

Use of microencapsulated healthy oil mixtures to enhance the fatty acid profile of foal pâté

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Objectives: The purpose of this study is to assess the effect of partial replacement of animal fat by microencapsulated oil mixtures,

walnut (treatment 1 - T1) or pistachio oils (treatment 2 - T2) blended with algal oil, on lipid profile of foal pâtés.

Materials and Methods: Oil mixtures (46.5 g of walnut - T1- or pistachio - T2 - oils blended with 3.5 g of algal oil) were micro-encapsulated following the method proposed by Vargas-Ramella et al. (2020). Three different batches of pâté were manufactured: the control (CON) - containing 100% of horse fat (30 g/100 g) and other two experimental batches (T1 and T2) in which the 50% of animal fat was substituted for the corresponding microencapsulated oil mixtures. The pâté included lean foal meat, fat source, foal liver, tap water, NaCl, milk powder, sodium caseinate, sodium phosphate, sodium nitrite and sodium ascorbate and was elaborated according to the procedure described by Rubén Domínguez et al. (2016) with some modifications. The same formula was employed in all groups, except for fat source and the manufacture process was replicate four times during different months. Five cans of pâté from each treatment were employed for the analysis. Fatty acids determination was carried out following the protocol explained by Domínguez et al. (2022) and the health indices were calculated according to Barros et al. (2020). One-way ANOVA was employed for statistical analysis and differences were considered significant if $P < 0.05$.

Results and Discussion: Statistical analysis showed that the fat reformulation affected the fatty acids profile of foal pâté. In particular, the use of T1 and T2 encapsulated oils favoured a significant ($P < 0.001$) decrease of the saturated fatty acids contents, and an increase ($P < 0.001$) of mono- (T2) and polyunsaturated (T1) fatty acids. Furthermore, it is noteworthy to point out that the presence of algal oil in the microencapsulated oil mixtures facilitated a significant ($P < 0.001$) increase of omega-3 (n-3) contents in T1 batch and of longchain n-3 fatty acid values in both the reformulated pâtés. Actually, it is well-known that marine oils are rich in long-chain n-3, as eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids. This is also reported in our data, where both T1 and T2 pâtés recorded values of 201.02 and 182.33 mg EPA+DHA/100 g of product, respectively. Thus, they could be claimed as “source of omega-3 fatty acids” and “high omega-3 content” according to the Regulation (EU) No 116/2010 (2010). Finally, a significant ($P < 0.001$) improvement of health indices was observed in T1 and T2 samples, obtaining PUFA/SFA, AI, TI and h/H values in line with the health recommendations described by Barros et al. (2020).

Conclusions: In view of the results and international recommendations, we can conclude that the reformulated batches, in particular

T1, represented a good and promising alternative to achieve foal pâtés with enhanced nutritional profiles.

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