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## Proximate composition analysis of trash fish from the selected landing sites of Jaffna district, Sri Lanka

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### Abstract

Marine coastal fishery often yields a considerable portion of the non-target species and by-catch as trash fish in total catch. Generally, it consists of edible and inedible fish species, which are unacceptable for human consumption usually discarded as waste. However, it has significant potential to use as animal feed. The current study was intended to determine the proximate composition of abundant trash fish in selected landing sites of Jaffna peninsula from November 2018 to March 2019. Crude protein, fat, ash and moisture content were analyzed in trash fish samples. Eight dominant trash fish species such as *Trichiurus lepturus*, *Carangoides talamparoides*, *Arius caelatus*, *Hilsa kelee*, *Pellona ditchela*, *Dussumieria acuta*, *Aurigequula fasciata*, and *Leiognathus splendens* were subjected to proximate analysis. Among the selected trash fish species *Carangoides talamparoides* has highest protein value (18.68%), *Hilsa kelee* consisted highest fat content (12.62%), Ash value (2.33%) is highest in *Aurigequula fasciata* and moisture content (80.32%) was high in *Arius caelatus*. The present study revealed the rich nutritive values of the locally available resources that were presently being wasted, has the potential to use as a nutrient ingredient for artificial feed formulation in livestock farming. It could be concluded that the converting of trash fish into wealth (livestock feed) as an opportunity of adding value to the fish by-product.

**Keywords:** Crude protein, fat, proximate composition, trash fish

### 1. Introduction

Fishery plays a major role as a source of income and livelihood activity for many people in Sri Lanka. Coastal fishery still contributing a major portion around 49% to total fish production of the country. National Gross Domestic Production (GDP) contribution at a constant price, in 2017 was 1.3% (Ministry of Fisheries and Aquatic Resources Development, 2018) [12]. Contribution of Jaffna fishery was a considerable proportion in the national fishery production of Sri Lanka, which was about 10% in 2017 (National Aquatic Resources Research and Development Agency, 2017) [13].

The term Trash fish explains the variety of non-economical important fish species caught in fisheries. This includes the collection of uneatable low-value marine fishes and juveniles of commercial value fishes, which were usually discarded as waste. Although the overall global bycatch situation is not well understood. It occupies a considerable portion about 40.4% of global marine catches, exposing systemic gaps in fisheries policy and management (Davies RWD, *et al* 2009) [5]. According to the United Nations agency (FAO, 2010), the world trend has been shifted toward better utilization of non-commercial discarded element of bycatch and trash fish.

Many Asian countries struggle to manage their trash fish production to balance social and economic benefit associated with different patterns of harvesting and use. Sadly, trash fishes were not often considered as a resource. The nutritional values of these discarded trash fishes were not properly understood very well. Hence, understanding the nutritional value of trash fishes are very important. These trash fish could be used as a vital supplement for the fulfilment of the nutritional requirement in livestock feeds. The direct input of trash fishes or incorporation in artificial feed was considered a better alternative.

There is concern that in the future the rapid expansion of aquaculture may be constrained by increasing dependence on low-value marine "trash fish" and fish meal.

The present study was undertaken to ascertain the nutritional composition of trash fishes along the Jaffna coastal waters. So that the trash fish will be effectively utilized as low-cost fishmeal and other by-product preparation.

## 2. Materials and Methods

### 2.1 Study area

The present study was carried out in selected DS divisions of Jaffna district such as Sandillipay, Tellipalai, Pointpedro, Chankanai and Jaffna. Potential two landing sites were selected from each DS division such as Mathagal, Mareesankoodal, Urani, Senthankulam, Suppermadam, Inpersiddy, Chullipuram, Ponnalai, Paasaioor and Columbuthurai.

### 2.2 Collection of trash fishes

The low value and low consumer demand fishes, small in size, low consumer preference have little or no direct commercial value (FAO, 2017) - "trash fish" species from selected landing sites were collected during the study period of November 2018 to March 2019. The collected samples were kept in iceboxes to keep freshness. They were transported to the laboratory in a polystyrene box and kept in the freezer. Trash Fish samples were washed thoroughly with seawater then again washed with running tap water. The samples were cleaned with de-ionized water to remove contaminants. Then drained under the fold of filter paper.

### 2.3 Preparation of fish for nutrition analysis

The selected trash fish samples were degutted, washed, and dried in an oven at 60 °C for 24 hours. The prepared thrash fish samples were grounded and stored in an airtight container.

