AVAILABILITY AND USABILITY OF ESSENTIAL AMINO ACIDS BY POULTRY FARMERS AND FEED MILLERS WITHIN IBADAN METROPOLIS OF OYO STATE, NIGERIA.

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ABSTRACT
It has been well reported that high amino acid density diets improve feed conversion and increase broiler chickens' weight gain and breast meat yield. Moreover, the availability and usability of notable essential amino acids seem limited in Nigeria. Therefore, the study examined the availability and usability of essential amino acids by poultry farmers and feed millers within the Ibadan metropolis of Oyo state, Nigeria. The field survey was carried out through the use of structural questionnaires. The information collected was subjected to descriptive statistics using SPSS (2000) statistical software to generate frequency. The result revealed that majority (80.0%) of the respondents indicated that they are aware of amino acids. Almost all the respondents (94.0%) indicated that they are aware of methionine and lysine amino acids, respectively. However, only 44.0, 34.0, and 26.0% indicated awareness of threonine, tryptophan, and valine amino acid respectively. Also, 78.0% of the respondents indicated that they are aware of the necessity of amino acids in poultry feed, moreover only 20, 2, and 0% use Threonine, Tryptophan, and Valine in their formulation. In conclusion, methionine and lysine are the most popular essential feed-grade commercial amino acids used within the study area while threonine, tryptophan, and valine feed-grade commercial amino acids are yet to gain much popularity, and this accounts for their low usage among farmers and feed millers. This study hereby recommends more awareness creation among farmers through seminars and other fora about these amino acids and their benefits in poultry production.
Keywords: Availability, Usability, Amino acids, Poultry farmer, Feed millers

INTRODUCTION

In the formulation of poultry diets, after the energy, protein feed resources are the next biggest component (Sleman *et. al*., 2015). Proteins are essential constituents of all tissues of the animal body and have a major effect on the growth performance of the bird (Kamran *et. al*., 2004). They also serve vital metabolic roles as blood plasma proteins, enzymes, hormones, and antibodies, each of which has critical roles in the chickens' body (Pond *et al*., 1995). However, poultry do not have requirements for proteins as such, but for the amino acids that they contain (Ravindran, 2004). The major functions of amino acids are to support animal growth and development, enhance meat quality, stimulate appetite, and improve disease resistance (Kuo *et al*., 2022). It has been well reported that feeding high amino acid density diets improves feed conversion and increases weight gain and breast meat yield of broiler chickens (Kidd *et. al*., 2004).

Traditionally, there are twenty (20) amino acids in the body protein that are considered to be physiologically essential in animal metabolism. These amino acids can be divided into two categories: those that cannot be synthesized at all or rapidly enough to meet the metabolic requirements of the animals and these are called essential amino acids. Others are those that can be synthesized from other amino acids and these are called nonessential amino acids. The essential amino acids must be supplied by the diet. (Ravindran and Bryden, 1999). These essential amino acids are lysine, methionine, tryptophan, threonine, arginine, isoleucine, leucine, histidine, phenylalanine, and valine. In broiler nutrition, Lysine, methionine, threonine, tryptophan, and valine are limiting, and synthetic feed-grade form must be supplied in the right proportion in feed to meet the requirements of the birds.

It is a common practice among poultry farmers and feed manufacturers in the US and Europe to use up to five feed-grade essential amino acids (namely Methionine, Lysine, Threonine, Tryptophan, and Valine) in feeds. On the reverse, only Methionine and Lysine are usually used by farmers and commercial feed manufacturers in Nigeria. In addition, the poultry feeds in Nigeria are formulated according to crude protein levels as opposed to the amino acid requirements for which the animals actually require. This method easily excludes the use of appropriate feed-grade essential amino acids in the poultry diet (Omede, 2004).
Ibadan is located in southwestern Nigeria, with about 128 kilometres inland northeast of Lagos and 530 kilometres southwest of Abuja, the federal capital. It is the capital and the most populous city of Oyo State, in

Nigeria. The city has a thriving agricultural sector, with substantial attention on poultry and livestock production. This city is home to the major poultry farms and hatcheries servicing the entire country (Efua, 2019). It also has very high concentration of poultry resource marketers and experts with major influence across the nation. Therefore, Ibadan can be described as the poultry heartbeat of Nigeria and can be used to draw inferences regarding the poultry practices obtainable in Nigeria.

Hence, this current research was carried out to evaluate the awareness of the availability and usability of some amino acids by poultry farmers and feed millers within the Ibadan metropolis of Oyo State.

MATERIALS AND METHOD

The field survey was carried out through the use of structural questionnaires. The information collected includes the level of crude protein in different classes of poultry feeds, understanding of amino acids and usage, common use feed-grade amino acids, availability, sources, poultry manure usefulness, and environmental impact of poultry manure.

The questionnaires were randomly administered to the poultry farmers and feed millers using the outlets of major poultry input retailers, and one-on-one contact with poultry farmers and feed millers. The information collected was subjected to descriptive statistics using SPSS (2000) statistical software to generate frequency.

