PROMOTING FISH VALUE ADDITION TECHNOLOGIES AMONG WOMEN SHGS IN JAGATSingHpur

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The study was carried out by Krishi Vigyan Kendra, Jagatsinghpur, in 2021-22 to promote various fish processing and postharvest value-addition technologies among farm women. Around 100 women from different blocks of Jagatsinghpur took part in the programme. Four technologies viz., hand operated fish descaling machine; motorized fish de-scaling machine; refrigerated mobile fish vending kiosk for fish chilling; and preparation of fish pickle were disseminated among women through training and demonstration. ICAR-Central Institute of Fisheries Technology, Kochi was involved as knowledge partner. The women SHG farmers used these technologies and found it more profitable as compare to previous followed practices. The B: C ratios for these four technologies were found to be 1.30; 1.41; 1.46 and 1.40 respectively.

Keywords: Hand operated fish descaling machine, fish value-addition technologies, fish processing

 INTRODUCTION

Jagatsinghpur district comes under the East and South Eastern coastal plains. The district covers 1759 sqkm. The area consists of 8 blocks. Out of these, Kujanga, Balikuda, and Erasama are coastal blocks. Kujanga and Tirtol are potential inland blocks, and Erasama is a potential brackish water block. The district is enriched with 1695.09 ha area of Inland water resources, brackish water resources of 5459.10 ha, and bounded by an 80 km coastline. These resources create ample scope for development in the Inland, brackish water, and Marine fisheries sectors aiming to enhance fish and shrimp production. In the district, total Freshwater fish production of 16,425 MT, total brackish water fish production of 13972MT, and total fish production of 42469 MT from the marine sector in recent years show that Jagatsinghpur district is full of fisheries resources. There is about 248152 nos of the SC population which is about 21.08% of the total population in the district, out of these population 105 families directly get their income from the fishery sector (GoO, 2019). This study helps and motivates them to adopt scientific postharvest technologies and value addition, by which means the price of the value added products made from value addition of less priced, easily and abundantly available fish and shellfish. The value added products are having longer shelf life as compared to raw fish. So it is very much helpful to improve their income to a greater extent. Almost all of the SC fishermen belong to the traditional fisherman community. This study helps them uplift their livelihood through advanced and improved
scientific post-harvesting technologies and preservation methodologies that help them improve their socio-economic condition. However, people need to be aware of advanced and scientific postharvest technology and value-addition methodologies, which can increase their income (Cecily, 1987)). Hence to promote fish value-addition technologies among women, SHGs were taken up

a) To uplift the livelihood and enhance the income of the fish farmer.

b) To generate awareness about the new scientific technology in the value addition and postharvest management of fish.

c) Entrepreneurship development in the field of the postharvest and fish processing sector.

d) To produce hygienic and quality fish and fisheries products.

**METHODOLOGY**

The study was conducted during the year 2022 in Jagatsinghpur, Odisha. Four value-addition technologies viz., mechanized fish descaling technology, hand operated fish descaling machine, refrigerated mobile fish vending kiosk and fish pickle preparation were selected for the study. These technologies were promoted among selected farm women belonging to women SHG through the skill training program at KVK, Jagatsinghpur. ICAR-Central Institute of Fisheries Technology, Kochi was connected as a knowledge partner, forty women farmers from 4 women SHGs i.e Maa Ramachandi, Maa Basualli of Kujanga block and Trinath SHG, Gorekhanathgadi of Tirtol block were trained in the training program. The farm women who were selected are engaged in culture fisheries activity in Tirtol block and dry fish production activity in Kujanga block. The SSGs groups were given training on "Preparation of dried, pickled & cured fish product and different advances in post harvest management technologies”. Around 10 members of 1 WSHG of village Dalimbapur of Block Kujanga who are doing dry fish business were given a practical demonstration on fish pickle preparation under the FLD program. Around 10 nos. of farmers of villages Indarpa, Manijhanga, Nimakana, Garam, and Sharadia of different blocks were selected under OFT Programme for performance evaluation of Hand operated & Motorized fish descaling machine. Around 10 farmers of villages Bagadia, Goram, Jhimani, Dalimbapur, Khandakapala, and Kapalaetc of different blocks were selected for the FLD program on Chill Fish-Refrgerated mobile fish vending kiosk. A post-training workshop on “Post-harvest technological tools, implements, and equipment" was conducted with 100 women at village Bagdia of the block, Kujanga. This workshop was really helpful for fish farmers interested in initiating some activities under fish processing and postharvest technologies.

