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VALUE - ADDED FISH PRODUCT DEVELOPMENT BY COASTAL WOMEN SELF HELP GROUPS

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VALUE – ADDED FISH PRODUCTS DEVELOPMENT BY COASTAL WOMEN SELF HELP GROUPS

Introduction

In aquaculture, about 30% of women in rural and coastal areas are directly or indirectly engaged in small-scale fisheries. Of the total employed in the fisheries sector, about 10-12 % of women are involved in fish processing. It is mainly a female-dominated activity in the South Asian region. Retail fish marketing is often best achieved through individual small-scale enterprise. In India, owing to the lack of an established marketing infrastructure and the demand for cheap fish, women have created a niche for processing and marketing fish at very low cost.

Women in India have contributed substantially to the social and economic growth of the economy. The women in coastal areas play an indispensable role in fisheries sector by taking part in various activities both in capture and culture fisheries, such as transportation and marketing of fish in domestic sector, shrimp-peelers in fish processing plants, workers in shrimp hatcheries, grow-out practices and fattening of mud-crabs, aqua feed production, preparation, processing and marketing the products.

In view of the significant nutritional, social, economic and environmental benefits, which generally can be associated with most existing aquaculture practices and the good prospects for further development and expansion of the sector, efforts should be made to aim for sustainable aquaculture development so that potential social conflicts and environmental problems are minimized.

With stagnating yields from capture fisheries and increasing demand for fish and fisheries products, expectations for aquaculture to increase its contribution to the world's production of aquatic food are very high and there is also hope that aquaculture will continue to strengthen its role in contributing to the food security and poverty alleviation in many developing countries. Fish can be preserved for future use with the help of various food preservation methods.

Sale of fish products by the Women SHGs

Several technologies for brackishwater species of finfish, shrimp and crab have been developed by researchers at the Central Institute of Brackishwater Aquaculture (CIBA). CIBA has also taken efforts in empowering the coastal women belonging to fishing and non-fishing communities with the technologies developed here. Various trainings and demonstrations conducted by CIBA among the women Self Help Group beneficiaries have witnessed that value – added fish products development technology is a viable alternative livelihood option for the coastal women Self Help Groups (SHGs).

CIBA has trained about 50 women in Value – Added Fish Products Development and has installed Fish Products Development Units at Kattur-Minjur, Light House Kuppam, and Kulathamedu village, Pulicat, Tiruvallur District and New Washermanpet, Chennai, Tamil Nadu, for domestic marketing of fish products. The beneficiaries have adopted this technology and have started their enterprise on a small scale and are on the path of self-sustenance.

The method of processing of value – added fish products like fish pickle, shrimp pickle, fish samosa and fish cutlet developed by this organization, is discussed in this pamphlet.

If this technology is adopted by coastal women, it can very effectively become a viable enterprise for their livelihood improvement. Owing to the relative ease of these techniques, reasonably good profit margin and familiarity of coastal communities with the adoption of this technology, this venture has proven to be a potential livelihood for the coastal women.

Training the WSHG on 'Value -Added Fish Products Development'

Nutritive value of fish

The food we consume contains various organic and inorganic substances. On comparing meat from terrestrial animals, fish is an excellent source of protein and contains about 18% of protein (wet weight basis). Since it has essential amino acids, it is a stable food compared to milk. Since fish contains rich amino acids like lysine and methionine, it can very well be eaten with grains which lacks lysine and with nuts which lacks methionine. Fish contains vitamin A and D and consumption of fish liver oil would supplement more of these vitamins. Fish muscle has vitamins like Thiamine, riboflavin, niacin, pyridoxine, B12, Pantothenic acid and vitamin C etc. Fish muscle contains minerals such as calcium, phosphorus, iron and iodine.

Fish Meat

Shrimp meat

Advantages of fish consumption

The beneficial effect of dietary fish is attributed to the fatty acid composition of the fish. Most of the fish contains omega-3 fatty acid and decosahexaenoic which help to reduce

the risk of cardiac disease, is good for the nervous system and also reduce the risk of breast cancer. Fish fat has characteristic features like easy digestibility and fish fatty acids are unsaturated in nature (70%) which reduce the cholesterol and heart diseases of the human body.

