

**MANUFACTURE OF A POULTRY RESIDUES
PROCESSING UNIT AND ITS UTILIZATION
IN FISH FARMS**

BY

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ABSTRACT

The first experiment was carried out through the year of 2014 at Department of Agricultural Engineering, Faculty of Agriculture, Zagazig University to manufacture and evaluate the performance of a batch cooker used for rendering poultry abattoir residues (intestines and legs residues). The second experiment was executed at Production and Aquaculture System Department of Central Laboratory for Aquaculture Research (CLAR), Abbassa, Abou- Hammad, Sharkia Governorate, to investigate the effect of different levels of poultry by-product meal on the performance, feed utilization of Nile tilapia fish (*Oreochromis niloticus*).

The objectives of this work are to:

1. Manufacturing a poultry residues processing cooker for producing the best quality finished product.
2. Selecting the proper parameters affecting the performance of the manufactured cooker.
3. Selecting appropriate replacement level of poultry by-product meal of Nile tilapia Diets.
4. Evaluating the finished product from the economic point of view.

The first experiment aimed to study the performance of the manufactured cooker under the following parameters: Four different cooker loading rates, vapor pressures and steering speeds. The performance of the manufactured cooker was evaluated taking into consideration the following indicators: cooker productivity, total losses, cooking efficiency, required power, specific energy and criterion costs. The second

experiment aimed to investigate the effect of different levels of poultry by-product meal on the performance, feed utilization, whole body composition of Nile tilapia and feeding cost. Growth performance was studied taking into consideration the following indicators: final body weight (FBW), daily weight gain (DWG) and specific growth rate (SGR). Feed utilization was studied taking into consideration the following indicators: Feed conversion ratio (FCR) and Protein efficiency ratio (PER).

The experimental results revealed that the total losses as well as criterion costs were minimum while overall cooking efficiency, the performance, feed utilization and whole body composition were maximum under the following conditions:

- Operating the manufactured cooker at cooker loading rates of 60, 45 and 30% for 100% intestines (R_1), 50% legs + 50% intestines (R_2) and 100% legs (R_3).
- Adjusting the cooking process at steering speeds of 30 rpm for (R_1) and 40 rpm for (R_2) and (R_3), respectively. Operating the manufactured cooker at vapor pressure of 2 bar for the same previous residues.
- The best replacement level of fish meal (FM) with poultry by-product meal (PBM) was at D_3 (50%). This diet achieved the same FCR, PER and lower relative cost per one kilogram gained compared with the control diet. Thus, the cost will be reduced from 6660 LE.Mg⁻¹ to 5330 LE.Mg⁻¹ with 20% reduction in cost.

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LIST OF ABBREVIATIONS

FBW	Final body weight.
DWG	Daily weight gain.
SGR	Specific growth rate.
FCR	Feed conversion ratio.
PER	Protein efficiency ratio.
R₁	100% intestines.
R₂	50% legs + 50% intestines.
R₃	100% legs.
FM	Fish meal.
PBM	Poultry by-product meal.
NRA	National Renderers Association.
UKDEFRA	United Kingdom Department for Environment, Food and Rural Affairs.
EPAA	Environment Protection Authority of Australia.
BDR	Batch Dry Rendering System.
USEPA	US Environmental Protection Agency.
MBM	Meat and bone meal.
BSE	Bovine spongiform encephalopathy.
HTR	High temperature rendering.
LTR	Low temperature rendering.
COD	Chemical oxygen demand.
BW	Body weight.
BL	Body length.