**Performance evaluation of fish value addition technologies**
### a. Motorized fish descaling machine

<table>
<thead>
<tr>
<th>a) Identified problem</th>
<th>High drudgery and Low shelf life due to processing and cutting fish in unhygienic conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Farmers practice</td>
<td>Descaling was done in the traditional method.</td>
</tr>
<tr>
<td>c) Technology</td>
<td>Motorized fish descaling machine is developed to remove fish scales easily. This equipment can remove scales from almost all species of fish, ranging from marine to freshwater. This machine contains a 0.5 HP AC motor with a proper belt reduction mechanism to achieve the required drum speed of 2030 rpm. The 340 mm diameter and 420 mm length drum was fabricated using an SS sheet. Inside the drum, a perforated SS sheet is fitted with suitable projections to remove the scale, and the drum is provided with a leak-proof door with a suitable lock.</td>
</tr>
<tr>
<td>d) Observation Parameters</td>
<td>Drudgery reduction, Percentage of scale removal (60-70%), adaptability for different species (Best suitable for fishes with medium size scales, Carp with sizes ranging from 0.5-1kg).</td>
</tr>
<tr>
<td>e) Farmers Feedback</td>
<td>Small fishes 0.5-1kg are easily descaled.</td>
</tr>
</tbody>
</table>

### b. Hand-operated fish descaling machine

<table>
<thead>
<tr>
<th>a) Identified problem</th>
<th>Low shelf life due to processing and cutting of fish in unhygienic conditions and high drudgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Farmers practice</td>
<td>Descaling was done in the traditional method.</td>
</tr>
<tr>
<td>c) Technology</td>
<td>A fish descaling machine is developed and fabricated to remove the fish’s scales easily. This equipment can remove scales from almost all types, sizes, and fish species, ranging from marine to freshwater. This machine is made of SS 304 and has a drum of 250mm diameter and 300 mm length. The drum is fitted in a strong SS frame and has suitable projections to remove the scale and is provided with a leak-proof door with suitable projections to remove the scale. A hand-operated pedal is fitted on one side of the drum to rotate the drum manually.</td>
</tr>
<tr>
<td>d) Observation Parameters</td>
<td>Percentage of scale removed (50-60%), adaptability for different species (Best suitable for fishes with medium size scales, Carps with size ranging from .750-1kg, drudgery reduction</td>
</tr>
<tr>
<td>e) Observation Parameters</td>
<td>The manual descaling machines are suitable to descale small fishes of size under 500 gm. It can descale 40-50% of fish in 15-20 minutes</td>
</tr>
<tr>
<td>f) Farmer's Feedback</td>
<td>Small fishes 500gms-1kg are easily descaled.</td>
</tr>
</tbody>
</table>
c. Demonstration on Refrigerated mobile fish vending kiosk for fish chilling

a) Identified problem
Low shelf life of fish.

b) Farmers practice
In the open vending market, use thermocol ice pack fish boxes for storing purposes.

c) Technology demonstrated
A low cost, energy-efficient, refrigerated mobile fish vending kiosk to sell fish at consumers' doorstep under hygienic conditions. The unit was fabricated mainly using food-grade stainless steel (SS 304) with transparent polycarbonate/toughened glass sheets for the display.

d) Observation Parameters
Storage-20kg at a time in temperature 0-4°C, shelf life 4-5 days.

e) Farmers feedback
The fish vending kiosk is an attractive and very useful machine at an affordable price. Very suitable for small-scale fish vendors, Lady fish farmers for daily selling purposes of fish.

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d. Demonstration on Fish pickle

a) Identified problem
To make effective utilization through the value addition of less-priced fish.

b) Farmers practice
Sell at a very low price.

c) Technology demonstrated
Fish pickle is a preserved food item through neither anaerobic fermentation in brine nor immersion in vinegar. The pH of a fish pickle should be 4.6 or lower to reduce microbial activity. Most sea fish like prawn, Tuna, Pomfret, Mackerel, Pangassius, and Rupchandi etc are ideally suitable for making fish pickles, with an average shelf life of one year and more.

d) Observation Parameters
Shelf life - more, It is rich in taste and flavor, colour, etc. B: C ratio-1.40

e) Farmers Feedback
The pickle has a very good selllife. The taste of the pickle is very good, as tested in the organoleptic evaluation, and it is very easy to prepare.

RESULTS AND DISCUSSION

Fish descaling was made using the machines, and around 3 and 5 kg of fish can get descaled in one operation in Hand operated and Motorized fish descaling machines, respectively (Zynudheen et al., 2017). In Hand operated and Motorized fish descaling machines, the fish got descaled in around 15-20 minutes, and around 50-60% & 60-70%, respectively, descaling occurred. These machines operated well when the fish were small, fresh, and wet (Samuel et al., 2018). The B:C i.e Benefit:Cost ratio of hand operated fish
desalting machine and motorized fish desalting machine is about 1.30, 1.41 respectively as compared to farmers practice without which is about 1. That means they would be able to get Rs. 1.30 and 1.41 by investing Rs.1 by using hand operated fish desalting machine and motorized fish desalting machine respectively, this indicates that fish desalting machine is very profitable for women farmer and WSHGs, fish vendors etc. The farmers appreciated these machines, but in comparison, the motorized fish desalting machine is very much appreciated as it is a very farmers-friendly tool. Farmers were giving their views to increase the power of the motors with regulated drum speed so that desalting could be done more efficiently and in all types of fish (Aniesrani et al., 2019).

