

EFFECT OF PERI-WEANING DIETARY EXPERIENCE WITH OREGANO ESSENTIAL OIL ON THE DEVELOPMENT OF FEEDING PREFERENCES IN LAMBS OF CHIOS AND KARAGOUNIKO BREED AT THE AGE OF 3, 5, 7, 9 AND 11 MONTHS OLD.

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SUMMARY

The crucial role of periweaning period in the development of lamb feeding preferences was examined in the present study. Twenty four female lambs, 12 of Chios and 12 of Karagouniki breed were the animals used. Two days after birth and having consumed enough colostrum lambs were separated from their mothers. They were housed in two identical pens with the same direction and orientation, the same covered area and similar troughs for feeding. They were reared on artificial milk using nipple feeders. Milk was offered ad libitum, in order to ensure that lambs met their daily requirements, until the age of 45 days. Lambs had free access to alfalfa hay and also received a commercial concentrated feed, supplemented with oregano essential oil (1 ml/kg) between the 15th and the 60th day of their life. After weaning and till the 60th day, lambs received only alfalfa hay and the concentrate supplemented with oregano essential oil.

The elements of lambs' feeding behaviour were recorded during the periweaning period (40th -60th day). As it was shown, lambs initially consumed small

quantities of the examined diet supplemented with the oregano essential oil, but they gradually increased their feed intake, occurrences and duration of eating from the 40th to the 60th day ($P < 0.05$). More specifically, Chios lambs consumed lower amounts of feed by having more occurrences of eating with a shorter duration compared to Karagouniki lambs ($P < 0.05$).

At the age of 3, 5, 7, 9 and 11 months old, lambs were individually subjected to feeding preference tests. These tests were implemented in 4 identical experimental pens equipped with 4 similar troughs. Immediately following 5 min of adaptation in the rest area, lambs were exposed simultaneously to 4 test feeds in the test area of the experimental pen for 25 min. Test feeds consisted of the concentrated feed that lambs ate daily, supplemented with eucalyptus or mint or orange or oregano essential oil (1 ml/kg). Behavioural components were recorded using cameras mounted 3 m above the pen floor.

As was shown by the feeding preference tests, previous exposure to oregano essential oil influenced the future acceptance of feed and modified lamb feeding preferences, as described by feed intake, occurrences and duration of eating, especially after the age of nine months old, in both breeds ($P < 0.05$). The present findings suggest that by applying the appropriate treatments and behavioural techniques, sheep could accept, and more efficiently ingest feeds supplemented with specific compounds. It is therefore clear that the manipulation of early feeding experiences during the periweaning period, could influence dietary preferences and enhance future performance of lambs.

Key Words: weaning; oregano; lamb; breed; feeding behaviour; learning; preference.

FACTORS INFLUENCING FATTY ACID COMPOSITION OF LAMB MEAT AND POSSIBILITIES FOR ITS IMPROVEMENT.

A REVIEW

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SUMMARY. The aim of this paper was the review of the scientific literature concerning the latest results on the fatty acid composition of lambs' meat and the possibilities of its improvement. Fatty acid (FA) composition of lambs' meat usually had no influence on its commercial value but has played an important role in the definition of meat quality as it is related to differences in organoleptic attributes, especially flavour and nutritional value of fat for human nutrition. On the other hand, the ratio between polyunsaturated (PUFA) and saturated (SFA) fatty acids and the ratio between $n - 6$ and $n - 3$ PUFA are considered two important indices for nutritional evaluation of fat in human nutrition. The ruminants' meat has a lower ratio of PUFA : SFA but the ratio $n - 6$ and $n - 3$ PUFA is at desirable levels, especially in animals raised on pasture. It has also been well established that meat from grazing animals has a higher concentration of conjugated linoleic acid than meat from confined concentrate – fed animals. Fatty acid composition of lamb meat is influenced by many factors such as nutrition before and after weaning, production system, sex, age and weight at slaughter, breed and fatness level. Among these, nutrition is considered the most important. In suckling lambs, fatty acid composition of the meat is influenced directly by fatty acid composition of their mothers' milk. The same could also be said for the artificially reared lambs. After weaning, the fatty acid profile of lamb meat changes gradually, depending on the age and weight at slaughter. The ratio PUFA : SFA is decreased by the increasing of age and weight at slaughter because the SFA content is increasing, while that of PUFA is decreasing. This ratio and the concentration of CLA is also influenced by the production system. Lambs reared in pastures have higher concentrations of PUFA and CLA in their meat. Although the effect of breed is considered important in practice, it isn't always so evident. Meanwhile breeds with big differences in their origin and characteristics have significant differences in fatty acid composition of meat. Sex is a significant factor influencing the fatty acid composition of lambs' meat due to differences in fat accumulation between males and females. Male lambs have higher concentrations of PUFA and linoleic acid in comparison with female lambs. As fatness increases the ratio of PUFA : SFA is decreased. Lambs' meat has the lower ratio $n - 6 : n - 3$ PUFA specially in comparison with pork. Another advantage of lamb, as generally with other ruminants' meat is the fact that represent the better physical source of CLA. In conclusion, it may be said that fatty acid composition of lambs' meat can be improved by choosing the production system, age and weight at slaughter as well as the breed and fatness level.

