



# **FERMENTED FISH PRODUCTS**



## B. Liquid fermented products :

- **Processing :**
- Fish & salt mixture allowed to stand for extended period until whole fish is converted to liquid.
- Liquid contains amino acids & other protein .....
- breakdown products which are water soluble.
- All types of fish can be used.
- Processing of some of the traditional products :

- **1. Nuoc-mam :**

- **Traditional product of Vietnam.**

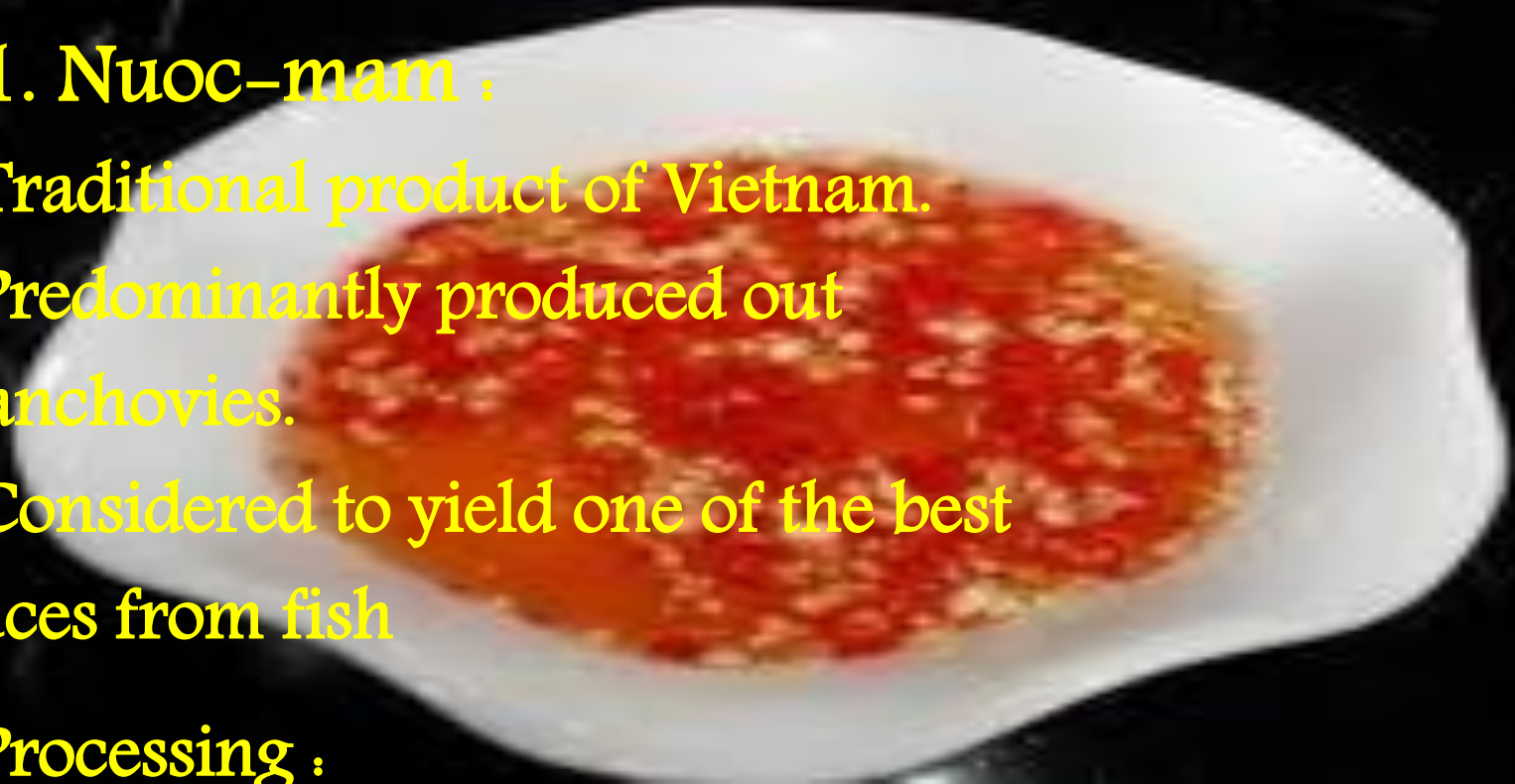
- **Predominantly produced out of anchovies.**

- **Considered to yield one of the best sauces from fish**

- **Processing :**

- **Whole fish washed → mixed with salt**

- **(1:5 to 1:1) → arranged in layers in tub/wooden or cemented vats → wt placed on top to keep fish immersed in brine formed → after 3-4 days liquid containing blood & salt (blood pickle) is removed →**



- liquid is kept aside → fish mixed well & blood pickle poured over it → form a 10 cm layer over it → container is kept covered.
- Fish left in this cond for 5 to 18 months → clear liquid float on surface is Nuoc-mam → siphoned out → liquid sauce is filtered & packed in bottle/earthen container → Kept exposed to sunlight till it is ripe.
- First grade nuoc-mam contains 20-23g N<sub>2</sub> /1000 ml & 50% of this should be titrable .
- Salt should be 20-25g/100 g & pH below 6.

## • 2. Patis :

- Fish sauce of Philippines.
- Straw yellow to amber liquid
- Production process same as

Nuoc-mam.

