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Valorization of Shrimp's Heads (*penaeus sp.*) by Enzymatic Hydrolysis: Application in Fish Nutrition

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In Madagascar, Shrimps exploitation generates, by the shelling, a lot of wastes. 60% of the shrimp is rejected as garbage, yet they contain biomolecules of biotechnological interest, which are able to influence the physiology of organisms. Therefore, a study has been realised from November 2016 to January 2017, the goal is to propose a way of valorisation of shrimp's wastes in aquaculture notably in *Oreochromis niloticus* nutrition.

The experience was done in the Marine Resources Valorisation laboratory (VALOREMAR) of IH.SM, the properties of shrimp's heads was increased by autolysis, which uses the endogenous pepsin of the viscera. Once wastes was mached, melt and homogenized, the reaction is started with activation of the pepsin at pH = 2 and 40 °C. Those parameters of hydrolysis (pH, temperature and hydrolysis degree) are controlled by the methods of pH-stat. The reaction is stopped after two hours by thermal inactivation of the enzyme. The autolysate powder is obtained by drying (at 70 °C) and grinding the supernatant obtained after centrifugation.

For the test of efficiency in fish nutrition, three experimental rations are tested respectively on three replicate lots of *Oreochromis niloticus*'s (Tilapia) juveniles. The protein source from animal is brought by the fish meal in the witness feed and is replaced, by the autolysate, partially in the food A50 (50%) and totally in the food A100 (100%). Juveniles were fed twice a day under the same conditions. The zootechnical performances are followed weekly for 6 weeks and were compared by the one-way ANOVA test on Systat 12 at a significance level of 5%.

An average degree of hydrolysis of $35.63 \pm 1.49\%$ and an autolysate yield of $8.21 \pm 2.49\%$ were recorded. The kinetics of hydrolysis presents the phase of fast growing and latency. After six weeks, the tested lots show higher performances compared to the pilot, especially those that are fed with food A100. The average gains of weight and height are respectively $35, 48 \pm 13, 21\text{g}/10, 34 \pm 1, 19\text{cm}$ for lot A100 and $32, 17 \pm 10, 8\text{g}/9, 98 \pm 1, 37\text{cm}$ for lot A50 against $28, 50 \pm 7, 76\text{g}/9, 38 \pm 1, 22$ for the pilot.

In conclusion, shrimp wastes constitute accessible resources of biomolecules valorizable by biochemical processes like autolysis. This process increases their functional and nutritional properties. Those products transfer into the fish feed increases the digestibility and growth of fish while decreasing the duration and costs of aquaculture.

Biography:

Razanajaosoa Marie Celina, is a Student in Marine biotechnology at "Institute Halieutiques et des Sciences Marines", University of Toliara (Madagascar), also treasurer at Young researchers Organization (YSO-Madagascar). She learnt marine biology and biotechnology, including the diversity of biomolecules and its potential in biochemistry. Her experience in biotechnology begun with my research on the "Valorization of shrimp's heads (*Penaeus sp.*) by enzymatic hydrolysis in fish nutrition" for the obtention of her bachelor degree in 2017 in the Valorem (Marine Resources Valorizations) laboratory of the IH.SM. Then, she was included to the laboratory's equip of researchers, where she mentoring laboratory's work for Master Class. Since she was in school, her passion is to discover the power of marine diversity on human health and her focus is improving Marine pharmacology in her country. She actually prepare her research on ascidian species with therapeutic potential in southwestern Madagascar and their biological activities.