List of fish products developed

Fish products can be prepared from fresh fish. The products are categorized into two types:-

Processed fish products

- Shrimp pickle
- Fish pickle

Ready to serve fish products

- Fish cutlet
- Fish samosa

Value added Fish Products

1. Shrimp pickle

Ingredients

Peeled shrimp meat, mustard seeds, green chillies, garlic, ginger, chilli powder, turmeric powder, white vinegar, sodium benzoate, citric acid, curry masala powder, coriander powder, fenugreek seeds, asafoetida, curry leaves, cumin seeds, salt and gingelly oil.

Preparation

Clean shrimp thoroughly, add salt & turmeric powder and marinate it for 30 min. Thereafter, the shrimp are shallow fat fried. Heat the pan and pour oil, add asafoetida, cumin seeds, fenugreek seeds and powder the mixture. Again heat the pan add refined oil, mustard seeds, onion, ginger garlic paste, curry leaves, chilli powder, salt then fry till brown and thereafter allow to cook for 5 min. Add vinegar and sodium benzoate. After cooling, the shrimp pickle is filled in bottles, a layer of oil introduced and tightly closed. Finally the bottles are labelled for sale.

Table1: Shrimp pickle preparation and cost calculation

Item No	Ingredients	Qty required (Units)	Cost (₹)
1	Peeled shrimp meat	1 kg	240.00
2	Salt	75 g	0.80
3	Chilli powder	60 g	8.00
4	Curry masala powder	15 g	10.00
5	Turmeric powder	10 g	10.00
6	Mustard	25g	10.00
7	Cumin seeds	25g	2.00
8	Fenugreek	25g	4.00
9	Garlic	200g	17.00
10	Ginger	200g	15.00
11	Green chillies	80g	2.00
12	Curry leaves	10g	2.00
13	Refined oil	700 ml	60.00
14	White vinegar	250 ml	15.00
15	Sodium benzoate	0.5 g	2.50
16	Citric acid	0.5 g	2.50
	Other costs*		220.00
	Total	2,500 g (approx)	620

* Bottling, packaging, labour and other sundry expenses

Nutritional composition and energy value of 100 g shrimp pickle

Nutrients	Energy value
Protein	14.9 g
Fat	22.0 g
Minerals	3.2 g
Energy	254 Kcal

Costs and Returns (Per batch of shrimp pickle- 2,500 g pickle)

1	Production cost per 2.5 kg (shrimp+)	= ₹620/-
2	Unit of bottles per batch	= ₹12 (Approx)
3	Cost of production per bottle	= ₹50/- per bottle (200 g)
4	MRP per bottle	= ₹75/-
5	Returns per shrimp pickle bottle	= ₹25/-
6	Returns per batch of 12 bottles of shrimp pickle	= ₹25 x 12 = ₹300/-

2. Fish pickle

Ingredients

Dressed fish meat, mustard seeds, green chillies, garlic, ginger, chilli powder, turmeric powder, white vinegar, sodium benzoate, citric acid, curry masala powder, coriander powder, fenugreek seeds, asafoetida, curry leaves, cumin seeds, salt and gingelly oil.

Preparation

Clean fish meat thoroughly and add salt & turmeric powder, marinate for 30 min followed by shallow fat frying. Heat the pan,pour oil, add asafoetida, cumin seeds, fenugreek seeds and powder the mixture. Again heat the pan, add refined oil, mustard seeds, onion, ginger garlic paste, curry leaves, chilli powder and salt, then fry till brown and allow to cook for 5 min. Add vinegar and sodium benzoate and allow the pickle to cool to room temperature. Thereafter, it is filled in bottles and closed tightly. Finally the bottles are labelled and sealed.

Table 2: Cost of preparing fish pickle

Item No	Ingredients	Qty required (Kg)	Cost (₹)
1	Dressed fish meat	1 Kg	140
2	Salt	75g	0.80
3	Chilli powder	60g	8.00
4	Curry masala powder	15g	10.00
5	Turmeric powder	10g	10.00
6	Mustard	25g	10.00
7	Cumin seeds	25g	2.00
8	Fenugreek	25g	4.00
9	Garlic	200g	17.00
10	Ginger	200g	15.00
11	Green chillies	80g	2.00
12	Curry leaves	10g	2.00
13	Refined oil	700 ml	60.00
14	White vinegar	250 ml	15.00
15	Sodium benzoate	0.5g	2.5.00
16	Citric acid	0.5g	2.5.00
	Other cost*		220.00
	Total	2,500 g (Approx)	520.00