### 2.4 Determination of Moisture Content

0.5 – 1g of the grounded sample of thrash fish was taken in a pre-weighed porcelain crucible for determination of moisture by placing in an electric oven at 105 °C for about 15 hours until a constant weight was obtained. During measuring sample placed in a desiccator until it's become to room temperature. Then, a dried sample with crucible was weighed accurately the loss of moisture was calculated as the percentage of moisture (AOAC, 2005) [3]

Moisture% = (Sample Fresh weight with crucible – Crucible weight) - (Sample dry weight with crucible – Crucible weight) / Sample fresh weight \* 100

### 2.5 Determination of Ash Content

Porcelain crucible was weighed and placed in a drying oven for one hour to remove moisture Crucible was removed from drying oven and placed in a desiccator for cooling then About 3-5g of prepared sample was taken and placed in a muffle furnace at 550 °C for six hours. Then the crucibles with ash were taken from muffle furnace and cooled in desiccators. The sample was weighed after the cooling (AOAC, 2002) [2] % of Ash (dry matter basis) = (sample ash weight / sample dry weight) \* 100

### 2.6 Determination of crude protein

Crude protein of trash fish was analysed by Kjeldahl method for that, 0.25g sample was accurately weighed and transferred into a Kjeldahl flask. 1 teaspoon of digestion mixer which is called a catalyst mixture was added into the sample. 5ml of con.H<sub>2</sub>SO<sub>4</sub> added into that. After the Kjeldahl flask was placed

on digestion apparatus. And boil until the solution becomes clear. After it's allowed to cool. Then 25ml of 4% boric acid solution was added to each series of 250ml conical flasks and placed on distillation apparatus. 5ml of distilled water was added to each tube. Then conical flask and Kjeldhal tube was attached to the distillation unit and preheated. The distillation continued till 100 ml of boric acid and ammonia solution was obtained. The flask containing boric acid was titrated with 0.1N H<sub>2</sub>SO<sub>4</sub>.

Percentage of crude protein = (burette reading \* Normality of H<sub>2</sub>SO<sub>4</sub> \* 8.75) / (Weight of sample \* dry matter%).

### 2.7 Determination of crude fat content

1 g of dry sample was weighed and put in the asbestos thimble, Fat extracting beakers were cleaned and weight accurately, 310 ml of acetone was added into the fat extracting beakers which were already dried. The beakers were fixed to the fat extracting apparatus with the sample tube and heated for 4-5 hours with heating point 60 °C. After the extraction thimble with the extracted sample was removed and the fat extracting beakers were transferred into a vacuum oven at 80 °C. Beakers were weighed again.

Percentage of Crude Fat = (weight of fat/weight of dry sample \* dry matter) \* 100

## 3. Results and Discussion

### 3.1 Nutrition Composition of abundant trash fishes

The fishes *Trichiurus lepturus*, *Carangoides talamparoides*, *Arius caelatus*, *Hilsa kelee*, *Pellona ditchela*, *Dussumieria acuta*, *Aurigequula fasciata*, and *Leiognathus splendens* are the non-commercial fish species which is abundantly landing around the coastal waters of Jaffna District through bycatch consider as waste. The tissues of the fish specimen were analysed to determine the compositions of water, protein, fat, and Ash. In the present study to evaluate the nutrient composition of the various trash fishes landed at selected landing sites of Jaffna District. The nutrients composition for various genera of thrash fish species collected from the landing sites were as follows.

**Table 1:** Moisture content of selected trash fishes

Type Of Species	Moisture%
<i>Trichiurus lepturus</i>	78.50
<i>Carangoides talamparoides</i>	77.96
<i>Arius caelatus</i>	80.32
<i>Hilsa kelee</i>	74.37
<i>Pellona ditchela</i>	79.35
<i>Dussumieria acuta</i>	80.26
<i>Aurigequula fasciata</i>	78.38
<i>Leiognathus splendens</i>	78.52

**Table 2:** Protein content of selected trash fishes

Type Of Species	Protein%
<i>Trichiurus lepturus</i>	13.65
<i>Carangoides talamparoides</i>	18.68
<i>Arius caelatus</i>	16.74
<i>Hilsa kelee</i>	12.63
<i>Pellona ditchela</i>	12.47
<i>Dussumieria acuta</i>	12.13
<i>Aurigequula fasciata</i>	14.91
<i>Leiognathus splendens</i>	14.57

