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Perception of poultry farmers on the use of culled bee brood as an alternative source of proteins in chicken feed additive

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Abstract This study set out to examine explore the perception of poultry farmers on the use of culled bee brood as an alternative source of proteins as chicken feed additive. The study was conducted in three districts of Southwestern Uganda including Kiruhura, Mbarara and Bushenyi. A sample size of 130 participants were conveniently sampled from communities. The study adopted a cross-sectional research design with a quantitative approach of data collection and analysis. Data was gathered through in-depth interviews with farmers who were selected using non-probability sampling techniques. Data gathered through these interviews were analysed using thematic content analysis. Findings from the study found out that: there was lack of awareness of cull bee brood can be fed poultry as an alternative source of proteins for chicken feed; cull bee brood is a rich source of protein; limited appreciation and lack of innovation are among the factors compromising farmers negating use of culled bee brood as an alternative source of proteins and an additive in chicken feed. The study recommended that the stakeholders involved in agricultural extension services need to embark on sensitization to help farmers adopt this alternative source of proteins as chicken feed additive.

Keywords Perception, poultry farmers, culled bee brood, proteins, chicken feed, additives

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Background

Protein sources are the additional main constituent of protein additive of poultry feeds in the livestock sector [1]. The scarcity of additive rich in protein have created challenges of feeds scarcity and malnutrition in the livestock sector [2]. This is attributed to scarcity of these additive on a commercial scale and in communities where these farmers are based [2]. Less efforts have been put in place to bridge the scarcity gap. Culled bee brood has been identified as one of the sources of protein additives in poultry farming [3]. Available evidence indicates that honey bee brood has high content of carbohydrates and protein, as well as essential amino acids [4]. Brood is a good source of phosphorus, magnesium, potassium and the trace minerals iron, zinc, copper, selenium and most of the B-vitamins, as well as vitamin C and choline [5]. The fat content provides a balanced composition of saturated and mono-unsaturated fatty acids with only about 2.0% being polyunsaturated fatty acids [4]. When fed on poultry, bee brood helps the chicken to grow faster than when fed on any other additives [3].

In Uganda, bees are mainly known as source of honey by farmers in rural communities [6]. A few people, use bee brood as a source of food and more so for feeding poultry as an alternative source of proteins [6]. Protein is one of the main compartments of poultry feed and is one of the major contributors to the finished feed cost, yet it is the scarcest component to farmers in the country [7]. However, bee brood is thrown by most, if not all farmers in Uganda after harvesting honey in Uganda [8]. Research on bees in Uganda and East Africa in general is mainly centred on honey as a main product and their role on pollination agriculture [9], little has been studied regarding bee brood as an alternative source of proteins in poultry. This study looks at perception of poultry farmers on the use of culled bee brood as an alternative source of proteins chicken feed additive.

Objective

To explore the perception of poultry farmers on the use of culled bee brood as an alternative source of proteins chicken feed additive.

Materials and methods

The study adopted a cross-sectional research design with a qualitative approach. The study involved 30 farmers from three districts of Kiruhura, Mbarara and Sheema in rural Southwestern Uganda. These farmers were selected using non-probability sampling technique. The selected farmers were subjected to in depth interviews. Data collected through interviews was transcribed and arranged according to the codes assigned to participants. Data was thematically analyzed with the help of a qualitative software Atlas. Ti version 7. The researcher independently read through transcripts and developed codes in accordance with emergent themes. Results were presented thematically following the pattern developed out of the themes from participants' views and narratives.

Results

Demographics

In this study, a total of 130 interviews (80 males and 50 females) were conducted. The Ages structure of the Respondents ranged between 18 to 70 years old. The majority of the Respondents (53 percent) had attained secondary level of education, whereas 30 percent had attained primary and those who had attained tertiary level of education comprised of 17 percent of the total respondents.

Overview

The results were structured according to three themes generated from the narratives of the participants. The themes included: awareness, appreciation and innovation on feed production.

