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Effect of natural additives on physical and sensory characteristics of Cinta Senese sausage

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Cinta Senese is a local pig breed typical of Tuscany, and traditionally its meat is processed in order to produce dry cured products. The use of curing agents as nitrites and nitrates is effective to increase the shelf-life of products and to stabilise their organoleptic properties, however their intake may represent a risk for human health. The aim of the study was to test the use of natural antioxidants as curing agents and to determine their effects both on the physical parameters and on the sensory profile of Cinta Senese sausages (würstels). Meat was obtained from two groups of stall-fed pigs, in order to have two replicates of the study design. Each meat batch was divided in two parts: one (NN) was processed using nitrites and nitrates as curing agents; the other (NA) was processed using natural extracts rich in antioxidant and antimicrobial compounds as chestnut hydrolysable tannins, tannins condensed from grape seeds, hydroxytyrosol and oleuropein from *Olea europaea*. The mixture of natural extracts was characterized by HPLC/DAD/MS and the antioxidant and antiradical capacity was evaluated. Vacuum-packed sausages were stored for 60 days at +4°C. Physical and microbiological parameters were determined at different storage periods: 7, 30 and 60 days. Colour (lightness L*, redness a* and yellowness b*) was measured with a Minolta® spectrophotometer. Samples were subjected to Texture Profile Analysis in order to assess hardness, chewiness, springiness and cohesiveness. Sensory attributes were determined using a ten-member trained panel and expressed in a continuous scale from 1 to 10. Data were analysed with Linear Mixed Models (R 3.4.1). Storage period affected redness and yellowness ($p < 0.01$), but only in NA. All colour parameters differed between NN and NA ($p < 0.01$): sausages cured with NN showed greater lightness and redness, but lower yellowness. All texture parameters resulted higher in NN ($p < 0.001$), except for the springiness. The panellists experienced in NN sausages greater colour homogeneity, uniformity, hardness and lightness ($p < 0.01$); in NA sausages, they perceived higher odour intensity and marked flavours as acid and tannic ($p < 0.01$). The NN sausages displayed greater global acceptability. The natural antioxidants mixture showed an effective antimicrobial activity, however further studies are needed to improve the organoleptic profile of NA products and, thus, their liking.

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