EVALUATION OF SOME LOCAL AND IMPORTED FEED STUFFS FOR POULTRY

BY

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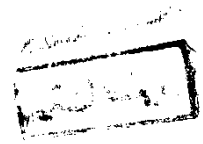

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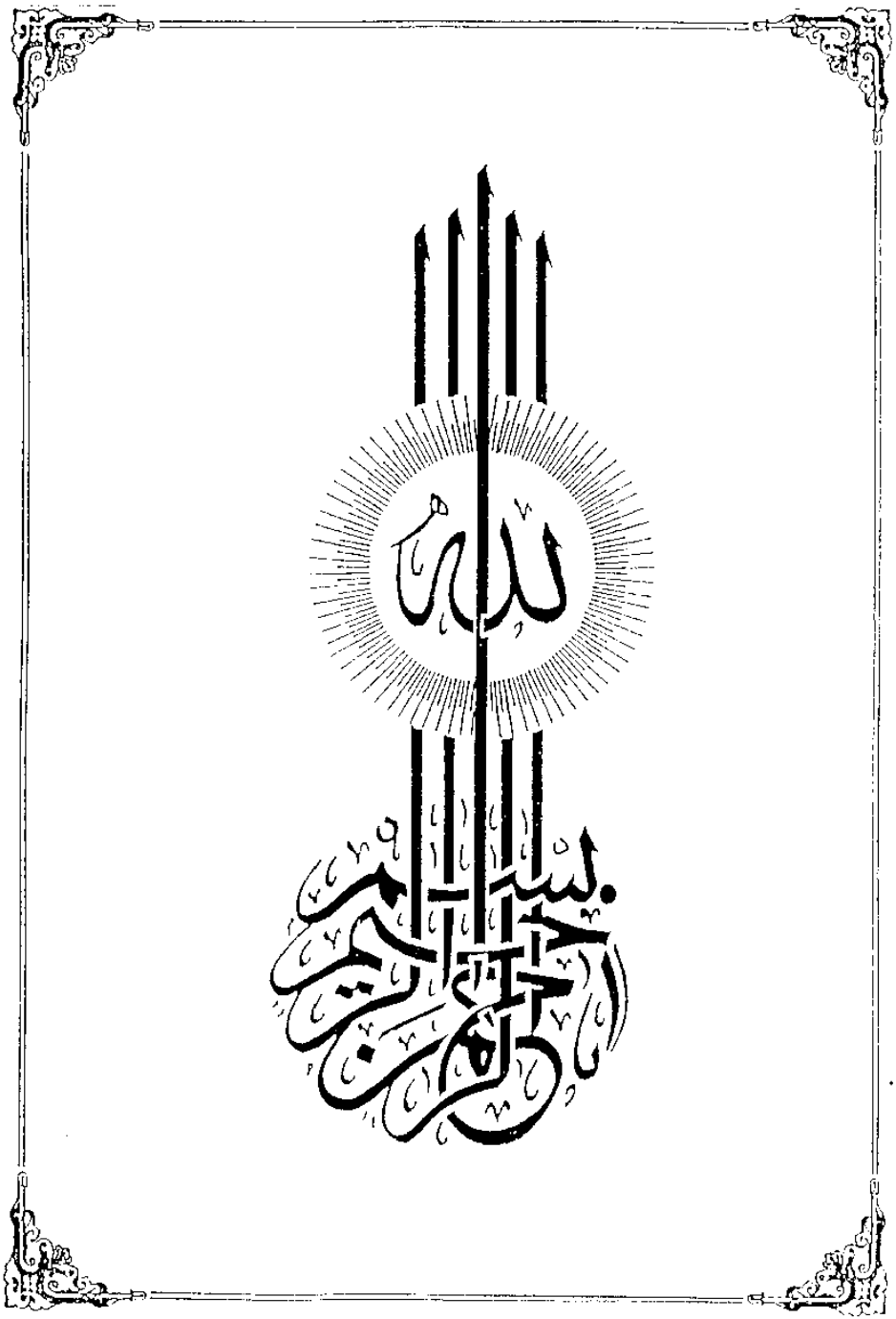

C O N T E N T S

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LIST OF SYMBOLS

BSH	:	Basatin slaughter - house
CGM	:	Corn gluten meal
CSM	:	Decorticated cottonseed meal
HB	:	Horse beans (vicia faba)
HBB	:	Finely ground horse beans (for broilers)
HBL	:	Coarsly crushed horse beans (for layers)
IFM	:	Imported fish meal
IMBM	:	Imported meat and bone meal
ISM	:	Imported soybean meal
LBM	:	Local blood meal (Organic Fertilizers Company)
LBMB	:	Local blood meal (Basatin Slaughter-house)
LFM	:	Local fish meal
LMBB	:	Local meat and bone meal (Basatin)
LMBM	:	Local meat and bone meal (Organic Fertilizers Company)
ME	:	Metabolizable energy
NFE	:	Nitrogen free extract
NPU	:	Net Protein Utilization
OFC	:	Organic Fertilizers Company
PBM	:	Poultry by-products meal
SMA	:	Local soybean meal (Alexandria)
SMD	:	Local soybean meal (Damnhour)

