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Classification of eggs from laying hens feeding different diets using e-Nose, e-Tongue and sensory evaluation

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Laying hens' diets can influence sensory attributes of eggs. The objective of this study was to evaluate differences in the sensory attributes of eggs produced by hens feeding diets with different feed supplements (isocaloric and isonitrogenous corn-soybean meal-based diets). Evaluations were carried out using electronic nose (e-nose), electronic tongue (e-tongue), and human sensory analysis. Hens (Lohmann Brown-Classis) were fed in three different groups receiving different amounts of yeast biomass enriched with zinc (Zincoppyeast, AGSIRA SRL, Romania); group 1 (control, corn-soybean meal-based diet), group 2 (includes 2.5% Zincoppyeast) and group 3 (includes 5% Zincoppyeast). Alpha MOS Heracles NEO e-nose and Alpha MOS Astree e-tongue were applied for the instrumental detection of odor and taste profiles of the egg samples, and results were compared with those of human sensory analysis performed according to the ISO 6658:2018 standard. From the chemical analysis, the feed supplementation significantly increased the protein content (from 12.7% to 13.4%) and decreased the fat content (from 9.5% to 9.3%). Results of e-nose suggest weak differences between the smell of the eggs of the experimental groups, at both mild (50 °C) and stronger (80 °C) heat treatment, but these differences are compatible with the natural variance of egg production. In the e-tongue analysis, perfect separation of group 1 and group 3 samples was observed, while misclassification occurred between group 1 and group 2, and between group 2 and group 3 samples. Based on the human sensory analysis (professional panel), the feed supplement had no clear and reproducible effect on the organoleptic indicators of boiled and fried eggs either. Overall, the tested feed supplement (0%, 2.5% and 5% Zincoppyeast) based on an industrial by-product (yeast biomass) did not have a clearly detectable effect on the organoleptic parameters of the eggs, based on neither instrumental nor human organoleptic tests.