

# CMFRI

## bulletin 44

Part Two

MARCH 1990



## NATIONAL SYMPOSIUM ON RESEARCH AND DEVELOPMENT IN MARINE FISHERIES

**MANDAPAM CAMP**  
16-18 September 1987

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Papers Presented  
Sessions III & IV

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**CENTRAL MARINE FISHERIES RESEARCH INSTITUTE**  
(Indian Council of Agricultural Research)  
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

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## UTILIZATION OF FISH TRASH FOR INCREASING YIELD AND QUALITY OF MILK IN CATTLE

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### ABSTRACT

The difference between cost of milk production and its selling price is very thin and is getting thinner due to cumulative increase in cattle food prices on one side and limitations on marketing price of milk on the other. Possible utilization of trash fish converted to liquid silage as a part of cattle food resulting in increased yield of milk and fat content are discussed in this paper. The development of silage and field trials on milking cattle were carried out by Gujarat Fisheries Aquatic Sciences Research Institute, Okha.

### INTRODUCTION

Almost 50 per cent or more fish catch in Gujarat does not fetch value and thus is commonly grouped as "trash fish". However, much value negative fish is also equally good in protein and other nutritive contents. With the increasing number of bottom trawlers, the quantity of trash fish caught is on the increase. The landings consist of 70 to 80% trash fish. Unfortunately this nourishing fishes are not commercially acceptable because of

food habits of fish eaters and large number of bones in such fishes. While a part of these fishes are sundried, some are converted to fillets and others are used to make manure or meal. Since such products are not highly priced the fisherman is at a loss. These so called trash fishes could be effectively used for making nutritive products for human consumption and for feeding cattle and poultry.

The Gujarat fisheries at its Okha laboratory started a programme of research for trash

fish initially with 75% grant of I.C.A.R. and later fully of its own. During the last decade this laboratory has developed:

- (a) Edible protein rich tablets and capsules, the tablets being sugar coated. They have been tested in large number of Ashram Shalas and other places and the feed back reports have been very encouraging. Over three million tablets have been test marketed, and repeat orders have been received.
- (b) Fish Kheema has also been successfully produced on large scale and tested.
- (c) Other items, like poultry feed superior quality fish fillet, fish cubes, soup powder, papad, chakri, ganthia and biscuits have also been produced.

As a part of its ongoing programme Gujarat Fisheries Aquatic Sciences Research Institute at its Okha processing laboratory has developed fish silage from certain uneconomic trash fishes. The silage has been tested repeatedly for (a) organoleptic conditions, (b) bacteriological counts, (c) nutritional values and (d) shelf life qualities.

This paper discusses the preparation, field experiments and feed back results of the silage.

#### MATERIAL & METHODS

Silage was prepared on the basis of flow chart given. It was further analysed for moisture, protein, fat, ash, silica and *E. coli*, *Staphylococci*, *Salmonella*, T. P. C. etc. and the results are given in Table 1.

TABLE 1  
Analytical data of the fish silage

	Liquid	Dry
Moiture	75.50%	19.43%
Protein	16.35%	48.56%
Fat	3.7%	21.17%
Ash	3.81%	—
Silica	0.02%	—
M. E (kcal/kg)	3303	4206
Total plate count	0.08 x 10 <sup>6</sup>	0.29 x 10 <sup>6</sup>
<i>E. Coli</i>	Absent	Absent
<i>Staphylococci</i>	-do-	-do-
<i>Steptococci</i>	-do-	-do-
<i>Salmonella</i>	-do-	-do-

The names of fishes used as raw material individually or in mixture are given in table-2.

