

# Post-harvest nutritional losses of major fish species in Bangladesh: A circular economy adoption for sustainable aquaculture.

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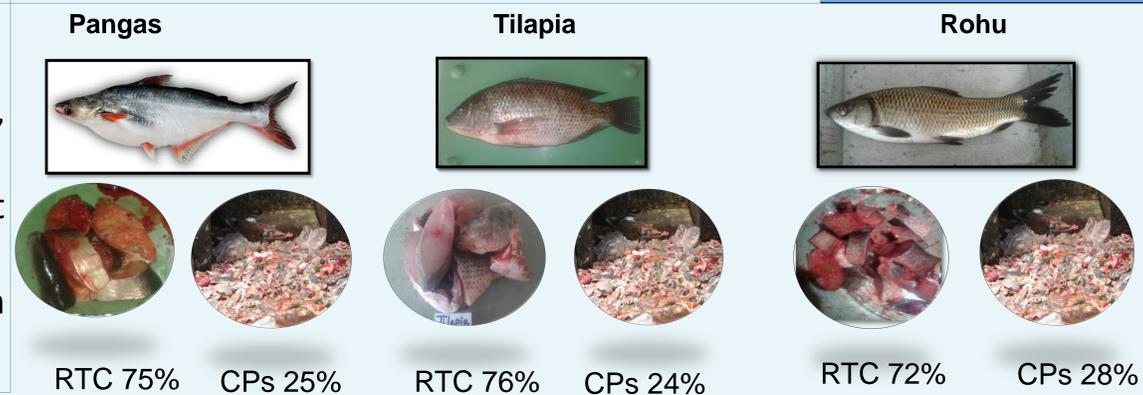
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## Background:

- ❑ Fish is one of the key valuable sources of high quality food for humans
- ❑ processing industry produces more than 60% as waste, which include head, skin, trimmings, fins, frames and viscera during filleting
- ❑ These fishery wastes are rich in high quality nutrients and there is a great potentiality to convert and utilize these into valuable products
- ❑ It could be processed into low market-value products, such as animal feed, fish meal and fertilizer

## Findings



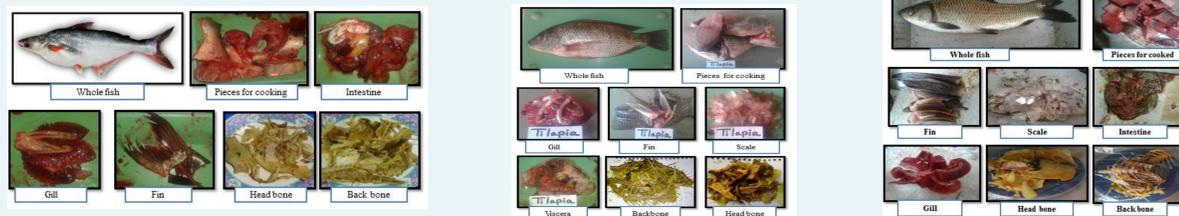
RTC: Ready to cook including plate waste and CPs: Co-products

## Objectives:

- ❑ To quantify the amount of co-products, plate waste and analysis their nutritional values.
- ❑ To identify the probable way for further utilization of formulating fish co-products meal (FCM).

## Method:

**Species Selection:** The most produced fishes of Bangladesh tilapia (*Oreochromis niloticus*), pangus (*Pangasius hypophthalmus*), hilsha (*Tenualosa ilisha*), rui (*Labeo rohita*), catla (*Gibelion catla*), mrigal (*Cirrhinus cirrhosis*), silver carp (*Hypophthalmichthys molitrix*), koi (*Anabas testudineus*) and shrimp (*Penaeus monodon*), prawn (*Macrobrachium rosenbergii*) which account for around 67% of the total fish production in Bangladesh



**Study design :** Fish at different size groups (sub-grouped in table sized) were considered.

## Data collection:

- ❑ Fish dressing data were collected from the market place by engaging local fish cutters.
- ❑ Household women were hired and fish dressing data were quantified
- ❑ Data on tilapia and pangus were also collected from a fish processing industry.

## Quantitative study:

- Cleaning Process: Whole fish, dressing portions including intestine, gills, fins, scale and blood were considered
- Plate waste data (mainly hard and soft bones) were collected from households level

## Qualitative study:

Nutrition data including Protein, Ash, Lipid, Calcium, Zinc, Iron, Selenium were assed both from edible and fish co-products.

## Table: Nutrient content of fish co-products

Fish Co-products	Protein %	Lipid %	Ash%
hilsha	41.59±0.77	24.51±0.76	22.84±0.36
rohu	43.34±0.42	25.25±0.25	21.76±0.28
catla	43.8±0.33	8.99±0.33	34.50±0.71
tilapia	26.0±0.23	22.88±0.61	34.36±0.41
pangus	26.65±0.19	37.55±0.21	24.57±0.41

The major micronutrients like Ca, Fe, Mg, P were found drained through the soft bones like intramuscular bones which could be eaten



FCM- Fish co-products meal

Fish co-products meal can substitute Fish meal  
FISH IN FISH OUT (FIFO) can be transform  
to FISH CO-PRODUCTS IN FISH OUT  
(FCIFO)

## Conclusion:

- ❑ Fish co-products are high in micronutrients and lipids. Both Fish meal and Fish oil for fish feed can be extracted from these fish co-products which about 20-25% of total fish volume in raw weight basis.
- ❑ Fish consumption data now considering the whole wet weight however correction factor for each species should take into account for proper nutrition programme.
- ❑ Small and medium enterpreneurs can be developed at market place to work with fish cutter to make sure the utilization of fish co-products.
- ❑ Fish is a holistic food item and can be a key item for recircular economy.