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Enzymatic hydrolysis for the selective extraction of surface-active and antioxidant hydrolysates from yellowfin tuna red meat: Optimisation using RSM

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Yellowfin tuna (*Thunnus albacares*) is globally recognised as a commercial tuna species that mainly meets the consumer demand in fresh and canned forms. The red meat from yellow fin tuna is a major edible fish by-product. However, it is underutilized and also has a low commercial value. The present study was focused on the selective extraction of surface-active and antioxidant hydrolysates from yellowfin tuna red meat based on separate hydrolytic conditions using papain. Efforts were made to comprehend the effect of key processing variables viz., enzyme-substrate ratio (0.25-1.5%) and hydrolysis time (30-240 mins) on the protein recovery, surface-active and antioxidative properties, using RSM with a central composite design. Single and combined effects of the variables on the responses were studied by formulating thirteen experimental runs. The optimum conditions for obtaining hydrolysates with surface-active and antioxidative properties were derived separately with emphasis on protein recovery and sensory acceptability. The coefficient of determination (R^2) ranged between 0.73–0.99 indicating the suitability of the regression model in predicting the changes in responses under different variable combinations. The optimum hydrolytic conditions to get hydrolysates having superior surface-active properties were enzyme-substrate ratio (E/S) of 0.41% and 30 minutes hydrolysis time with a desirability of 0.611. Similarly, the optimum conditions to exhibit the highest antioxidative properties with a desirability of 0.932 were: 1.28% E/S and 240 minutes hydrolysis time.

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Changes in the physical appearance of selected marine fish (*Sardinella albella*, *Pennahia anea*, *Pentaprion longimanus*, *Scomberoides lysan*) during iced storage

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Changes in the physical appearance, biochemical and microbiological quality of four marine fish viz., *Sardinella albella* (White sardine), *Pennahia anea* (Donkey croaker), *Pentaprion longimanus* (*Longfin mojarra*), *Scomberoides lysan* (Double spotted queen fish) during iced storage was studied. The fish were procured in fresh condition from Visakhapatnam Fishing Harbour on the east coast of India. Major changes in physical appearance at the time of loss of microbiological quality during iced storage varied with the fish species. *Scomberoides lysan* showed blackening of gill cover, blackening at the origin of pectoral fin and the eye sclera turned to yellow; *Sardinella albella* showed reddish gill cover; *Pentaprion longimanus* lost its silvery white hue and scales; *Pennahia anea* showed skin rapture and gills turned pale red. The Aerobic Plate Count (APC) crossed 5,00,000 cfu/g after 4 days, 6 days, 6 days and 21 days of iced storage of *Pentaprion longimanus*,

Scomberoides lysan, Sardinella albella and *Pennahia anea*, respectively. The Total Volatile Base Nitrogen (TVB-N) exceeded 35 mg/100g after 2 days, 6 days, 8 days and 21 days of iced storage of *Pentaprion longimanus, Sardinella albella, Scomberoides lysan* and *Pennahia anea.*

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Valorisation of paste shrimp (*Acetes* spp.) for the production of protein hydrolysate

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Paste shrimp forms major group of by catch among non-penaeid prawn landings of India. Commonly it has been utilized for the preparation of fish meal and dried product. Conversion of this underutilized species for the production of protein hydrolysate is one of the effective way of increasing the price or value. The preparation of protein hydrolysate was done by enzymatic hydrolysis using alcalase on which the conditions were optimized through response surface methodology using central composite design (CCD). Different parameters such as degree of hydrolysis, antioxidant properties and antihypertensive properties were studied and found to have efficient biological activities. In addition to that, functional properties of protein hydrolysate were evaluated and found to have good solubility, foaming and emulsifying properties proving that paste shrimp protein hydrolysate could be used for fortification of food. Therefore, it is concluded that *Acetes* protein hydrolysates contain potential bioactive properties that could be utilized in the application of functional foods and nutraceuticals. In addition to that, good amount of functional properties was obtained which can be used in the foam, emulsion formation. Further investigations could be carried out in the purification of bioactive peptides from *Acetes* spp. for nutraceuticals purposes.

AV OR 13

Effect of dietary fibres on the functional properties of heat induced fish gels

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Dietary fibres can be an effective tool in seafood processing for improving functional properties of products such as water binding, gelling, etc. In this study, heat induced gels prepared from threadfin bream (*Nemipterus japonicus*) containing one of the three types of dietary fibres (wheat fibre, oats fibre and psyllium fibre) was evaluated with respect to the functional properties. Dietary fibre was incorporated at 2% level to the fish mince. Addition of dietary fiber increased the water holding capacity of the fish gels. The cooking yield was significantly higher for oat fibre incorporated fish gel. Wheat fibre incorporated fish gels were whiter; however the hardness and cohesiveness were lower than oat fibre incorporated gels. The folding score of oat fibre incorporated fish gel was significantly higher among the samples. Among the dietary fibres oat fibre was found to be the best option as it did not affect the textural properties when compared to the control whereas psyllium fibre had a negative effect on the textural properties of the fish gels. Sensory evaluation of the samples indicated that addition of dietary fibre did not affect the flavour of the fish gels.