

practical solutions for oxidative stabilization and improved delivery of oils from fish in food products. Encapsulation also masks the undesirable smell of fish oil and enables it to smoothly blend in to product. Emulsions of fish oil, garlic oil and their combination were prepared using high pressure homogenizer. These emulsions were encapsulated in alginate to produce microcapsules using cost effective microencapsulator developed at ICAR-CIPHET. Functional bread developed with fish oil microcapsules has better oxidative stability than bread with unencapsulated oil. Further the functional bread developed with fish oil plus garlic oil microcapsules has better oxidative stability than bread with fish oil microcapsule. There is no significant difference in sensory parameters of functional bread developed with microcapsules in comparison with control bread.

AV OR 39

Improved utilization of sardine head waste: Preparation and characterization of protein hydrolysate

PRAVEENA RAJ, K. ELAVARASAN*, C.S. TEJPAL, ANUJ KUMAR, K. SATHISH KUMAR, S.K. PANDA

ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, India; *elafishes@gmail.com

Present study was undertaken to improve the utilization of sardine (*Sardinella longiceps*) head waste (SHW) through enzymatic hydrolysis. The hydrolysis of SHW was carried out using papain for 90 min at 50°C. The degree of hydrolysis achieved was 18.24% and SDS-PAGE revealed the presence of peptides in the hydrolysate with the molecular weight range of 24–less than 14 kDa. The SHW hydrolysate had a protein

content of 77.21%. The sardine head waste protein hydrolysate (SHPH) was more of white in colour ($L^*-82.34$). Fatty acid composition analysis indicated that the SHPH is a good source of monounsaturated fatty acids (MUFA) and docosahexaenoic acid (DHA). The mineral analysis showed the absence of toxic elements and presence of good amount of sodium, calcium, and potassium. The antioxidant activities like DPPH free radical scavenging activity and ferric reducing power revealed the potential of SHPH as water soluble antioxidants and dose dependency. More than 70% of the proteins in the SHPH are soluble in wide range of pH except pH 5. The emulsion properties of SHPH in the pH range of 3-11 except pH 5 was good in terms of emulsion activity and emulsion stability. The surface charge analysis in the pH range from 3-11 indicated that the isoelectric point of SHPH preparation is closer to 5 and in agreement with the solubility data. The FT-IR analysis indicated the presence of β -sheet configuration in the peptide mixtures. The NMR analysis showed chemical shift corresponds to the amino acid domain from 0.5 to 4.5 ppm. The study has demonstrated use of sardine head waste as a potential raw material for the production of bio-functional and nutritionally high quality protein ingredient having the compatibility for the formulation of emulsion based health care products.

AV OR 40

Study on effect of grape seed extract in enhancing the shelf life of fish sausage

C.V. RAJU*, I.P. LAKSHMISHA, P. ARUN KUMAR, RICHA CHOUDHARY

College of Fisheries, Karnataka Veterinary, Animal and Fisheries Sciences University, Mangalore, Karnataka, India; *cvraj@hotmail.com