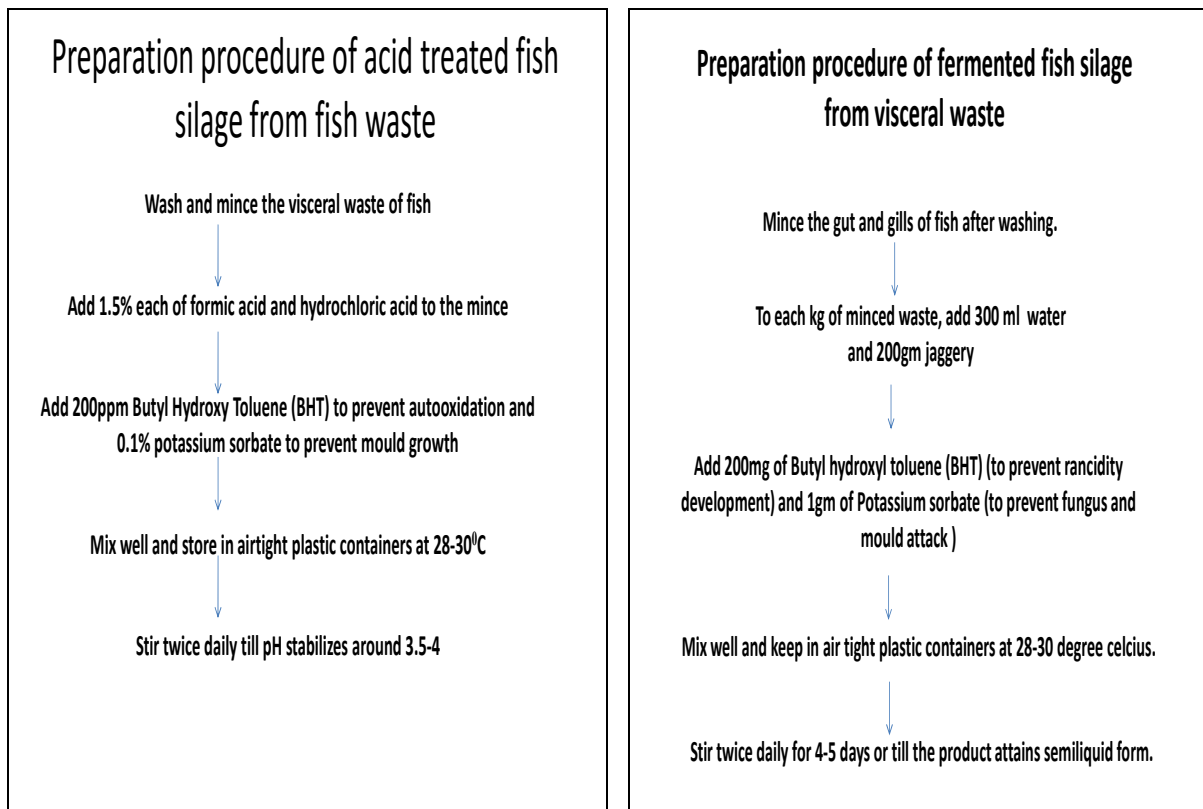


FISH SILAGE FROM VISCERAL WASTE OF FRESHWATER CARPS

1. **Title / name of the technology:** Fish silage from visceral waste of freshwater carps
2. **Background:** Large quantities of fish parts are being wasted in tropical countries like India. These wastes dumped in and around human habitations are inviting serious environmental and health threats. The fish wastes are a great source of proteins, fats and minerals which could be put to different uses. Fish meal is one such byproduct from fish waste. Fish meal production is a capital intensive enterprise where most resource poor coastal fisherwomen cannot venture into. Fish silage is another option which is economically viable and low risk technology which can be adopted by coastal fisherwomen
3. **Technology description:** Fish silage is a liquid product made from dressing waste of fish or whole fish to which acids, enzymes or lactic-acid-producing bacteria are added, with the liquefaction of the mass provoked by the action of enzymes from the fish. There are 2 types of fish silage: 1) Acid treated fish silage 2) Fermented fish silage.



4. **How it is women friendly?:**
 - The production of fish silage involves less capital investment and low skill requirement.
 - The cost of production of silage is Rs 6/kg and Rs 10/kg for acid treated and fermented fish silage respectively.
 - Hence the technology of fish silage production is women friendly.
5. **Performance:**
 - The cost of production of silage is Rs 6/kg and Rs 10/kg for acid treated and fermented fish silage respectively.
 - There was an increase of 8% in egg production in Japanese quails (*Coturnix coturnix japonica*) when fed with acid added fish silage at 3% of the diet.
 - The cost of feed/kg gain in weight decreased by Rs 5/- when 10% of diet of broiler chicken was replaced with fish silage.

- Significant gain in weight, lowered feed conversion ratio and feed cost/kg gain in weight were observed in Vanraja birds fed with fish silage.
- The inclusion of fish silage at 5% level resulted in a 14.31% reduction in feed cost/kg weight gain in rohu fingerlings.

6. Locale of dissemination/application:

- The technology can be adopted by coastal fisherwomen where the availability of raw material (fish waste) is in plenty.

7. Outcome/impacts/benefits:

- Fish silage production from fish waste can not only be an income generating activity for coastal women but will also help in alleviating environmental pollution caused by the piling up of fish processing wastes around human habitations.
- Fish silage could be put to use as a feed ingredient in poultry, livestock and fish feed and also could be used as organic manure in crops.

8. Limitations if any:

- Since silage is a liquid product which is bulky, it occupies more space.
- The access to raw material should be easy so that the waste can be collected before it gets spoiled.
- Since the bulk availability of marine fish is seasonal, the production of silage is also most likely to be a seasonal activity unless otherwise taken up by beneficiaries located near to inland fish markets.

9. Photos:



10. **Source (author/ organization) :** Tanuja, S. & Anil Kumar, ICAR-CIWA, Bhubaneswar, Odisha

11. **Developed/ tested/ refined :** Developed and tested

12. **Year & purpose:** 2013-16 under the Institute project 'Aqua and poultry feed from fish and shellfish wastes for employment generation of coastal women'

13. **Cost (initial investment and operating cost in Rs./h and Rs/Unit output):** The fixed assets required in the production of fish silage are meat mincer and plastic containers. The total cost of these fixed assets is around Rs 15000/-. Solar dryer for drying silage mixed with other ingredients could also be used. The production cost for acid treated silage is Rs 6/kg and that of fermented silage is Rs 10/kg.

14. **Patent/ commercialization details:** Nil

15. **Whether further study/ modification are required or not:** Further study to explore the possibilities of using fish silage as organic manure needs to be explored. Production of organic manure from fish silage is a much more feasible income generating activity for women.