Refrigerated Fish vending kiosk is a user-friendly technology. Hygienic, low-cost and energy efficient refrigerated mobile fish vending kiosk is a promising option for small vendors who contribute above 95% of the market chain to sell fish at the consumer’s doorstep under hygienic conditions in village/urban/municipality areas with proper waste disposal system. The B:C i.e Benefit: Cost ratio of refrigerated fish vending kiosk is about 1.46 as compared to farmers practice without which is about 1.27 without using refrigerated fish vending kiosk. That means they would be able to get Rs. 1.46 by investing Rs.1, this indicates that refrigerated fish vending kiosk is very profitable for women farmer and WSHGs, fish vendors etc. These technologies are very helpful for fish farmers, fish vendors, and SHGs of the district who need to be made aware of such superior and low-cost technology. This technology allows them to increase their profit through more hygienic and improved processing (CIFT, 2020).

The demonstration on Fish pickle technology was very much appreciated by the women farmers (Abharam et al., 1993). The B:C i.e. Benefit: Cost ratio of fish pickle is about 1.40. That means they would be able to get Rs. 1.40 by investing Rs.1, this indicates that preparation of fish pickle value addition methodology can be a very profitable business venture for women farmer and WSHGs. And also they are reporting that at the fish pickle would have very good shelf life ie about 6 months and more. Overall they are planning to start it as a business venture (Jawahar et al., 1996).

A post-training workshop on “Postharvest technological tools, implements, and equipment” was conducted with 100 nos of women fish farmers at village Bagdia of the block, Kujanga. This workshop was really helpful for fish farmers interested in initiating some activities under fish processing and postharvest technologies. Many women farmers and SHGs are engaged in fish farming as their primary source of income (Huss et al., 1988). The demonstrated technologies of value addition and postharvest management would create ample opportunity for the development of fish farmers, especially for the women farmers and SHGs, contributing to their socio-economic upliftment (Surendran et al., 2006). Jagatsinghpur district has an 80 km length of coastal line and capture fisheries have immense potential. Farmers are involved in producing dry fish and other products, however, they do it in an unhygienic manner. These activities could be performed around the year facilitating active participation of women farmers. As an impact of the training, several trained SHGs/
Rural Youths who were practicing any group activity were forwarded a step ahead to adopt value-added fishery product preparation, dry fish production, and preparation of fish pickle as income generating activity of the group. All the technologies popularised through demonstration are superior to existing technologies/methods followed by fish farmers, womens’ farmers, and SHGs.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Treatments</th>
<th>weight of fish (Kg)</th>
<th>No of farmers</th>
<th>Input cost (Rs.)</th>
<th>Output cost (Rs.)</th>
<th>B:C ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Descaling machine</td>
<td>Farmers practice</td>
<td>100</td>
<td>10</td>
<td>10,000</td>
<td>20000</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Hand operated fish descaling machine</td>
<td>150</td>
<td>10</td>
<td>13000</td>
<td>30000</td>
<td>1.30</td>
</tr>
<tr>
<td></td>
<td>Motorized fish de-scaling machine</td>
<td>200</td>
<td>10</td>
<td>17000</td>
<td>40000</td>
<td>1.41</td>
</tr>
<tr>
<td>Refrigerated mobile fish vending kiosk for fish chilling</td>
<td>Farmers practice</td>
<td>250</td>
<td>10</td>
<td>22000</td>
<td>50000</td>
<td>1.27</td>
</tr>
<tr>
<td></td>
<td>Refrigerated mobile fish vending kiosk for fish chilling</td>
<td>1000</td>
<td>10</td>
<td>81000</td>
<td>200000</td>
<td>1.46</td>
</tr>
<tr>
<td>Demonstration on Fish pickle</td>
<td>Farmers Practice</td>
<td>20</td>
<td>10</td>
<td>1200</td>
<td>2400</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Demonstration on Fish pickle</td>
<td>20</td>
<td>10</td>
<td>5200</td>
<td>12500</td>
<td>1.40</td>
</tr>
</tbody>
</table>

CONCLUSION

Value-added fishery product preparation and their marketing can be suggested as new enterprises for SHGs for the overall progress of the group as well as the economic uplifftment of the group members. These activities can be done around the year when members can actively participate. There should be the inclusion of small schemes regarding these programs so that the interested small women farmers, SHGs can avail those for expansion of their units and will make continuity in their activity. Involvement of the fisheries department, NGOs and farmers of fishery cluster of different blocks in promoting and popularization the technologies on a large scale. SC lady farmers are coming forward and showing much interest in fish farming and make fishery cluster. However, the social
empowerment of SC farmers/WSHG significantly depends upon their economic empowerment. Keeping in view making these groups economically and socially independent, these types of capacity-building programs should be promoted in the fisheries sectors, which not only improves their knowledge and skill level but also will give them enough confidence to carry out these income-generating activities for improving their livelihood. Again, it is also very important to link the skilled members to various government schemes, NGOs, and financial institutions to get capital to initiate their activities and make them sustainable.

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REFERENCES