TABLE 2  
Names of fishes (raw material) used

Common name	Species name
Anchovy	<i>Coilia dussumieri</i>
Lizard fish	<i>Saurida tumbil</i>
Silver bar	<i>Chirocentrus dorab</i>
Pellona	<i>Pellona ditchella</i>
Moon fish	<i>Drepane punctata</i>
Coral trout	<i>Variola louti</i>
'Dhoma'	<i>Otolithus ruber</i>
Ribbon fish	<i>Lepturacanthus savala</i>
Sole fish	<i>Cynoglossus lingua</i>
Cuttle fish	<i>Sepia aculeata</i>
Silver belly	<i>Leiognathus fasciatus</i>
Bony beam	<i>Nematolosa nasus</i>
Rainbow fish	<i>Platyglossus dussumieri</i>

Pre-primary trials regarding acceptability of this silage were carried out on pigs, chicken and cattles at Gujarat Fisheries Aquatic Sciences Research Institute campus and the approximate suitable percentage of mixing this silage with normal animal food was decided upon. It was then decided to carryout field trials with ensilage mixture of 5 and 10% in the feed of milking cattle.

The field trials were conducted on milking cattle at

- (a) Valsalya Dairy Farm, Jamkhambhalia
- (b) Chandaria Trust, Ravalsar
- (c) INS Walsura Naval Establishment, Jamnagar (all above in Jamnagar District) and
- (d) Gujarat Agriculture University, Junagadh campus, cattle breeding farm (on growing calves).

#### DISCUSSION

Feed back data received from field centres with milking cows are given in tables 3, 4 & 5.

TABLE 3

## Fish Silage Experiment Data - Vatsalya Dairy Farm, Jam Khambhalla

Sr. No.	Name of the centre	No. of milking cow taken up	Average yield of milk per day for the last 15 days before feeding silage for cows		Average yield of milk per day 30 days of 10 per cent liquid fish silage in feed.		Average increase per day for cows		Average fat content in milk before fish silage given (%)	Average fat content in milk after fish silage given (%)	
			Morning (litres)	Evening (litres)	Morning (litres)	Evening (litres)	Morning	Evening			
1.	Jam-Khambhalla	<i>Experimental</i>									
		Cow no. one	3	3	3.250	3.432	0.268	0.432	0.682	4.5	5.0
		Two cows									
		Cow no. two	4	4	4.316	4.300	0.316	0.300	0.616	4.5	5.0
		<i>Control</i>									
		One cow	5	5	5.0	4.983	0.0	0.017	0.017	5.0	5.0
		Average % of increase in yield in expt. cows : 11.68%									
		Average % of increase in yield in fat in expt. Cows : 11.11									

TABLE 4

## Fish silage Data - Navsargan Rural Development Foundation, Ravalsar

1.	Ravalsar	<i>Experimental</i>									
		Cow no. one	2.794	2.188	2.981	2.325	0.187	0.37	—	+ 6.50	—
		Two cows									
		Cow no. two	1.623	1.311	1.636	1.181	0.013	0.30	—	- 3.98	—
		<i>Control</i>									
		Cow no. one	1.123	1.023	0.873	0.766	-0.267	-0.515	—	-23.99	—
		Two cows									
		Cow no. two	0.777	0.559	0.711	0.526	-0.033	-0.098	—	- 7.41	—

TABLE 5

## Statement showing the increase of milk production and fat content during feeding of liquid fish silage

Place of experiment : INS Valsura, Dairy farm

Name of Buffalo : KATNA

Percentage of silage given : 5%

Date	A. M.			P. M.			Remarks
	Qty. of milk (L)	Fat	Sp. Gravity	Qty. of milk (L)	Fat	Sp. Gravity	
01-2-87 to 08-2-87	2.9	6.8	1.026	2.3	6.6	1.025	This is preprimary expt. only and requires broad based trials and feed back.
09-2-87 to 15-2-87	3.1	6.9	1.027	2.4	6.8	1.026	
16-2-87 to 22-2-87	3.2	7.2	1.028	2.5	7.0	1.027	
23-2-87 to 28-2-87	3.2	7.2	1.028	2.5	7.0	1.027	
Total increase in milk production 10%; Increase in fat content 4.5%							