* Bottling, packaging, labour and other sundry expenses

Nutritional composition and energy value of 100 g fish pickle

Nutrients	Energy value
Protein	19g
Fat	30g
Minerals	6.0g
Energy	450 Kcal

Costs and Returns (Per batch of fish pickle 2500 g)

1	Production cost per 2.5 kg (fish+)	- ₹520/-
2	Unit of bottles per batch	- ₹12 (Approx)
3	Cost of production per bottle	- ₹43/- per bottle (200 g)
4	MRP per bottle	- ₹60/-
5	Returns per fish pickle bottle	- ₹17/-
6	Returns per batch of 12 bottles of fish pickle	- ₹17x12 =₹204

3. Fish cutlets

Ingredients:

Dressed fish meat, potato, onion, pepper powder, mint leaves, coriander powder, coriander leaves, MSG, egg white, baking powder, bread crumbs, sunflower oil, ginger, chopped garlic, garam masala powder, green chillies and salt.

Preparation:

Dress fresh fish/shrimp, debone it and keep it aside. Boil potatoes for 15 min, cool, peel and smash into a paste. Fry chopped onion, garlic, ginger and green chilli paste in a little oil. Mix fish meat with potato paste and onion thoroughly. Add salt, garam masala powder, pepper, chilli powder, coriander powder, MSG, baking soda and mix well. Shape the mixed stuff (25g) into a round shape. Dip this into egg white suspension, roll it over on bread crumbs (At this stage, it could be packed in polythene pouches and stored in freezer for a 24 hr period). This can be fried in shallow oil and served hot with sauce. Cutlets can also be packed in aluminium boxes and stored in refrigerator. The dough for cutlet preparation can be refrigerated for 2 days.

Table 3: Cost of preparing fish cutlets

Item No	Ingredients	Qty required (Kg)	Cost (₹)
1	Dressed fish meat	1 kg	300.00
2	Potato cooked	215 g	7.00
3	Salt	23 g	4.00
4	Onion	125 g	7.00
5	Garlic	15 g	5.00
6	Ginger	15 g	5.00
7	Green chilies	4 g	2.00
8	Pepper	4 g	5.00
9	Garam masala powder	7 g	5.00
10	Coriander powder	3 g	3.00
11	MSG	3	3.00
12	Baking powder	2 g	5.00
13	Egg	6 Nos	17.00
14	Bread crumbs	150 g	10.00
15	Sun flower oil	300ml	25.00
16	Curry leaves	10g	2.00
17	Pudina leaves	10g	2.00
18	Coriander leaves	10g	2.00
	Other expenses*		90.00
	Total	**1500 g**	**500.00**

* Bottling, packaging, labour and other sundry expenses

Nutritional composition and energy value of 100 g product (Fish cutlet)

Nutrients	Energy value
Protein	11.3 g
Carbohydrate	7.0 g
Fat	2.3 g
Minerals	2.1 g
Energy	93.5 K cal

Costs and Returns (Per batch of Fish cutlets 1500 g)

1	Production cost per 1.50 kg (fish +)	- ₹500/-
2	Unit of fish cutlets per batch	- ₹60 (Approx)
3	Cost of per fish cutlet	- ₹8.30/- (25g each)
4	MRP per fish cutlet	- ₹15/-
5	Returns per fish cut let (25g)	- ₹6.70/-
6	Returns per batch of 60 No's of fish cutlets	- ₹6.70X 60 = ₹402/-

4. Fish Samosa

Ingredients

Dressed fish meat, cooked potato, sun flower oil, tomatoes, ghee, green peas, carrot, cabbage, onion, ginger, garlic, green chillies, curry leaves, mint leaves, coriander leaves, chilli powder, garam masala powder, salt, pepper powder, turmeric and maida powder.

Preparation

Mix maida flour with salt, water and ghee, mix thoroughly and make it to the size of half a roti or prepare in the shape of a samosa outer layer. Fry onion, potato, green chillies, turmeric and salt for 15 min. Mix ginger paste, chilli powder, turmeric powder and salt thereafter fry for 15 min. Add cumin seeds, cashew nuts and green peas and mix well. Take 15 g size, keep it inside the dough and shape it in the form of a samosa. (This dough can be preserved in freezer for 2 days). Deep-fat-fry the samosas in refined oil. Thereafter, these can be packed in pouches and served or can be stored in refrigerator for a couple of days.

