

Different assumption way of limonene in kids can affect their oxidative status and meat quality?

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Introduction: Terpenoids are rapidly adsorbed and distributed in various body tissues, also for ruminants, and they get readily metabolized (Adams et al., 2011). The aim of this paper is to evaluate how, in kids, the absorption way, oral or respiratory, can influence terpenoids concentration in the meat and how its presence can affect meat colour, rheological profile and oxidative status during 7 aging days, and how it can affect animals' oxidative status, using limonene as tracer compound.

Materials and methods: A total of 27 Saanen kids 80 days old were involved, randomly subdivided in three groups for the three different treatments with limonene essential oil: control group (CG; did not received limonene addition), respiratory group (RG; respiratory exposure) and oral group (OG; oral administration). The limonene essential oil was pure at 99.9%. Respiratory exposure was performed by placing animals in a closed chamber with an electric essential oil diffuser. The oral administration was performed each twice a day, at 0h, 12h, 24h and 36h of the trial. One ml of limonene was administered directly in the mouth with a syringe. Before starting the trial (0h), and at 12h, 24h and 48h, blood samples from each kid were taken for plasma oxidative profile evaluation. All kids were slaughtered, carcasses were chilled at 2°C for 24h and after this the Longissimus dorsi muscle was sampled from the right carcass of each kid. Muscle was subdivided in three parts, randomly assigned to one of the three aging times: 1, 4 and 7 days. At each aging day meat colorimetric, rheological and oxidative parameters were determined. Intramuscular fat limonene concentration was quantified only at day 1. Moreover, hepatic antioxidant enzymes activity was determined. Limonene and hepatic enzymes were subjected to analysis of variance considering the group as fixed effect. The meat and the plasma profile analysis were subjected to mixed ANOVA considering as fixed effects the experimental group, the time, and the binary interaction between them. All models included the single kid random effect.

Results: Limonene meat concentration was higher in the OG group (8.32 mg/kg) compared to RG and CG groups (respectively 1.27 and 0.8 mg/kg) ($P < 0.01$). Moreover, the OG kids showed the highest superoxide dismutase, catalase, and glutathione peroxidase activity ($P < 0.01$). No differences were observed in plasma oxidative profile between groups and during time, and on meat quality ($P > 0.05$). All meat samples contained limonene, even if OG group with higher concentrations. In fact, animals that are fed with hay acquire terpenes from it and this explains why the CG group showed limonene concentration in meat (Viallonista et al., 2000). Although no effect was observed on meat, also during aging, antioxidant activity showed to be higher in OG group. In fact, dietary consumption of high amounts of natural antioxidants results in the transfer of these molecules to animal tissues followed by a significant increase in total antioxidant activity (Jiang et al., 2015).

Conclusion: In conclusion, oral limonene administration is better than respiratory assumption in kids, resulting in a better animal oxidative status.

Literature:

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