

Use of turmeric as natural antioxidant in healthy beef pâté: Effect on lipid oxidation and lineal aldehydes

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Introduction: The addition of natural antioxidants is a common strategy used by the meat industry to stabilize healthy meat products (Munekata et al., 2020). Among the alternatives to replace synthetic antioxidants, turmeric stands out as a promising natural option (de Carvalho et al., 2020). In addition, the meat products reformulated with turmeric could be considered as a functional food due to the health benefits of this ingredient (Munekata et al., 2021). Thus, the aim of this study was to assess the antioxidant activity of turmeric in beef pâté.

Materials and methods: Five batches of healthy beef pâté reformulated with canola oil were manufactured: batch 1 and 2 were the controls, without and with sodium ascorbate, respectively. The remaining batches were reformulated by adding increasing amounts of turmeric (25, 50 and 75 mg/kg). The TBARs value was measured using the Vyncke (1975) method, while the lineal aldehydes were identified and quantified with HS-SPME-GC/MS technique (Domínguez, et al., 2019).

Results: Results revealed that the control samples with ascorbate had the lowest lipid oxidation (TBARs; 0.37 mg MDA/Kg), followed by samples with 50 mg/kg turmeric (0.44 mg MDA/Kg). The other samples (control without antioxidant and pâté reformulated with 25 and 75 mg/kg turmeric) did not show differences among them, with values ranged from 0.51 to 0.57 mg MDA/Kg. Similar TBARs values were previously described by Vargas-Ramella et al. (2020) in deer pâté. Either way, the TBARs values in our samples were below those necessary (>0.6 mg/kg) for the detection of rancid flavors by the consumer (Martínez et al., 2006). In contrast to our findings, the use of turmeric extract in fresh sausages did not influence TBARs at day 0, while a high antioxidant effect, even more intense than erythorbate samples, during cold storage was observed (de Carvalho et al., 2020). Additionally, three lineal lipid-derived aldehydes (pentanal, hexanal and nonanal) were detected in beef pâté samples. It is well known that these compounds derived from lipid oxidation reactions (Domínguez, et al., 2019). Contrary to results observed in TBARs values, the content of pentanal and hexanal dramatically increased with the addition of turmeric. The opposite results were observed when turmeric extract was added to fresh sausages (de Carvalho et al., 2020). In our case, the lowest pentanal ($P<0.05$) contents were observed in control samples without antioxidant, while the other 4 batches presented no significant differences among them. Concerning hexanal, both controls showed lower values ($P<0.05$) in comparison with samples with turmeric, which showed a progressive increase in hexanal values as the amount of turmeric increased. Finally, the nonanal presented the most variable contents, with the lowest values in the ascorbate pâtés batch and the highest in the 75 mg/kg turmeric-added samples.

Conclusions: In conclusion, the use of turmeric did not show a clear antioxidant effect in healthy beef pâté. However, it is important to highlight that the lipid oxidation was below thresholds limits in which rancid is appreciable by consumers.

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