Milk somatic cell counts, milk bacterial counts and milk composition of local Greek goats

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ABSTRACT: The aim of this paper was to study milk SCC, milk BC and milk composition (fat, protein, lactose) of the healthy indigenous Greek goats. Thirty-six dams (12 from the first, 12 from the second and 12 from the third and subsequent lactation) were used after a suckling period of 60 ± 4.6 days. Thirteen dams had a twin type birth and the other twenty-three single type births. The animals were kept indoors all year round. The diet consisted of 1 kg concentrated feed (pellets) administered daily in the milking parlour (0.5 kg at morning milking and 0.5 kg at afternoon milking) and 1 kg of lucerne hay given in the stable.

Dams were milked twice a day for 12 weeks in a milking parlour 1x12 side by side of "Casse" type with a low milk line and air pipeline. The working parameters of the milking machine were: vacuum level 38 kPa, pulsation rate 90 pulsations/min and pulsation ratio 50:50. Every 14 days, milk recording was applied, to determine total machine milk and hand-stripped milk. Milk samples (~ 60 ml) were taken separately from each fraction of the morning and afternoon milking. Sample analyses for the measurement of milk SCC, SPC, fat, protein and lactose were performed in a specialized milk laboratory of the Greek Dairy Organization in Paralimni, Giannitsa. The determination of milk SCC was done by a Fossomatic 400. Milk BC were measured by a Bactoscan 8000S. Milk fat, protein and lactose contents were measured by near infrared spectrophotometer using a Milkoscan FT 120. All instruments were calibrated with goat milk standards. The ponderable mean was used for

the calculation of morning, afternoon and daily SCC, BC and also fat, protein and lactose percentages. Throughout the experimental period the animals were controlled for clinical signs of mastitis. All the variables measured were compared by ANOVA using the SAS General Linear Model procedure. The results of the experiment showed that the average milk SCC in healthy local Greek goats was found to be $1,047 \times 10^3$ /ml. Milk BC were found to be within the legal limits of the E.E. (310 000 CFU/ml). Both SCC and BC increased as the stage of lactation increased ($P < 0.01$). Parity and reduced milk production contributed significantly to increased milk SCC ($P < 0.05$). Milk SCC and BC were influenced significantly by milk fraction ($P < 0.05$) and milking hour ($P < 0.05$). With regard to milk composition, milk protein was correlated positively ($r = 0.27$) and milk lactose negatively ($r = -0.50$) with SCC. A positive significant correlation was found between milk SCC and BC ($r = 0.24$). Type of birth did not influence milk SCC and BC.

Key words: goat; somatic cell counts; bacterial counts; milk yield; milk composition

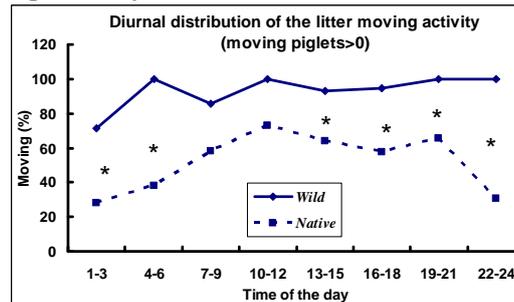
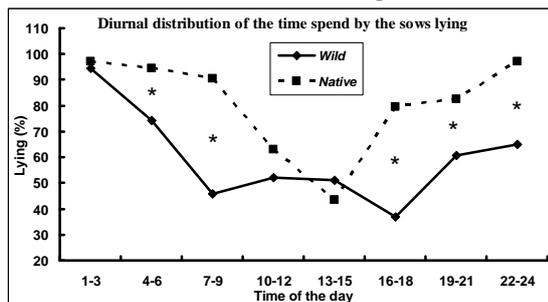
MATERNAL AND LITTER BEHAVIOUR OF INDIGENOUS AND WILD SOWS IN SEMI-INTENSIVE PRODUCTION SYSTEM

