Conversion of Hatchery Waste to a Feasible Feed Ingredient for Poultry

J.R.T.V. Jayakody, N.M.N. Nambapana
Uva Wellassa University, Badulla, Sri Lanka

and

K. Hettiarachchi
CIC Feeds Pvt. Ltd, Ekala. Sri Lanka

Introduction

The unprecedented increase in the cost of feed ingredients, especially the protein sources has encouraged the feed industry to go for cheap alternative protein sources. Hatchery waste is one such source. Hand book of poultry feed from waste processing and using defines hatchery waste as collectible material remaining after saleable chicks removed (Adel *et al.*, 2000). Due to the broiler industry in Sri Lanka only from un-hatched eggs and infertile eggs approximately 2500 ton of hatchery waste is generated annually. With the expansion of day old chicks production in the country, disposal of this waste has become a serious issue and has created problems with health and environmental pollution. Conversion of this waste to a cheap source of nutrition to livestock could reduce the cost of feed and volume of importation while eliminating the problems related with hatchery waste. As the composition of the hatchery waste varies and less attention has been paid regarding the commercial value of this ingredient (Saima, 2001). Therefore, this study was conducted with the objective of preparing a dry, pathogen free feed ingredient from hatchery waste, determining its nutritional composition, comparing the product with the standards (NRC, 1994) of available protein sources and the value of protein in commercial feed formulation.

Methodology

Raw broiler hatchery waste was collected from CIC hatchery through stratified sampling technique .Uniformly mixed, weighed waste was autoclaved under 1.76 $kgcm^{-2}$ pressure, 125 ^{0}C for 15 minutes following Lilburn *et al* (1997). Microbiological analysis was conducted for both raw and autoclaved product. The autoclaved product was oven dried; ground and dried. Samples were collected for three consecutive hatches within two weeks period. Resulted product was subjected to analysis of proximate composition, free fatty acid content, mineral content and the value of protein in practical commercial feed formulation. Data obtained were statistically analyzed through one sample t-test in Minitab (Version 14.0) computer software at 5% level of significance.

Results and Discussion

The yield (54.27%) of the product was approximately half of the amount of the raw hatchery waste. Hatchery by products (HBP) was a Calcium rich protein source. The chemical composition obtained for the product is shown in Table 1. Total plate count of the treated hatchery waste (5.26×10^{3}) was significantly less than that value of the raw hatchery waste (3.66×10^{8}). *Coliforms and Escherichia coli* were detected in most of the raw hatchery waste samples (Table 2) and not detected after the treatment was applied. *Salmonella* were not detected in either forms in the tested hatchery waste. No significant difference between the protein content of the product and the waste milk powder (WMP)

was observed. Protein content of the product was significantly greater than that of copra meal and soy bean flour, while it was significantly lesser than the protein content of blood meal, dehydrated cattle skim milk, fishmeal (FM), meat meal, meat and bone meal (MBM), poultry by products meal, hydrolyzed feather meal, soy bean meal (SBM), brewer's yeast, poultry offal meal (POM), ground nut meal and gingerly poonac. Calcium content of the product was significantly higher than that of any other available protein sources. Compared to the other available sources, hatchery by products has the highest value of protein in practical commercial feed formulation (Figure 2).

Table 1: Chemical composition of hatchery by products

Compound	Percentage
Crude Protein	23.51
Crude Fat	13.76
Total Ash	53.44
Calcium	21.55
Phosphorus	0.40
Chlorine	0.48
Sodium	0.31
Acid Insoluble Ash	0.31

Table 2: Species detected in raw hatchery waste

Species detected	Count obtained in raw hatchery waste (CFU)		
	Sample 1	Sample 2	Sample 3
Coliforms	$> 1.1\times10^{6}$	$> 1.1\times10^{8}$	4×10^{5}
Escherichia coli	1.1×10^{6}	1.1×10^{6}	Not detected
Salmonella	Not detected	Not detected	Not detected

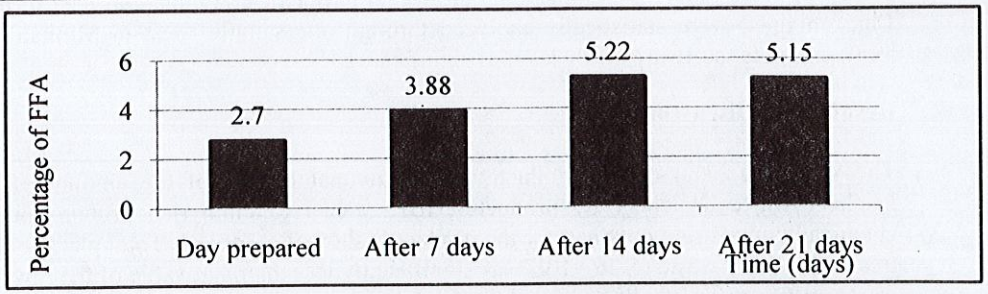

Figure 1: Change of FFA with time

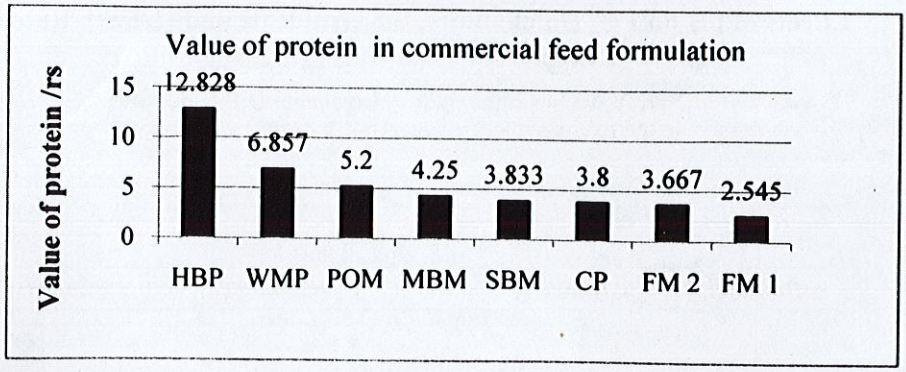

Figure 2: Value of protein in practical commercial feed formulation

Conclusion

This study revealed that raw hatchery waste could be converted in to Calcium rich protein source under less amount of expenditure .This solves the problem of disposing hatchery waste and reduces the environmental pollution while substituting a fair amount from expensive Protein and Calcium sources in the feed industry .The autoclaving process was able to reduce the microbial load up to a low level and decrease the amount of *Coliforms* and *Escherichia coli* to a non detectable level .Generation of free fatty acid in the product was significantly higher compare to the day prepared.

Acknowledgement

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