Effects of Cryptothecodinium cohnii, Chlorella spp. e Isochrysis galbana addition to milk replacer on goat kids and lamb growth.

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Acknowledge

Present manuscript shows results from the Spanish Government Grant AGL2009-11944.
Introduction

Small ruminant research is growing nowadays (Arguello 2011). Goat kids and lambs growth have been studied deeply in the past (Arguello et al. 2004a), but the micro seaweed inclusion in the diet is a new topic where no information is available.

An interesting review (Christaki et al. 2010) addressed the use of algae as feed in animal nutrition. Authors resume that algae rations addition in lactating cows increased milk production and milk protein. In calves (22 month old) the dietary algae enhanced immune function and improved carcass characteristics. In sheep, the algae nutrition affected milk fat composition. But authors conclude that further investigation is needed about the use of algae in animal nutrition.

The effects of marine algae on cow milk production have been recently addressed. Wullepit et al. (2012) induced milk fat depression in early lactation by feeding docosahexaenoic acid (DHA) from seaweed. The DHA supplementation induced a milk fat depression but could not improve the energy balance. The DHA addition increased lipid peroxidation.

Travnicek et al. (2008) observed the effect of supplementation of selenium inorganic and organic forms (using Chlorella spp.) on the activity of glutathioneperoxidase in newborn lambs. The positive effect of selenium supplementation of ewes contributed to higher activity of glutathioneperoxidase in the wholeblood of their lambs and higher Se concentration in the blood serum.
Recently, Moreno-Indias et al. (2012) studied the effect of milk replacer addition with docosahexaenoic acid (DHA-Gold®) on goat kids meat quality and immunity. Results indicated that the diet containing DHA did not affect the IgG, IgM concentration or complement activity during the first month of live, but influence on cellular immunology was not tested.

Due to the reduced knowledge about the use of seaweed in the small ruminant newborn growth, the aim of the present study is to investigate the effects of the different sources of microseaweed in the small ruminant newborn growth.

Material and methods.

The present experiment was conducted at the Veterinarian Faculty of Universidad de las Pamas de Gran Canaria (Spain). Eighty Majorera goat kids (males and females) and 80 Canarian sheep lamb were randomly assigned to four groups by specie. At birth, the newborn were separated from their mothers and dried. Their umbilical cords were disinfected. Then, they were weighed and assigned to one of the four experimental groups by specie. Kids and lambs were bottle-fed colostrum from a pool prepared prepartum, according to the kid management protocol described by Arguello et al. (2004b) with modifications suggested by (Trujillo et al. 2007). Then, beginning with the fourth feed, kids and lambs received their corresponding diets: Control groups was fed with a commercial milk replacer (Bacilactol Cabritos, Saprogal, La Coruna, Spain; 95.5% DM, 23.6% CP, and 22.7% ether extract) at 16% (w/w); Cryp. groups received a commercial milk replacer (15.1% w/w) supplemented with 9 g of apaste of Crypthecodinium cohnii; Chlo. groups received a commercial milk replacer (15.1% w/w)
supplemented with 9 g of a paste of *Chlorella* spp., *Isochrysis* galbana. Animals were individually fed (by bottle) twice daily (ad libitum) according (Arguello et al. 2004a) with the corresponding diet until d 60. Animals were weighed every week at 8:00 a.m. (MOBBA, Barcelona, Spain; accuracy, 5g) and liquid diet intake was recorded every week.

The SAS (Version 9.00, SAS Institute Inc., Cary, NC) program package was used for statistical analysis. A PROC MIXED procedure factorial ANOVA (analysis of variance with repeated measures) was performed to evaluate the effects of the diets on growth and milk replacer intake.

Results and discussion

The figure 1 shows the goat kids growth curves for the four experimental groups. Birth weight, intermediate weights and weight at day 60 are similar to observed previously by Marichal et al. (2003) in the same breed. No effects of microseaweeds addition in the milk replacer were observed on growth. The effect of adding fat to diets for ruminants depends not only on the type of fat but also on the amount added (Manso et al. 2009). Nevertheless, in the present experiment, animal performance was not affected, since no differences were observed in the growth rate or in the food efficiency ratio, although in pigs and other animals, fish oil supplementation has been found to reduce the inflammatory response and this may benefit growth performance (Gabler and Spurlock 2008). In reference to milk replacer intake (Figure 3), no effects of microseaweeds addition in the milk replacer were observed. Similar milk replacer intakes were reported
by Arguello (2000) in the same breed at similar ages. Voluntary feed intake of milk replacer by pre-ruminant animals is influenced by the dry matter content in the milk replacer (Sanz Sampelayo et al. 2003), and for this reason it was decided to keep the amount of dry matter constant. On the other hand, Wistuba et al. (2005) observed a decrease in the ADG and in voluntary feed intake with supplementation using 3% fish oil. Differences on fat percentage would be the reason of that discrepancy.

In the figure 2 and 4 it is shown the growth curves and milk replacer intake for the four lambs experimental groups. No significant effects of different seaweed addition on milk replacer were observed nor growth neither milk replacer intake. Similar average daily gain were observed by Ripoll-Bosch et al. (2012) in other Spanish sheeps (Ojinegra). By present time, present reported results are the firsts ones about Canarian sheep. The no differences between experimental groups might be raise in that all animals receive the same amount of dry matter, although control animals received all the dry matter from milk. Similar no effect results have been observed in the literature (Lewis et al. 2008). Although it has been mention by Carroll et al. (2003), Gaines et al. (2003), Liu et al. (2003) that growth (in pigs) is improved when animals are feed with fish oil are under immune challenge, results from Lewis et al. (2008) and present work indicate that under no infection or immune challenge the omega 3 sources addition to milk replacer did not improve the growth performances in lambs.
References


Figure 1. Goat kids growth curves
Figure 2. Lambs growth curves
Figure 3. Goat kids milk replacer (16% w/w) intake.
Figure 4. Lambs milk replacer (16% w/w) intake.