Table 4. Cost of preparing fish samosas

Item No	Ingredients	Qty required (Kg)	Cost (₹)
1	Dressed fish meat	1 Kg	180.00
2	cooked potato	100 g	3.00
3	Sun flower oil	500ml	35.00
4	Ghee	50g	20.00
5	Green peas	100g	10.00
6	Carrot	100g	10.00
7	Cabbage	100g	10.00
9	Onion	100g	10.00
10	Ginger	25g	5.00
11	Garlic	25g	5.00
12	Green chillies	50g	5.00
13	Curry leaves	10g	2.00
14	Pudina leaves	10g	5.0
15	Coriander leaves	10g	20
16	Chilli powder	20g	5.00
17	Garam masala powder	10g	10.00
18	Salt	20g	2.00
19	Pepper powder	5g	5.00
20	Turmeric	10g	5.00
21	Maida powder	500g	13.00
22	Other cost *	-	325.00
	Total	**2,750 g**	**685.00**

* Bottling, packaging, labour and other sundry expenses

Nutritional composition and energy value of 100 g fish samosa)

Nutrients	Energy value
Protein	18.5 g
Carbohydrate	10.0 g
Fat	3.30 g
Minerals	3.0 g
Energy	180 K cal

Costs and Returns (Per batch of fish samosas of 2750 g)

1	Production cost per 2.75 Kg (fish+)	- ₹685/-
2	Units of fish samosa per batch	- ₹55 (Approx)
3	Cost per unit of fish samosa	- ₹12.50/-(50 g each)
4	MRP per fish samosa	- ₹15/-
5	Returns per fish samosa (50 gms)	- ₹2.50/-
6	Returns per batch of 55 fish samosas	- ₹2.50 x 55 = ₹137.50/-

Packaging of fish products

After processing, packing of fish products is very important for enhanced shelf life. There are various packaging

materials available in the market like bottles, sachets, plastic bags, polythene covers, tin foil, aluminum foil etc. We can use packaging materials depending on the type of food products that can be packed.

Packing and labelling of fish products

Sealing of fish products

Fish product labels

Storage

Fish spoils very quickly and should be used as soon as possible. It should be kept covered in the coldest part of the refrigerator for no longer than 2 days. Pre-packaged fish and shellfish can be refrigerated in the original package for a short time. Fish wrapped in butter paper should be taken out and wrapped in aluminum foil or plastic wrap. Frozen fish maintains good quality when placed in the freezer immediately after purchase. Freezer temperatures of -18°C to -20°C or lower are necessary to prevent loss of colour, texture, flavour and nutritive value. Cured fish is best kept covered in the refrigerators. Canned fish after opening should be used up immediately or refrigerated.

APPROXIMATE BUDGET FOR MINI SCALE FISH PICKLE DEVELOPMENT UNIT

Job: Fish pickle preparation
Production target: 200 bottles of 200 g each for 20 days a month
Days engaged: 20 days / month
No of personnel working: 10

Fixed costs

Sl.	Items	Outlay (₹)
A.	**Fixed Items**	
1.	Electronic grinder	8000.00
2.	Mixer	4000.00
3.	Sealing machine	8,000.00
4.	Silver coated table	80,000.00
5.	Oven	15,000.00
	Total	1,15,000.00
B.	**Operational expenses per month**	
5.	Other short and medium term costs (including, packing materials, Vessels, Fuel, Strappers, ice box etc.) (₹30,000 for 3 months)	10,000.00
6.	Labour (₹50/ man day) x 10 labour x 20 days (month)	10,000.00
7.	% interest on capital cost/yr	8 %
C.	Returns per batch of 12 bottles @ MRP of ₹ 60/bottle	204.00
D	Gross returns on 4000 bottles/ month	68,000.00
E	Gross returns per year	8.16 lakhs
F	Net returns (-) (8 % on capital cost) / year)	8.06 lakhs/year

Marketing

These products can be packed in glass bottles/aluminium pouches for sale. Cutlet and samosa products can be packed in double layered aluminium pouches for sale.

Marketing of fish products by coastal Women Self Help Groups

Market linkages created for the beneficiaries for marketing fish products

Dr. S. Ayyappan, DG, ICAR, visiting the fish product processing unit at Kattur village, Tiruvallur District, TN.