INTRODUCTION

During the last twelve years, there has been a rapid development of the poultry industry in Egypt. Official records indicate that the number of poultry farms increased from about 100 in 1971 to approximately 16000 and 3600 broiler and layer farms; respectively in 1986 (Ministry of Agriculture). Such significant increase in the number of birds raised for meat and egg production necessitates the provision of adequate quantities of feed amounting to 2.8 million tons annually.

Government projections for the year 2000 estimate a population of 600 million broilers, 28 million layers and 5 million broilers breeders. Feed requirements will amount to 4 million tons (El-Sherif, 1983). At such rates of production, the quality of feeds produced become of primary importance particularly when it is realized that more than 85% of feed ingredients are imported at present time while less than 15 % are locally produced .

Among the current problems confronted by the poultry industry, shortage of high quality feed appears to be a major importance affecting the profitability of poultry production ventures.

In Egypt, formulating properly balanced rations for poultry production requires adequate information regarding the nutritive value of locally produced and imported feed ingredients.

A lot of research has been carried out to evaluate the quality of feed ingredients used in poultry rations including the study of raw materials and processing methods. However, information is still lacking regarding method of production, chemical composition and nutritive value of some ingredients.

There are several methods for evaluating the biological value of proteins which have been used by many investigators working with rats and chicks. In this study, however, the Net Protein Utilization (NPU) method using chicks was applied. Some new by-products have been recently processed in Egypt and it was found necessary to evaluate these feedstuffs.

Mycotoxins, especially Aflatoxins produced by Aspergillus flavus can cause illness in poultry, the condition known as mycotoxicosis. This condition has been often responsible for poor growth and high mortality among birds. Accordingly, a useful and rapid test for the detection of mycotoxins has been developed and it is suggested that such test should be carried out on all ingredients used in poultry rations . The present study involved the detection of mycotoxins in protein supplements.

In developing countries, including Egypt, salmonella species cause some problems for the poultry industry. Such species are found in animal protein supplements which are

poorly processed. Consequently, the present study involved an examination of feed ingredients for salmonella species.

The present study was designed to evaluate different feed ingredients either locally produced or imported. The former included fish meal, meat and bone meal, blood meal, poultry by-products meal, decorticated cottonseed meal , soybean meal, corn gluten meal and crushed horse beans . The latter included fish meal, meat and bone meal and soybean meal.

Methods of evaluation included proximate chemical analysis, amino acids determination, calcium and phosphours content and Net Protein Utilization values. Urease activity was determined in soybean meals as a quality control test.

REVIEW OF LITERATURE

Studies have been carried out to evaluate some protein sources used in poultry rations.

I- Animal protein sources

The animal protein sources used for feeding poultry in Egypt have been almost entirely imported until recently when some companies started to produce meals from animal by-products using modern processing techniques.

Much consideration has been given to animal protein supplements due to their high content of protein as well as their balanced amino-acids make-up.

1- Fish meal

Fish meal is considered the most important protein source for poultry, therefore attention has been focused on the nutritive value of various samples of fish meal.

Factors affecting quality of fish meal were studied by several authers. Source of raw materials and processing methods are the most important factors affecting nutritive value of fish meal.

Bender and Haizelden (1957) reported that, the N.P.U. Values for several fish meals ranged from 80 for undamaged

materials to as low as 18 for grossly maltreated fish meal.

Harms and Scott (1956) studied the effect of drying conditions on **nutritive value of fish meal . Cooked white** fish was air dried at temperatures ranging from 90 °C to 160 °C. These investigators reported that only temperatures below 140°C produced fish meals of high quality. In addition Lea et al (1960) found that overheating caused the loss of about 60% of lysine in herring fish meal, while proper heating (at 115°C) rendered less than 27% lysine unavailable. Ali (1970) studied the effect of different heat treatments on fish meal quality and found that mild heat (95°C) did not affect the availability of lysine while it was affected by severe heating. He concluded that the period of exposure as well as the method of heating affected the lysine availability.

