

Impact of microalgae incorporation on sensory profile and consumer's expectations of bread and cheese

Microalgae are a promising future food source with their rich nutrient content and potential to contribute to a carbon-neutral economy. However, incorporating microalgae into food formulations presents sensory challenges, particularly in terms of colour and distinct fish-like aromas. In the YUM ALGAE project, this study successfully evaluated the impact of microalgae incorporation in two distinct food matrices – bread and camembert-like cheese. Four loaf bread samples and cheeses were assessed, incorporating chlorella (*Chlorella vulgaris*) or spirulina (*Arthrospira platensis*), both raw and with enzymatic treatment. A panel of 65 naïve tasters (aged between 20-59 years) was first invited to evaluate all the products' expectations on a 9-point hedonic scale, visualising half-loafs and half-cheeses on a simulated store shelf. Then, at the sensory booth, participants were instructed to evaluate the samples' appearance and odour, rating their overall acceptance and indicating the aspects they valued most and least when presented sequentially with a slice of each product. Simultaneously, using a Rate-All-That-Apply (RATA) ballot for appearance (no. of attributes: bread-11 and cheeses-8) and odour (no. of attributes: bread-10 and cheeses-8), a trained panel (n=10) evaluated each of the samples. The attributes were pre-defined based on the team experience, a literature review, and a pilot test with dried biomass from microalgae. Based on the naïve tasters' evaluation, all the samples had a high mean acceptance score (>6.0). No significant differences were found between samples with raw microalgae incorporation and those treated with enzymes, except for cheese with chlorella, where the sample with raw chlorella had a higher value (p=0.02). Regarding the sensory profile, the sea-like odour intensifies, and the cheese/bread odour decreases for the samples with enzymatic treatment. This research highlights the success of sensory research in the development of new alternative proteins, instilling confidence in the potential to overcome the associated sensory barriers.

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