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Effect of legume flours on the binding property of Nile tilapia (*Oreochromis niloticus)* fish nuggets

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Nile tilapia (*Oreochromis niloticus*) is one of the widely cultured fresh water fish in Sri Lanka. The fish has limited scope for consumption in the fresh form due to the low recovery of flesh (50%). This study is an attempt to explore the possibilities of better utilization of this species by development of a nutritious, value-added minced fish product. Tilapia minced flesh (75%) consisting of garlic paste (4%), pepper (2%), ground plain taste cracker (3%) and salt (0.6%) optimized with 15% binder was selected as the best ingredient combination (rank sum 25) for tilapia fish nuggets. In order to produce nutritious, value-added fish mince, the gluten protein binder was replaced with legume proteins i.e. lentil flour, chickpea flour and cowpea flour. The developed fish nuggets with different binders were evaluated for sensory properties, proximate composition and cooking properties (moisture and fat retention ability, cooking yield) in order to select the best binder. Raw fish nuggets were analyzed for moisture, fat, protein and ash content. Incorporation of legume flour significantly ($P < 0.05$) increased the protein content of nuggets. Fish nuggets extended with wheat flour has a protein content of 17.9% whereas those with legume flours had a protein content of 22.3% - 22.8%. The highest cooking yield (85.08%) was observed in the fish nuggets with lentil flour binder, while nuggets with cowpea, chickpea and wheat flour have 73.19%, 70.54%, and 73.54%, respectively and the values are significantly different ($P < 0.05$). Among the nuggets with legume flour, the lentil flour had a stronger ability to retain the moisture (38.35%) than the other two types of flours. The sample with wheat flour attained only 76.25% of fat retention giving the least fat retention in fish nuggets. In conclusion, this study has shown that legume flour can be successfully used as a binder or extender in the preparation of tilapia fish nuggets with increased protein content.

Keywords: Tilapia nuggets, lentil, chickpea, cowpea, wheat

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