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Joint Seminar of the FAO CIHEAM Networks on Pasture and Forage Crops and on Sheep and Goat Nutrition

Alternative feed resources and their management for transiting towards a sustainable ruminant production

Catania, 27-29 September 2022

Boosting the contribution of livestock and forage productions to sustainable agri food systems

The Mediterranean basin is highly affected by climate change, while certain countries still need to increase livestock production in order to achieve food self-sufficiency. Producing «better» is an urgent issue.

In this respect, ruminants have an asset: they can be fed on plants, plant parts and agro-industrial by products which are not directly recoverable for humans.

The Mediterranean landscapes are composed of an agro-silvo-pastoral mosaic, which offers opportunities for interactions between livestock production, agriculture and natural areas. Mediterranean grasslands are an important source of forage; cultivated forage, possibly associated to perennial or annual crops, provides high-quality feed for periods of high nutrient requirements; agro-industry produces a variety of typical by-products which may be included in ruminant diets.

This joint seminar of the «Ruminant nutrition» and «Mediterranean pastures and forage crops» sub-networks aims at exploring the various opportunities in terms of novel or underexploited local feed resources, which could be valued better in the future and used to secure small ruminant feeding systems and boost animal production. Joining these two sub-networks gives the opportunity to consider the question from two complementary points of view, thus encouraging system approaches

Effects of bitter vetch and sorghum grain incorporation on goat kid carcass and meat quality

Soumaya Boukrouh^{1,2}, Jean-Luc Hornick¹, Ali Noutfia², Claire Avril³, Mouad Chentouf², Jean-François Cabaraux¹

¹Department of veterinary management of animal resources, FARAH, IVT, Faculty of Veterinary Medicine, ULiège, Liège, Belgium

²INRA, Regional research of Tangier. Tangier, Morocco

³HEPH Condorcet, agronomy category. Mons, Belgium

E-mail: s.boukrouh@uliege.be

Take home Message bitter vetch and sorghum grains can substitute fava bean and barley, respectively in the diet of goat kids in Northern Morocco.

Introduction In Northern Morocco, goat production is an important economic activity for rural population providing more than 68 % of the income. Bitter vetch (*Vicia ervilia*) is an ancient grain legume crop of the Mediterranean region grown and harvested to utilize its grains and hay in ruminant feeding (Sadeghi et al., 2009). Its grains are potentially valuable feed for ruminants as a source of protein (Larbi et al., 2011). Sorghum (Sorghum bicolor L. Moench) is cultivated worldwide and is an important crop for food and feed. In Morocco, sorghum is considered a minor cereal (Ater and Hmimsa, 2006), but efforts are made nowadays to add value to underexploited feed resources.

This study aimed to evaluate the effects of incorporating sorghum or bitter vetch grains in the diet of goat kids as a substitute for a local diet based on barley and fava bean.

Material and methods Thirty-six goat kids were allocated into three homogeneous groups and received an isonitrogenous and isoenergetic diet containing 50% oat hay and, respectively, either 30 % bitter vetch and 19% barley, 30% fava bean and 19% sorghum, or 30% fava bean and 19% barley (control diet).

The experiment lasted 90 days and was preceded by an adaptation period of 15 days. Diet's ingredients were ground, mixed, and provided as a total mixed ration twice a day, at 8:00 AM and 4:00 PM. Water was provided ad libitum. The refusals were collected and weighed daily to determine daily dry matter intake (DMI, g/d) and to adjust the quantities distributed to allow 10 % refusals. The average daily gain was calculated by the difference between the initial and final live body weights divided by the number of days in the trial period. At the end of the trial, and after a 24-h fasting period, animals were weighed and slaughtered.

Fasted body weight, chilled body weight, hot carcass weight, and empty body weight were measured to characterize carcass quality. Longissimus Dorsi and Semimembranosus Muscles were used to determine meat quality. The factors were tested by generalized linear models (GLM). Growth performance, slaughter and carcass measurements were compared using one-way analysis of variance. Meat quality results were compared according to a mixed model.

Results and discussion Diet had no significant effect on average daily gain weight, final hot and chilled carcass weight even if daily dry matter intake was significantly lower for bitter vetch group. This result could be attributed to efficiency of use of diet components. Diet had significantly affected carcass colour. No significant effect was observed on Belly and tail outline. However, at back and saddle, lightness, redness and yellowness indices were significantly different.

The back of carcasses of animals that received bitter vetch were lighter than control and redder than sorghum. The group that received sorghum was less yellow than control, probably due to low accumulation of fat. At saddle, sorghum was lighter and less red than control. This could be due to the oxidation of myoglobin to metmyoglobin (Calnan et al., 2016). Regarding muscles (Longissimus Dorsi and semimembranosus) characteristics, no effect on moisture was recorded however pH, colour, water retention capacity and ash content were significantly affected.

Conclusion Bitter vetch and sorghum grains can be introduced into goat kid diets without any negative effect on carcass and meat quality. Investigations on meat fatty acids are needed to characterize the effects of diets on goat kid meat.

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