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Alfalfa but not milk in lamb's diet improves meat fatty acid profile and α-tocopherol content

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Abstract

To establish animal feeding recommendations, it is required to quantify whether the effects of combining dietary alfalfa and milk on meat composition of light lambs are overlapped or independent. This experiment aimed to evaluate the separate effects of dietary alfalfa and milk access on the light lamb carcass quality (10-11 kg), meat colour, chemical composition, fatty acid profile and α-tocopherol content. Thirty-two lambs were assigned to one of four treatments in a 2×2 factorial design. The factors were the inclusion of dietary forage (grazed alfalfa vs. concentrate-fed indoors) and lactation length (weaning at a target live-weight of 13 kg vs. suckling until slaughter at 22-24 kg). Dietary alfalfa but not milk supply improved conjugated linoleic acid isomers (CLA), omega-3 fatty acids and α-tocopherol contents in lamb meat without affecting meat colour attributes. Milk supply affected more the fatty acid profile (more saturated) than the α-tocopherol content of meat. Thus, dietary alfalfa improved CLA, omega-3 fatty acids and α-tocopherol content in light lamb without affecting the meat colour, whereas lengthening the lactation period did not provide benefits in terms of meat colour or healthy nutrient composition.

Key words: fresh forage; suckling period; lamb meat quality; lamb nutrition; light lamb; vitamin E.

Introduction

Lamb meat types differ greatly worldwide, with the two main country producers yielding heavy carcass weights (22 kg in Australia and 16 kg in China). In Europe, this outcome differs considerably between the two principal producers, United Kingdom and Spain, which yield an average carcass weight of 20 and 11 kg, respectively (FAOSTAT, 2017). Thus, lamb meat has not standard attributes, and on-farm dietary and management practices may impact the subsequent quality traits of lamb meat during retail display. The Spanish lamb meat comes mostly from light lambs that are early weaned at 12-14 kg of live-weight (LW) and fed intensively with concentrates until 22-26 kg of LW, depending on the Spanish region (Alfonso et al., 2001), which yield a carcass weight ranging from 9 to 13 kg (MAPAMA, 2017).

Interest in natural compounds with antioxidant effect on meat quality and animal welfare has been increased dramatically during the last decade. Dietary inclusion of antioxidants in animal feed has been proven a more effective strategy to prevent oxidative damage of meat compared to their direct addition into meat or meat products, due to uniform integration into cell phospholipid membranes (Kerry, Buckley, Morrissey, O'Sullivan, & Lynch, 1998). The most proven dietary antioxidants in animal feed are firstly vitamin E and secondly plant polyphenols