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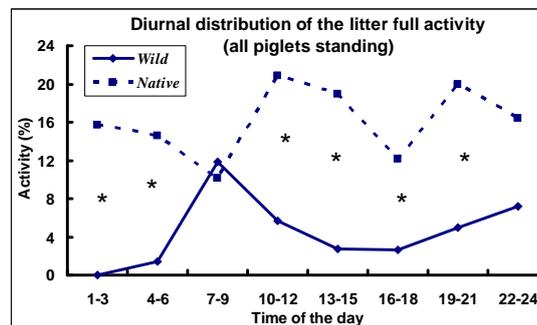
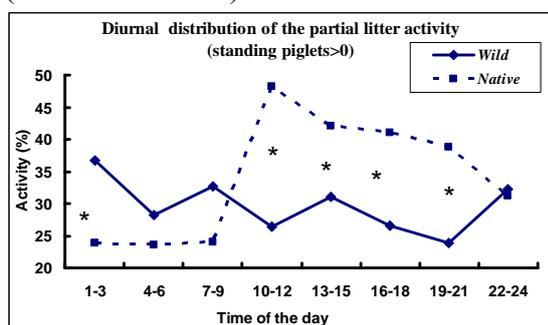
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Abstract. In this study the maternal and litter behaviour were examined to assess whether the process of domestication imposes changes to behavioural characteristics in pigs. Six indigenous and six wild sows and their purebred litters were used. All sows were loose-housed in indoor pens (2.0 x 2.0 m) equipped with piglet creep area (0.6 x 0.6 m) heated with infrared lamp. The sows were farrowed in the open (oak wood) and moved indoors at least one week after farrowing. Behaviour was continually recorded by means of Time-lapse Video after animal adaptation to the new environment for a period of at least four days. The videotapes were later analysed to quantify the undisturbed characteristics of the nursing behaviour (suckling duration and suckling interval). The activity of the sows and piglets was also recorded by instantaneous sampling in five minute intervals.

The mean suckling duration and the suckling interval did not differ significantly between breeds and were measured at 28.7 ± 0.98 and 31.5 ± 1.04 sec and at 48.6 ± 2.83 and 53.4 ± 2.91 min for the wild and the indigenous sows, respectively.



The wild sows had fewer posture changes (10.8 vs 13.18%, $P < 0.05$) than the indigenous. The major posture changes were also fewer for the wild sows (3.29 vs 6.50%, $P < 0.05$) than the indigenous, especially during the first night hours of the day. The total laying down time for the indigenous sows was longer ($P < 0.05$) than for the wild (77.92 vs 63.06%).



The diurnal variation of the piglets' activity fluctuated significantly with occasional significant ($P < 0.01$) differences between the breeds.

It may be concluded that the process of domestication imposes changes to behavioural characteristics of the sows and their litters kept under semi-intensive production systems during the suckling period.

Keywords: Maternal Behaviour, Wild boar, Domestication, Suckling

Expression of antimicrobial peptides Gallinacins and Fowlicidins during embryogenesis and in the reproductive tract of male and female chickens

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SUMMARY. Antimicrobial peptides (AMPs) and proteins have been recognized as key mediators of the innate immune response functioning as the first line of defense against potential pathogens. These host peptides provide a natural defense mechanism and function to protect organisms from microbial colonization and infection. In the chicken the most familiar innate host defence molecule is lysozyme, which is expressed in chicken macrophages, gut epithelial cells and oviduct tubular gland cells, and whose lytic activity is directed against the cell wall polysaccharide of gram-positive bacteria. Other avian innate molecules identified with microbial killing activity include cysteine rich cationic peptides called gallinacins and more recently the fowlicidins typified by their conserved N-terminal cathelin domain. Although there are many studies regarding the expression of these antimicrobial peptides in the cells of the chicken gastrointestinal tract, little is known of the synthesis and roles of antimicrobial peptides in protecting the avian reproductive tract and embryos from microbial assault. The aim of this study was the investigation of expression of the antimicrobial peptides Gallinacins (Gals) and Fowlicidins (Fowls) in the reproductive tract of both male (testis, epididymis) and female (ovary, oviduct) chicken and in chicken embryos during embryogenesis. RNA was extracted from the reproductive organs of male and female chicken, as well as from embryos from the third up to the tenth day of embryonic development. Using Reverse Transcription (RT) and Polymerase Chain Reaction (PCR) we investigated the expression of 15 genes encoding the families of Gallinacins and Fowlicidins antimicrobial peptides. The RT-PCR analysis data revealed that most of the genes which were investigated in this study were expressed in the reproductive tract and in the chicken embryos in various stages of embryonic development. More detailed, higher levels of expression were observed for Gals3, 4, 6, 7, 9, 10 and 12 in the ovary, for Gals 2, 4 and 9-12 in the oviduct, for Gals3, 4 and 9-12 in the testes and for Gals2, 4 and 8-12 in the epididymis. High levels of expression were also observed for Gals1, 3, 6, 7, 9 and 11 in chicken embryos from day 3 until day 10 of embryonic development, while there was a significant down-regulation for Gals2, 5, 10 and 12 during these stages. In addition mRNA transcripts were detected for all the Fowlicidin genes in the male and female chicken reproductive tract, as well in the chicken embryos during embryonic development. The results of this study show that the Gallinacins and Fowlicidins antimicrobial peptides are expressed in the chicken reproductive tract and embryos and probably play a significant role in the antimicrobial mechanism of the reproductive tract *in vivo* and the developing chicken embryos *in ovo* and provide novel information on the roles of these antimicrobial peptides in the protection of the avian reproductive tract and embryos from microbial colonization and infection.