RESULTS AND DISCUSSION

Awareness of Amino Acids

Awareness of the amino acids is presented in Table 1. The majority (80.0%) of the respondents indicated that they are aware of amino acids.

The awareness of amino acids by name is presented in Table 4.2. Almost all the respondents (94.0%) indicated that they are aware of methionine and lysine amino acids respectively. However, only 44.0, 34.0, and 26.0% indicated awareness for threonine, tryptophan, and valine amino acid respectively.

Table 1: Distribution of respondents based on awareness about amino acids

Awareness of amino acids	Frequency	Percentage
Yes	40	80.0
No	10	20.0

Table 2: Distribution of respondents based on varieties of amino acids known

Amino acid known	Frequency	Percentage
Methionine	47	94.0
Lysine	47	94.0
Threonine	22	44.0
Tryptophan	17	34.0
Valine	13	26.0

Necessity of amino acids in poultry diet

Awareness of the necessity of amino acids in poultry diet is presented in Table 4.3, 78.0% of the respondents indicated that they are aware of the necessity of amino acids in poultry feed, while 22% indicated they do not consider amino acids as a necessity in poultry diet.

Table 3: Distribution of respondents according to awareness of the necessity of amino acids in poultry diet

Awareness of the necessity of amino acids in poultry diet	Frequency	Percentage
Yes	39	78.0
No	11	22.0

Amino acids used

Table 4.4 shows the distribution of the respondents based on amino acid usage. Nearly all (92.0%) of the respondents indicated that they use methionine and lysine, 10.0% indicated that they use threonine while only 2.0% indicated that they use tryptophan.

Table 4: Distribution of respondents according to amino acids used

Amino acid used	Frequency	Percentage
Methionine	46	92.0
Lysine	46	92.0
Threonine	10	20.0
Tryptophan	1	2.0
Valine	0	0

Availability of Amino Acids

The distribution of the respondents based on the appraisal of the availability of amino acids is presented in Table 4.5, 96.0 and 92.0% of the respondents indicated that lysine and methionine are readily available for use, while 16.0 and 6.0% indicated that threonine and tryptophan are readily available for use respectively within the study area.

Table 5: Distribution of respondents based on availability of amino acids

Available amino acid	Frequency	Percentage
Methionine	46	92.0
Lysine	48	96.0
Threonine	8	16.0
Tryptophan	3	6.0

The awareness, availability, and usage of crystalline Amino acids

Although the survey revealed that the majority (80.0%) of the farmers indicated that they were aware of amino acids (Table 4.1), it can be deduced that they had a limited understanding of the essential amino acids required in poultry nutrition. As shown in Table 4.2, nearly all (94.0%) of the respondents indicated that they were aware of methionine and lysine only while only 44.0, 34.0 and 26.0% indicated they were aware of threonine, tryptophan, and valine amino acids respectively. This further corroborates the other findings of the survey regarding amino acids usage where 92.0% of the respondents indicated that they use methionine and lysine while only 10.0% and 2% indicated that they use threonine and tryptophan in their poultry diet (Table 4.3).

Threonine is considered to be the third limiting amino acid in broiler's nutrition (Kidd and Kerr, 1997; Kidd *et al*., 1999). It has a major role in maintaining gut barrier integrity (Horn *et al*., 2009) and intestinal mucin synthesis (Bertolo *et al.,* 1998), which is a major glycoprotein for the protection of intestinal linings from acidic chyme, pathogens, digestives enzymes, and other intestinal injury (Zaefarian *et al*., 2008). It is quite unfortunate that many poultry farmers are still oblivion of these enormous benefits. Tryptophan plays an indispensable role in poultry performance with the main function of improving the poultry's performance by enhancing protein synthesis and the immune system (Linh *et. al.,* 2021). It also helps reduce the stress impacts and aggressive behaviours (Hsai *et. al.,* 2005). Valine is a potentially limiting essential acid in corn – soybean meal formulations for growing chickens (Han *et al*., 1992).

One of the contributory factors for the low awareness and use of other commercial amino acids within the study area could be the availability of these amino acids. The survey revealed that 96.0 and 92.0% of the respondents indicated that lysine and methionine are readily available for use respectively, while 16.0 and 6.0% indicated that threonine and tryptophan are readily available for use respectively within the study area (Table 4.5). This is an indication that lysine and methionine are easily accessible to the poultry farmers and feed millers in the study area and this is expected to influence the level of their usage over other amino acids which are rarely available.

CONCLUSION AND RECOMMENDATIONS

i. Methionine and lysine are the most popular essential feed-grade commercial amino acids used within the study area.
ii. Threonine, Tryptophan, and Valine feed-grade commercial amino acids are yet to gain much popularity, and this accounts for their low usage among farmers and feed millers.
iii. Availability and knowledge are two major reasons for the low usage and popularity of other feed-grade essential amino acids not in use by the farmers and feed millers within the study area.
iv. Formation of strong collaborations with amino acids manufacturers for awareness creation among farmers and feed producers through seminars and other fora about these amino acids and their benefits in poultry production, and also ensure their steady availability within Nigeria.

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