- Small fish salted whole/ large one gutted & cleaned  
→ chopped to pieces → diff ratio of salt & fish are mixed based on quality → fermentation in drums/ cement tanks.

## • 3. Budu of Malaysia

- Fish sauce from small anchovies (*A. commersonii*) collectively called Ikan bilis.

- Traditional fermentation is done mainly on east coast of Malaysia with *Stolephorous* sp.
- Mixing fish with 25 to 33% salt, incubation at ambient temp for 6 months to 1 yr. in tanks.
- Boiling hydrolyzed mixture for 2 hrs., cooling, decanting & then bottled.

- **4. Nam-pla of Thailand**



- **5. Fish soy sauce & paste:**

- Fish soy paste is a dark brown, moist solid product.
- Fish soy sauce is dark brown to black liquid.

- **Factors affecting processing & quality of Fish sauce :**
- **(i) salt :**
- Putrefying bacteria stops growing at high salt & low pH content.
- But, halo-tolerant & halophilic bacteria grow well
- A 20% salt conc. Is required to prevent excess conversion of org. nitrogenous compounds to ammonia.
- High Salt fermentation – proteolysis mainly by intestinal enzymes of fish & m.o & microbial enzymes are not involved.

- **(ii) Lipid content :**
- Fermentation – anaerobic process.
- So, oxidation of lipid & development of oxidized flavors are not significant.
- Marginally spoiled fish containing oxidized fat are often used to prepare fish sauce.
- Pelagic fish with high fat content is popular raw material for fish sauce.
- Oxidized fat may affect color & flavor of sauce.





- **(iii) Color :**
- Color varies with fish used.
- Most imp sauce nuoc-mam, nam-pla made out of anchoviella.
- Color varies from yellow to light brown.
- Sauce from oil sardine / mackerel – deep brown or dark red.
- **(iv) Flavor :**
- Most imp quality of fish sauce is its aroma.
- Volatile & non-volatile compounds contribute to flavor of sauce.
- Volatile compounds – ammonia, TMA & DMA,

- Low mol. Wt aliphatic carboxylic acids & esters, Non-volataile – peptides, peptone, amino acid, fatty acids & their esters, sugars, their derivatives etc.
- **(v) Accelerating rate of fermentation :**
- Production of fish sauce – time consuming.
- Method employed to speed up the process – accelerating temp to 45° C.
- Fermentation gets accelerated, resultant sauce becomes unacceptable due to presence of characteristic flavor.
- Another method is to carry out fermentation in traditional style for some period & then accelerating

- by artificial heating.
- Process completed by 2 months instead of 12 months.
- **(vi) Nutritional quality :**
- Fish sauce is not nutritionally imp product due to its limited use for high salt & hazards associated with intake .
- Principally used as condiments to flavor & salt many veg & animal prdt dish.

- **C. Fermented Fish paste :**

- Processed in many Asian countries.
- Fish & salt pounded to form paste.
- Fish sun dried & sealed in containers where air is excluded for maturing.
- **1. Philippines Bagoong :**
- Fish or shrimp paste obtained by fermenting whole or ground fish, shrimp or shrimp roe.
- High quality bagoong – pasty consistency.
- Bagoong na alamang obtained by fermenting sps of small shrimps with salt.

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- Fish : salt (3:1) → mixed well in wooden/cement floors → fermented in tanks → settled → a cheese like aroma develops → bagoong harvested & bottled.
  - filter hydrolysate → patis → bottled
  - **2. Malaysian Belachan :**
  - Decapod shrimp & tiny Acetes sp Used to prepare traditional Fermented Belachan.
  - Known as Kappi in Thailand, Ngapi Burma & trassi in Indonesia.
  - Tiny shrimps transformed to fine meaty paste.

- Have characteristic strong pungent flavor.
- Normally added as flavoring ingredient in Malaysian cuisine.
- Commercially prepared one more uniform in color & flavor.
- Sand is a major contaminant in shrimp paste.
- **3. Indonesian Trassi :**
- Paste made from small shrimps or small fish.
- Trassi usually has a strong smell, excellent keeping quality.
- Often mixed with Spanish peppers to give spicy prdt called sambal.

- Consumed regularly with rice, dried salted fish in Indonesia.
- **4. Korean Jeotkal :**
- Salted & fermented seafoods.
- Traditional prdt of Far Eastern countries.
- Salting fish/shell fish → whole/sliced → aging at proper temp.
- Characterized by specific flavor formed by enzymatic digestion of substrate.
  
- Ngapi of Myanmar.
- Mams of Vietnam.

## • LACTIC ACID FERMENTED PRODUCTS :

- Generally processed out of freshwater sps.
- Fermentation with lactic acid is quicker than salt alone.
- Salt level lower 6–18% compared to fish sauce where salt content is more than 20%.
- Process involved mixing of fish with salt & carbohydrate eg. Cooked rice, cabbage etc.
- Keeping quality & extent of fermentation depends on amt of salt & carbohydrate used.
- Carbohydrate are used as food source for lactic acid bacteria.



- **Pla-ra of Thailand**
- Fish scaled, eviscerated → mixed with salt (3:1) → packed in jars for 15 to 90 days → fish taken out of jars after stipulated periods → washed well and allowed to drain → subsequently mixed with roasted rice (rice to fish 1:10) → further storage in jars for 1 to 6 months.
- Consistency of pla-ra varies from brown liquid to partly dried