

Exploring the boundaries of animal, veterinary and biomedical sciences

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ABSTRACT BOOK

Use of *Cistus ladanifer* condensed tannins to improve the nutritional value of ruminant edible fat

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Cistus ladanifer L. (rockrose) is a tanniferous shrub quite abundant in Mediterranean countries. *Cistus ladanifer* is able to modulate ruminal biohydrogenation (RBH) and, when associated with forage-rich diets supplemented with PUFA-rich vegetable oils, increased the ruminal production of vaccenic acid (*t*11-18: 1), resulting also in a higher concentration of conjugated linoleic acid isomer (CLA) - rumenic acid (*c*9,*t*11-18:2) in lamb meat. Due to beneficial health effects of CLA isomers, RBH modulation has been target of numerous works in order to increase ruminal production of *t*11-18:1 and, thus the *t*11-18:1 availability for conversion to *c*9,*t*11-18:2 in tissues/mammary gland. To explore the use of *C. ladanifer* as a way to improve the fatty acid (FA) profile of ruminant fats, were developed two trials with the objective to: *i*) elucidate which type of *C. ladanifer* compounds might be responsible for RBH modulation; and *ii*) evaluate if a specific *C. ladanifer* fraction is able to induce the same effect of *C. ladanifer* plant on FA profile of fat. In order to clarify which *C. ladanifer* fractions might modulate RBH was performed an *in vitro* study, where five fractions of *C. ladanifer* – essential oil, dichloromethane extract, total phenolics, non-tannin phenols and condensed tannins (CT), were incubated with ruminal fluid for 6 h. Volatile FA production was not affected by *C. ladanifer* fractions. Fraction of CT was the most active on RBH modulation, leading to highest *t*11-18:1 accumulation. To evaluate if the inclusion of *C. ladanifer* CT extract in lamb diets can induce the same effect of *C. ladanifer* aerial part on the FA profile of fat, two levels of *C. ladanifer* CT (1.25 and 2.5%) and two ways of CT supply (aerial part vs. CT extract from *C. ladanifer*) were tested in a productive trial with 36 crossbred Merino Branco ram lambs. A diet without CT was also tested. Basal diet was composed of dehydrated lucerne with soybean oil (6%). Lambs stayed in trial for 5 weeks. Inclusion of *C. ladanifer* CT extract in diet (1.25% CT) led to the highest *t*11-18:1 concentration in intramuscular and subcutaneous fats. However, in this diet the *c*9,*t*11-18:2 content was similar to diet without CT incorporation, which may be due to downregulation of stearoyl-CoA desaturase activity, the enzyme that convert *t*11-18:1 to *c*9,*t*11-18:2. *Cistus ladanifer* CT extract might be a good approach to enhance the nutritional value of ruminant fat, but is essential to ensure the endogenous synthesis of *c*9,*t*11-18:2.

Keywords: *Cistus ladanifer*; condensed tannins; fatty acids; biohydrogenation; ruminants

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