TABLE 5 Continued

Place of Experiment : INS Valsura Dairy farm

Name of Buffalo : RITA

Percentage of silage given : 10%

Date	A. M.			P. M.			Remarks
	Qty. of milk	Fat	Sp. Gravity	Qty of milk	Fat	Sp. Gravity	
01-2-87 to 08-2-87	2.1	6.9	1.026	2.2	7.0	1.025	This is preprimary expt. only and requires broad based trials.
09-2-87 to 15-2-87	2.2	7.0	1.027	2.3	7.1	1.026	
16-2-87 to 22-2-87	2.5	5.1	1.027	2.6	7.1	1.026	
23-2-87 to 28-2-87	2.5	7.3	1.027	2.6	7.3	1.026	

Total increase in milk production — 18.6%; Increase in fat content — 5.0%

Place of experiment : INS Valsura dairy farm

Name of Buffalo : ASHA

Percentage of silage given - 10%

Date	A. M.			P. M.			Remarks
	Qty of Milk	Fat	Sp. Gravity	Qty. of milk	Fat	Sp. Gravity	
01-2-87 to 08-2-87	1.9	8.1	1.026	1.6	8.0	1.025	This is preprimary expt. only and requires broad based trials.
09-2-87 to 15-2-87	2.2	8.3	1.027	1.9	8.3	1.026	
16-2-87 to 22-2-87	2.3	8.4	1.028	2.0	8.4	1.026	
23-2-87 to 28-2-87	2.3	8.4	1.028	2.0	8.4	1.027	

Total increase in milk production — 22.8%; Increase in fat content — 4.3%

Place of experiment : INS Valsura dairy farm

Name of Buffalo : NILAM

Percentage of silage given : 10%

Date	A. M.			P. M.			Remarks
	Qty. of milk	Fat	Sp. Gravity	Qty. of milk	Fat	Sp. Gravity	
01-2-87 to 08-2-87	2.7	7.1	1.026	2.2	7.0	1.025	This is preprimary expt. only and requires broad based trials.
09-2-87 to 15-2-87	2.8	7.3	1.027	2.3	7.3	1.026	
16-2-87 to 22-2-87	2.0	7.5	1.028	2.5	7.5	1.028	
23-2-87 to 28-2-87	3.0	7.5	1.028	2.5	7.5	1.028	

— Total increase in milk production — 12.2%

— Increase in fat content — 6.4%

— Overall increase in milk production and fat content by feeding 10% fish silage is 17.9% and 5.2% respectively.

These indicate that :

- (a) At 5% fish silage mixed with rations the cattle gave about 10% more milk and about 11.5% increase in fat content in experimental group in comparison to control.
- (b) At 10% mixture with rations the increase in milk yield in the experimental group was as much as 18 to 20%.
- (c) The fat content increase varied between 5 and 11%.

Junagadh cattle breeding farm has also shown encouraging growth potential of cows but definite conclusions will be obtained on full growth cycle observations.

During the experiments and observations, it has been noted that for economic productions of silage :

- (1) Raw material should be cheap and fresh,
- (2) Quality and quantity of chemical preservative should be optimum.
- (3) Ensilage producing centres can be preferably located in the coastal areas near landing sites and surrounding dairy areas with easy transportation facilities.
- (4) For proper storage and shelflife and to avoid corrosion and toxicity HDPE drums, plastic carboys etc. are preferable to metal containers. This being a liquid product it entails long distance transportations overheads. Hence dry product experiments with various animal feeds are indicated and are on hand.

#### CONCLUSIONS

- (1) The process needs cows, cost and trash fish materials easily and locally available.
- (2) The product can be useful and cost effective in areas with cattle farms near to landing centres.

- (3) The process has been simplified to a level where only one trained technical staff is required. The rest would be on daily wages and can be relieved when there is no work this will reduce further costs.

Further field trials on larger scale will be on hand. The product trial on poultries and piggeries as well as on growing cattles has indicated increased hatchability.

Such product preparation and popularisation can lead to :

- (a) Increased constructive utilization of trash fish,
- (b) better remuneration to fishermen and
- (c) more yields and profit to farmers at low costs and simple technology.

#### *Flow chart for preparation of fish silage*

