

Post-harvest Handling and Nutritive Quality of Low-value Fish Products Marketed in Lake Victoria Region

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Study Area

The image shows a wide, aerial view of a deep blue ocean. The water's surface is covered in small, rhythmic ripples. In the upper portion of the frame, the sky is a lighter blue, filled with soft, wispy white clouds. The overall scene is serene and expansive.

Purpose of Our Research

Study is designed to determine impact of post-harvest handling and processing on nutrient composition of low-value fish products

Main research question:

- What is the nutritive quality of common 'low-value' fish products marketed in Lake Victoria region?



Contributing questions:

- What is the detailed range of 'low value' fish products marketed in Lake Victoria region?
- What is the effect of post-harvest handling activities on nutritive quality of common 'low-value' fish products?

Research Methods

- Reviewed literature on low-value fish products (LVFPs) in Lake Victoria region
- Focus group discussions with women processing *mukene* (Kiyindi)
- Key informant interviews with:
 - Mukene fishermen at Kiyindi (Mukono district) and islands
 - Low-value fish processors
 - Islands (Munyama, Zinga, Chiko, Bugaya, and Ndotwe)
 - Landing sites - Kiyindi and Ggaba
 - Processors/traders in food markets - Busega, Katwe, and Kalerwe
- Observations of processor/trader activities – Islands, landing sites, and food markets
- Collected LVFP samples from landing sites and markets to determine nutritive value: crude protein, crude fat, iron, calcium, zinc, and fatty acid profile (DFST & UIRI)

Low-Value Fish Products Marketed in Lake Victoria Region

- Range of fresh and processed products
- Most common products:
 1. By-products from Nile perch processing
 2. Dried *R. Argentea* (also called *Mukene*, *Dagaa*, or *Omena*)
 3. Juvenile fish from indiscriminate fishing (especially in islands)
 4. Some high-value products down-graded due to poor handling and processing

FRAMES (*Fille*)

- Constitute 40-43% of total fish weight
- Major product traded in regional markets
 - Salted and sun-dried, smoked, deep fried

Nutritive quality

- Good source of minerals esp calcium
- Handling compromises nutritive value esp fatty acid profile

Concerns:

- Frames getting bonnier:
 - Filleting technique is improved
 - Smaller fish being caught



SKINS

- Immature skins used for direct human consumption
- Perch skin de-scaled and rolled:
 - Smoked mostly for export
 - Deep fried – for local market
- Direct consumption still limited - Most skin from artisanal filleting operations is discarded
 - Need sensitize riparian populations on nutritive value
 - Need more appealing value-added products



OFF-CUTS

- Trimmings generated from standardizing fillet size; also called red meats or chips
 - Range from 10 to 200 gm in weight
- Good quality off-cuts often do not reach local markets (used for fish fingers and patties)
- LV off-cuts mostly salted and sun-dried and destined for DRC

Nutritive value

- Higher Ca, Fe, & Zn than fillet but quality often compromised by handling
- Highly divisibly hence has potential to improve food security of low-income groups

OFF-CUTS

- Quality of off-cuts determine quality of product
- Artisanal off-cuts often constitute red meats and trimmings sorted from by-products
 - Include fins, bones, and scales
- Molded in flour and deep fried in perch oil
 - Ugandan side of the Lake, fish balls (20-25 grams) sell for UShs.100 (about US\$ 0.06)
- **NEED TO IMPROVE ARTISANAL HANDLING AND PROCESSING**



OFF-CUTS

Concerns

- Improvement in filleting results in less trimmings
- Availability of trimmings for local consumption is being threatened by the growing demand at regional & international markets.

GUTS

- No documented processing & consumption of fish intestines, **liver**, and other internal organs in the Lake Victoria region.
 - Air bladders (swim bladders or maws) are the only high-value product derived from Nile perch
- Of 11 artisanal processors visited, only one by-product trader was observed selling a small section of the intestine (the pyloric caeca or *obubede*)
 - Cheapest by-product on the market (75 gram for US\$1.00)
- Internal organs are underutilized and have potential to improve food security

Juveniles

- Juvenile - fish weighing less than ½ kg
 - Nile perch less than 18 inches
 - Tilapia less than 11 inches
- Trade in and utilization of juvenile fish attributed to necessity to improve access to fish
 - High value products exported
 - Fish by-products also commercialised

Juveniles

- Products and processing
 - Tilapia & Nile perch constitute great proportion of juveniles
 - Mostly smoked or salted and sun-dried
- Contribution to food security
 - High local demand – especially smoked *Semutundu (fatty catfish)* & tilapia
 - Affordable price – esp perch juveniles
 - Large regional market especially DRC and Southern Sudan

ROE

- Mature female perch has an egg sack that weighs about ½ kg
- Mostly deep fried or smoked and sold in local markets
 - Smaller eggs (including tilapia's) are sun-dried and sold to the DRC together with other dried fish products

Nutritive value

- Rich in protein, essential fatty acids, and minerals (esp zinc)

Concern:

- Eggs are becoming scarce due to indiscriminate fishing (perch <3 yrs)



FAT PADS

- Fat mostly found under skin especially belly flaps
 - Amount of fat depend on age of fish and spawning
 - On average 100 gm of perch yields 750 mg oil
- Artisanal processors extract fat by melting at high temperatures
- Perch oil used locally to deep fry fish, cassava, and sweet potatoes
- Perch fat remains an underexploited resource

FAT PADS

- Nutritive quality
 - Good fatty acid profile and comparable to values from other fish parts
 - Quality often compromised by processing & usage (FFA)
- Concerns:
 - Excessive exposure to air increase spoilage (lipid oxidation)
 - Overheating and reusing fat reduces functionality of essential fatty acids
 - Deep frying food increases amount of total fat in diets
 - Younger fish being harvested reducing fat available for making oil

FACTORY REJECTS

- Most fish is rejected by filleting factories because of:
 - Heavy bruising from rough handling while removing from nets, throwing on unpadded canoe bottom, and force used to through on auction slabs
 - Spoilage – inefficient cold chain
 - Oversized Nile perch of more than 40 kgs
- Fish products rejected at the filleting stage
 - Spoilt whole fish – sold to artisanal processors
 - Lower grade fillet (poor cuts and spoilt fillets) – sold to by- product traders

FACTORY REJECTS

- On Ugandan side of Lake Victoria, fresh pieces of Nile perch (often factory rejects) are sold fresh or deep fried
 - 1 cube (25-30 grams) is sold at UShs.100 (US\$ 0.06).
 - An average consumer buys 5-10 pieces but some consumers buy as few as 1-2 pieces.

FACTORY REJECTS

Concerns

- Most raw products start off spoilt
- Handling compromises quality
- Expensive – may not contribute to food security of groups susceptible to malnutrition



MUKENE (Dagaa or Omena)

- Mukene increasing in Lake Victoria
- Processing methods still crude
 - Sun-drying on ground
 - Storage does not allow adequate aeration
- Not attracting good international market
- Seems to be underfished and incur greatest losses



Areas of Concern in Processing



Areas of Concern in Processing



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