grazing situations. They showed that goats spent most of their time in the spring and the fall foraging, but the time spent resting increased significantly in the summer, limiting grazing activities. Step counts were statistically similar but significantly increased in the summer and fall. Goats were out grazing 48% of the time in the spring, compared to 27% in the summer and 31% in the fall. As indicated by the GPS collar data, seasonal variation greatly influenced all measured parameters. These results highlight the capabilities of GPS collars and sensors for monitoring grazing behavior, contributing to knowledge that can enhance grazing management strategies and animal performance.

Goat value chain and the innovation of short marketing channel in Chefchaouen, Northern Morocco

Authors: Chebli Y, youssef.chebli@inra.ma, El Otmani S, Chentouf M

Regional Center of Agricultural Research of Tangier, National Institute of Agricultural Research, Avenue Ennasr, BP 415 Rabat Principale, Rabat 10090, Morocco.

KEY WORDS: GOAT VALUE CHAIN, PARTICIPATORY MAPPING, SHORT MARKETING CHANNELS, RURAL LIVELIHOODS, SUSTAINABLE PRACTICES

The Chefchaouen region in northern Morocco, with its unique topography and Mediterranean climate, provides a distinctive environment for studying the value chain of goat farming. This study employed participatory mapping and qualitative interviews with relevant stakeholders to characterize the goat value chain and assess the early adoption of innovative short marketing channels, such as Ajbane Chefchaouen. Through semi-structured interviews, insights were gathered from value chain actors regarding their roles, practices, and the challenges they face. The findings highlight key weaknesses, including restricted market access, seasonal production variability, and insufficient infrastructure. The Ajbane Chefchaouen cheese production unit emerges as a transformative innovation, enhancing economic returns, preserving cultural heritage, and promoting sustainable practices by connecting producers directly to consumers. However, challenges such as milk supply irregularity and infrastructure deficits persist. This study underscores the importance of strengthening the goat value chain from stakeholders' perspectives to improve rural livelihoods and ensure long-term sustainability.

