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Livro de Resumos do XV Encontro de Química dos Alimentos: Estratégias para a Excelência, Autenticidade, Segurança e Sustentabilidade Alimentar

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PC-B31: Effect of the application of bioactive extracts on the storage time of smoked horse mackerel (*Trachurus trachurus*) with reduced salt

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Smoking of food is one of the oldest preservation methods and quite popular among fish and meat preservation strategies. The process combines salting, drying, heating and smoking steps. Salting and smoking, besides their preserving effects, are important to add flavour so appreciated by traditional foods consumers[1-3]. However, reducing salt intake is an important public health issue. Thus, both food industry and food services are interested in reducing the salt content of products[4]. Moreover, today's consumer is also looking for more natural foods with high nutritional value and functionality [5,6]. Special attention has been given to the addition of bioactive compounds mainly with antioxidant and antimicrobial activities[7-9]. The general objective of the present study was the valorisation of low commercial value and abundant fish species such as horse mackerel (*Trachurus trachurus*) by developing smoked products with reduced salt content and fortified with natural bioactive compounds extracted from seafood and forest by-products. The fish, obtained in the local auction market, was smoked in a semi-industrial smoking oven for 4 h at 70 °C with a final thermal shock step of 1 h at 90 °C. Smoked fillets were divided into four groups and sprayed with one of four bioactive extract solution (100 mg/ml): two different solutions of mussel extract with peptides <3kDa, one solution of microalgae extract, *Tetraselmis* sp. with peptides <3KDa and a pine bark extract (*Pinus pinaster* Aiton subsp. *atlantica*) solution. A control sample without any spraying completed the set of five samples. Smoked fillets were vacuum-packed and stored at 4-6 °C, over 30 d. Quality changes, over the 30 days of storage, were studied by monitoring microbiological and physicochemical properties at weekly intervals. For microbial enumeration a pack was opened weekly, and 30 g of smoked fish was taken aseptically, from different sites, and homogenised for 90 s in a stomacher and subsequently decimally diluted. Total viable counts were performed on pour plates according to EN ISO 4833-1:2013; psycrotrophic microorganisms according to ISO 17410:2001; Enterobacteriaceae counts according to ISO 21528-2:2017 and yeasts and molds according to NP 3277-1:1987. Detection of Salmonella and *Listeria monocytogenes* was done according to ISO 6579-1: 2017 and ISO 11290-1:2017, respectively. Physicochemical properties analysed included: salt (NaCl) content, aw, moisture, pH, peroxide value index (PV) and thiobarbituric acid index (TBA), antioxidant activity (DPPH and ABTS methods), colour and firmness. Sensory evaluation by quantitative descriptive analysis (11 attributes) was performed by four trained panellists. Average total viable cell numbers were similar among all samples (including control) except for mussel extract MuE (CPC) that maintained levels above 8 log CFU, form 2 wk of storage onwards; the remaining samples demonstrated a steady increase in total viable cell numbers (30 ºC) only from 21 d onwards and reached final numbers between 6-7 log CFU. *Enterobacteriaceae* were reported constantly between 1-2 log CFU, molds were undetectable and yeasts reached higher viable numbers (3 log CFU) in smoked fillets with mussel extracts. Salmonella and Listeria were not detected throughout storage. In terms of antioxidant activity samples were quite stable over time. Concerning degradation indicators, such as TBA and PV, no tendency was noticeable. TBA index after 7 d of storage was low and stable and PV was unstable. Nevertheless, panellists found some off-flavours during their evaluation especially in the samples with mussel extract and microalgae extract that was more intense after 15 d of storage (Figure 1). The pine

bark-treated samples presented more similarity with the control samples throughout storage. Texture and firmness were generally stable over time and with small differences between treatments, control samples showing higher values. Principle component analysis applied to physicochemical data (Figure 2) showed that antioxidant activity and pH, moisture and water activity discriminate samples over time (PC1) and, sample treatment with mussel extract MuE(ESB) as well. In this output, samples with higher values are projected towards the left side and this was also clear in pine bark (PBE) treated samples. Samples with mussel extract (MuE(ESB)) are quite stable (PC1) except for those with 7 d of storage. Overall, these results indicate the potential of these treatments to extend shelf-life of fish products and contribute to reintroduce sea and forest by-products into the food chain along adding value to abundant and undervalued fish products.

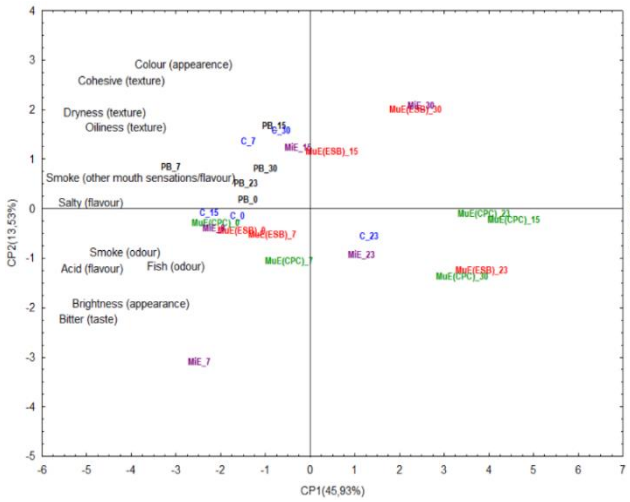

Figure 1: Principal component analysis of sensory parameters (CP1 vs CP2 – 45.93% vs 13.53%). C (blue) – Control formulation; MuE (ESB) (red) – formulation with application of mussel extract (ESB); MuE (CPC) (green) – formulation with application of mussel extract (CPC); MiE (purple) – formulation with application of seaweed extract; PBE (black) – formulation with application of pine bark extract, for sampling times 0, 7, 15, 23 and 30 days.

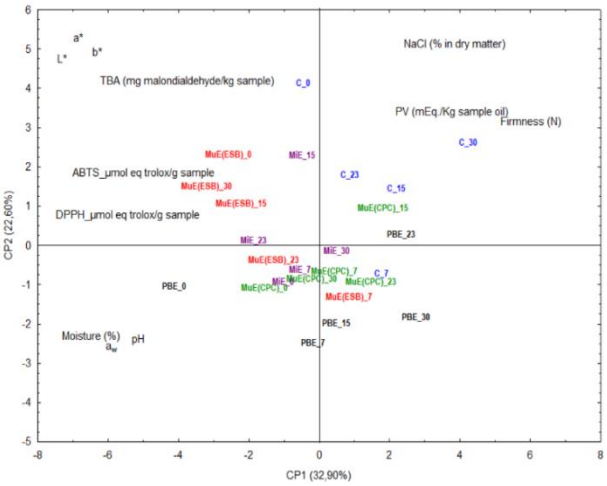

Figure 2: Principal component analysis of physicochemical parameters (CP1 vs CP2 – 32.90% vs 22.60%). C (blue) – Control formulation; MuE (ESB) (red) – formulation with application of mussel extract (ESB); MuE (CPC) (green) – formulation with application of mussel extract (CPC); MiE (purple) – formulation with application of seaweed extract; PBE (black) – formulation with application of pine bark extract, for sampling times 0, 7, 15, 23 and 30 days.

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