B-55: Evaluation of different acid treatments and fermentation duration of fish waste silage

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In many tropical situations, by catch, surplus fish and fish offals are not being used for a variety of reasons, extending from transport problems to difficulties associated with processing. One obvious outlet for such fish by-products is in the manufacture of fish meal. Fish silage offers the greatest scope for small scale production specially in artisanal fisheries. Fish silage is a liquid product resulting from the liquefaction of whole or parts of fish. Objectives of this study were to find the most suitable among the 4 acid treatments and the optimum duration of fish silage production.

Fish wastes were collected from the fish market, Kandy and it consisted of offals, skins and heads of large fish types such as tuna, mullet etc. These wastes were packed into 10.2 cm width polyethylene bags and were deep frozen overnight. Next day, offals were ground with a manually operated meat mincer. The ground offals were treated with 3% acetic acid (99%), citric acid (99.5%) formic acid (85%) and phosphoric acid (85%). Each treatment was triplicated and packed into "Glass Preservation Jars".

Samples were analysed for moisture, dry matter, ash, organic matter, liquefaction, ether extract, pH, total nitrogen, soluble nitrogen, NH_4 - nitrogen.

Data was statistically analysed with complete Randomized Design (CRD) by Analysis of Variance procedure and the mean separation was done by Duncan's New Multiple Range Technique (DNMRT).

In all the 4 treatments, pH increased during the initial ensiling period. After 12th day it started to stabilize. In the formic acid treatment. pH remained below 4.5, while in the other 3 treatments pH increased beyond 4.5, A pH below 4.5 will inhibit the spoilage microbial activity. Increase of pH values

may be due to the breakdown of protein during the storage period. In formic acid treatment, liquefaction and soluble nitrogen levels started to stabilize after the 24th day. When the protein and other nitrogen compounds are autolysed into short chain peptides and amino acids by enzymes during the ensiling process, nitrogen becomes more soluble. Due to the activity of tissue degrading enzymes, liquefaction levels increased. Dry matter loss was not significant in formic acid and acetic acid treatments. Slight difference in the levels of ash and organic matter in the freshly minced and acid added fish silage, demonstrate the difficulty in extracting representative and homogeneous samples.

In all 4 treatments, ammonia nitrogen values increased until the 12th day and thereafter it stared to decrease. Increase in NH_4 - Nitrogen may be due to increase in protein breakdown during the early ensiling period.

Objective of any preservation, is to keep the original material away form spoilage microbial activity and to preserve as much of the raw material nutrients as possible. Formic acid (3%) treatment inhibits spoilage microbial activity as well as preserves the original nutrients without any adverse loss. Therefore, it could be considered as the best among the 4 treatments to produce good quality fish silage.

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