**Table 3:** Fat content of selected trash fishes

Type of Species	FAT%
<i>Trichiurus lepturus</i>	5.03
<i>Carangoides talamparoides</i>	3.84
<i>Arius caelatus</i>	1.69
<i>Hilsa kelee</i>	12.62
<i>Pellona ditchela</i>	7.65
<i>Dussumieria acuta</i>	1.30
<i>Aurigequula fasciata</i>	3.49
<i>Leiognathus splendens</i>	3.65

**Table 4:** Ash content of selected trash fishes

Type Of Species	ASH%
<i>Trichiurus lepturus</i>	1.16
<i>Carangoides talamparoides</i>	2.05
<i>Arius caelatus</i>	0.95
<i>Hilsa kelee</i>	1.63
<i>Pellona ditchela</i>	0.49
<i>Dussumieria acuta</i>	2.20
<i>Aurigequula fasciata</i>	2.33
<i>Leiognathus splendens</i>	2.29

The results for the trash fish tissue clearly shows that the average water content was 78.46%. Among the eight species the moisture level was found higher in *Arius caelatus* which is about 80.32% and lower was about 74.37% found in *Hilsa kelee*. The level of water content is more during the period (Northeast monsoon) this is because of loss of energy for reproduction and migration, which will be compensated by drinking more water leads to more water in the body tissue (Kavitha, B., 1998) [10]. These results (Table1.0) almost similar to that of the earlier studies of various trash fishes.

The second most constituent of trash fish tissue is protein. Generally, it ranges from 12%- 18%. The protein level was found to be within the range. Most of the trash fish protein content ranges near 12%. *Carangoides talamparoides* showed the highest 18.68% among all. The crude protein content of trash fish almost similar to the previous results. In general, the amount of protein in thrash fishes varies from stages of life and it also depends upon their habits (Kungsuwan., 1999) [11]. The protein content of fish varies widely depending on factors such as natural feeding habits and availability of feed, fasting during spawning, migration (Khasim Prasad., 1998) [9]. The level of protein was found to be a considerable amount in trash fish, which will be useful to prepare the fishmeal.

Among the eight species, *Hilsa kelee* showed the higher fat content and *Dussumieria acuta* was observed lower than that of other species was about 12.62% and 1.30% respectively. These results have been the agreement with the results of the previous author.

On the other hand, Ash value of 2.33% is highest in *Aurigequula fasciata* and *Pellona ditchela* was observed lower than that of other species was about 0.49%.

#### 4. Conclusions

In the present study, the nutritional composition was studied in eight different species of thrash fish. To study the nutritional composition of any fish at first their water content should be evaluated. There was a little number of reports regarding the proximate composition of trash available. Our present investigation shows the important nutritive value of the trash fishes. It can act as a great ingredient in the production of livestock feed.

#### 5. References

1. AOAC (Association Official Analytical Chemists), Official Methods of Analysis, 16th Edition. Gaithersburg, Maryland, USA 1999.
2. AOAC. Ash, 981.12. Official Methods of and calorific content of Analysis (17 ed.). Gaithersburg, Maryland 2002.
3. AOAC. Official methods of analysis. 8 Edn, Association of Analytical Chemists, Gaithersburg, MD 2005.
4. Central Bank Annual Report of Central Bank of Sri Lanka 2017.
5. Davies RWD, Cripps SJ, Nickson A, Porter G. Defining and estimating global marine fisheries bycatch. Marine Policy 2009. doi:10.1016/j.marpol.2009.01.003
6. FAO. The Production of Fish Meal and Oil; Fishery Industries Division, Fish. Tech. Pap. 1986;142:63.
7. FAO. The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Rome 2018.
8. Immaculate KJ, Velammal A, Jamila P. Utilization of Trash Fishes as Edible Fish Powder and its Quality Characteristics and Consumer Acceptance. World. J Dairy and Food Sci 2013;8(1):01-10
9. Khasim Prasad. Ready to fry, dried products from low-cost fish. Society of fisheries technologist, Cochin, India 1998, 261-263
10. Kavitha B. Crabs of the trash fish landings of Cuddalore Port. M.Sc., thesis CAS in Marine Biology, Annamalai University 1998.
11. Kungsuwan. Bycatch utilization in Thailand. Report and proceedings of FAO 1999, 85-104
12. Ministry of Fisheries and Aquatic Resources Development. Fisheries Statistics 2018
13. Socio-Economic and Marketing Research Division, National Aquatic Resources Research and Development Agency (NARA). Fisheries Industry Outlook 2017,