Rheological and Textural Properties of Protein Enriched Salmon Products Containing Different Texture Modifiers, Intended for Dysphagia Patients

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AIM

This study examined the influence of different texture modifiers and proteins on rheological and textural properties in texture-modified and protein-enriched salmon products tailored for dysphagia patients. The objective was to create nutritious salmon products suitable for individuals with severe dysphagia, adhering to the International Dysphagia Diet Standardization Initiative (IDDSI) level 4, pureed foods.

METHOD

Salmon filet (Salmo salar) portioned and frozen (-30 °C) before production, was thawed, and heat treated at 90°C, for 10 minutes (core temperature). Following heat treatment, the fish was blended (Thermomixer, VorWerk, France) with the addition of salt (1%), oil (3%), water (20 %), 1% texture modifiers (agar-agar, xanthan gum, corn- or pea starch) and addition of 3 % protein (fish protein hydrolysate, caseinate or pea protein). After blending, the mixture was packed and sealed in plastic cups and stored at 4 °C for 24 hr. All samples were heated to 40 °C core temperature before analysis. Rheological (Rheometer, TA Instruments, US) and textural analysis (Texture Analyzer, Stable Micro Systems Ltd, UK) was then performed.

RESULTS

All samples showed shear thinning behavior and the viscosity of the samples at shear rate of 50 s^{-1} was over 1750 mPa.s for all samples. According to National Dysphagia Diet[1] foods with viscosity above 1750 mPa.s is classified as pudding like and is at IDDSI level four[2]. Addition of proteins to AA and XG led to increase in viscosity (except for AA-FPH) with Pea protein giving significantly higher viscosity for both AA and XG. On the contrary, addition of proteins to FX (corn starch) and PS (pea starch) did not significantly change the viscosity values of samples. Frequency sweep was performed and tan δ values were under 0,6 indicating the gel like structures. Looking at the Amplitude sweep the significant effect on Storage modulus, Yield Stress, Yield Strain and Flow point values were observed.

CONCLUSION

In conclusion, this study investigated the critical aspects of developing protein-enriched salmon products with specific texture modifiers aimed at meeting the dietary needs of dysphagia patients, particularly targeting IDDSI level 4 requirements. Through rheological and textural assessments, valuable insights were gained regarding the influence of different texture modifiers and proteins on the final product's characteristics. The experimental results revealed that the addition of certain proteins, such as fish protein hydrolysate (FHP), caseinate, or pea protein, in conjunction with texture modifiers like agar-agar (AA), xanthan gum (XG), corn

starch (FX), or pea starch (PS), resulted in varied effects on the viscosity and textural properties of the salmon products. Notably, the viscosity values obtained at a shear rate of 50 s-1 surpassed the threshold for IDDSI level 4 classification, indicating a pudding-like consistency suitable for dysphagia patients. These findings give more insight and knowledge needed to create nutritious and suitable products that meet the precise dietary needs for dysphagia patients.

REFERENCE

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