Wide variations in protein quality were found among over one hundred samples of different fish meals which were evaluated as amino acids sources using chick growth as criterion of adequacy (Grau and Williams , 1955). Ferreira (1964) found that the limiting amino acids in fish meal were Cystine and methionine which amounted from 45 to 55% of their values in egg protein. He showed also that the digestibility of fish meal proteins ranged from 79 to 94% in 8 samples and the digestibility was not related to available lysine or to biological based on chemical score . Anderson et al (1968) showed that lysine

and methionine were the first limiting amino acids in fish meals prepared from different species. Burgos et al (1969) reported appreciable variations in both content and availability of amino acids particularly for cystine, methionine and lysine in fish meal from different sources.

Fish meal composition, fat removal and duration of storage were shown to have significant effects on the protein quality of fish meals (Rand et al, 1960). Evaluation of the quality of fish meal protein when fed to chicks as the sole source of protein was influenced by the composition of the mineral mixture included in the test diet (Miller, 1970).It was also influenced by excesses of lysine present in fish meal over the concentration needed in the diet (Miller and Kifer, 1970).

2- Meat meal

Much work has been done to study the effect of processing methods on meat meal quality.

Harms and Scott (1956) studied the effect of drying conditions on the nutritive value of meat meal . They concluded that drying below 140°C resulted in favourable growth of the chicks. Abou-Raya et al (1971) reported that locally produced meat meal proved to be unsatisfactory supplement most likely due to poor preparation. Skurray and Herbert (1974) found that pressure cooking for ½ hour at 275 KPa tended to decrease the nutritive

value of sheep heads and trotters while prolonged pressure cooking for 1½ hours at 275 KPa reversed that trend.

Meat meal varies widely in composition. A study on 36 samples of meat meal prepared by different methods was carried out by Pavlasova et al (1982). It showed significant differences in the content of ash, $CaCO_3$ and acid number of fat, due to method of preparation. In France Lessire and Leclerco(1983) carried out a study on ten meat meals obtained from different processing plants. They found that crude protein content varried from 50.6 to 67.3 % while ash and fat content varried from 19.3 to 41.9 and 2.15 to 13%; respectively.

Many investigators studied the effect of raw materials on the nutritive value of meat meals. Skurrary and Herbert (1974) reported that meals prepared from hard offals(sheep heads , calves heads and trotters) had high calcium and collagen contents and low essential amino acids, while meat meal prepared from soft offals (sheep guts and rumens) had low calcium and collagen contents and high essential amino acids.

In spain, Carballo and Corbonell (1978) analyzed 17 samples of meat meal prepared from cattle, pigs or mixed livestock. Crude protein content ranged from 44.30 to 80.5% while ash content differed widely among the various samples.

In Egypt, a study on animal slaughterhouse by-products

especially meat and bone meal has been done by Nada (1984). This investigator showed that meat and bone meals had crude protein content ranging from 48.9 to 63.1%, which varied according to the ratio of their components and the processing method.

The availability of Ca, P, Mg, Mn, Zn and Cu, in meat meal fed to growing chicks was investigated by Bul - bul and Bragg (1981). Availability values observed indicated that meat meal is an excellent source of minerals, and that there was variation in composition due to differences i raw materials used in day to day manufacturing.

3- Blood meal

Extensive studies have also been carried out on blood meal as a source of protein for poultry.

The processing method is one of the factors which affects the quality of the meal. Nada (1984) studied blood meals dried by several methods, and showed that, heat-dried meal had crude protein content of 79.9 to 82.4% while sun-dried meal contained 68.1 to 72.8% crude protein. He also reported that blood meal dried by adding calcium oxide had crude protein content ranging from 41.2 to 47.7% along with high ash content. The results also showed that total protein efficiency of sun-dried blood meal was higher than that of meals dried by adding calcium oxide

and by using heat.

A study where calcium oxide was mixed with fresh blood in ratios of 16 : 1 and 8 : 1, was carried out by Abou - El Hassan et al (1970). The results showed that for both mixtures crude protein content of 66.03 and 46.03%, respectively were obtained. In addition, the net protein utilization(N.P.U.) for the 8 : 1 and 16 : 1 ratios of blood to calcium oxide were 84 and 63, respectively. Patgiri et al (1978) carried out a study on mixing the fresh blood of goats with calcium oxide at a ratio of 8 : 1 then sun - dried. Mean values from 25 samples each of untreated and treated blood meal were as follows 86 and 54 % for crude protein, 0.66 and 0.28 % for crude fat and 10.45 and 7.52 % for moisture, respectively.

Amino acids content of blood meal was determined by a number of investigators. Fisher (1968) found that isoleucine, methionine and arginine were limiting amino acids in blood meal , whereas tryptophan was not.

Blood meal was found to be a satisfactory source of lysine in all vegetable rations for baby chicks (Squiff and Braham, 1955). According to Nada (1964) isoleucine is the first limiting amino acid while sulpher bearing amino acids are the second limiting in blood meal.