Table 1: Themes, sub themes and categories on cull bee brood as protein additives for poultry feeding

Themes	Sub themes	Categories
Awareness	Unaware that bee brood can feed poultry	-Limited awareness on the need for proteins in poultry
		-Not sure whether chicken can feed on bee brood mixed in feeds

	Unaware of protein importance	-Whether protein is so important for chicken growing
Appreciation	Limited appreciation	-Focus is pressed on honey
		-Collecting bee brood is time wasting
		-Bee brood is a waste
Innovation	Lack of innovation	-Feeds are bought from processors
		-Lack of farming integration approaches

Theme one: Awareness on the use of cull bee brood as an alternative source of proteins chicken feed additive

Results under this theme describes participants' level of awareness on the use of cull bee brood as an alternative source of proteins chicken feed additive. In this study participants were both poultry and bee keepers. Study findings found that farmers were not aware that cull bee brood can be fed to poultry and secondly, can be a source of protein additives for poultry feeds. Details are presented herein.

Unaware that bee brood can feed poultry

The Interview results showed that there was limited awareness on the need for proteins in poultry and that farmers were not sure whether chicken can feed on bee brood mixed in feeds.

Limited awareness on the need for proteins in poultry

The study found out that poultry farmers were not aware of the need for proteins in their Poultry farming practices. Most of them were depending on manufactured feeds and trusted the manufacturers of these feeds to be the custodian of the knowledge on what the chicken needs to grow. On this issue, one of the participants had this to say;

Here we depend on feeds we buy from these producers. On my side, I cannot tell which food nutrients these chickens would require. We depend on these experts who mix these feeds and sale to us. As for the bee brood being protein additives for chicken feeds, I am hearing it from you for the first time. (A 54-year-old poultry farmer, from Mbarara district)

Not sure whether chicken can feed on bee brood mixed in feeds

Results from this study further found out that most farmers were not sure whether chicken can feed on bee brood mixed in feeds. Most farmers indicated that they were not aware that bee brood could be utilized as poultry feeds. On this issue, one of the participants was quoted giving the following views;

There are things I have never paid attention to, like bee brood, I couldn't imagine they can be as useful as the level of feeding poultry. After harvesting honey, some here cook and eat them.... The rest are thrown in the dust bin. (A 48-year-old farmer from Kiruhura district)

Inadequate awareness of protein importance

From the study, it was found out that most farmers were not aware of bee brood protein importance. From our interviews, it appeared that even some were not sure whether proteins were important in chicken rearing. On this issue, one of the participants had this to say;

I have been rearing poultry under indoor system; I buy food from the feeds vendors but I don't pay attention to the nutrient content. Maybe what I can recognize in that content are the grains but the rest I don't care. (A 37-year-old, female poultry farmer, Kiruhura district)

The same issue was repeated by another farmer who was quoted verbatim saying;

Much as I know that the chicken requires feeds that help them grow fast, I rarely pay attention to what kind feed nutrient they need. I just buy feeds and feed them. (A 44-year-old male farmer, Mbarara district)

Theme two: Appreciation of cull bee brood as an alternative source of proteins chicken feed additive

From our interviews, we found out that a significant number of farmers seem not to recognize that bee brood.

Limited appreciation

Results found out that there is little appreciation of bee brood as an alternative important aspect of bee keeping. It was found out that most farmers anchored bee keeping on honey while others considered collection of bee brood as a wastage of time.

Focus is pressed on honey

From the study, it was revealed much of farmers' efforts is pressed on honey as a major reason for bee keeping. This is confirmed by the views from one of the participants who had this to say;

As far as I am concerned, the primary role of keeping bees is honey. There are a few people in this community who eat bee larva and they do it in hiding. When, you talk of using them as feeds in poultry, it sounds strange because I have never heard of it. (A 60-year-old farmer, Sheema district)

Collecting bee brood is time wasting

From out interviews, most farmers' perceived collection of bee brood as time wasting. This view is supported by interview findings from one of the participants who was quoted verbatim expressing the following views;

If it is feeding poultry, I may agree but they are always in small quantities and seasonal. We don't harvest bees every time. Yet, like me I have around 3,000 chickens on my farm. Don't you think this is time wasting? (A 58-year-old male farmer, Sheema district)

Theme three: Innovation on the cull bee brood as an alternative source of proteins chicken feed additive

From our findings, innovation was an important component that was found to be missing among farmers to promote the use of cull bee brood as an alternative source of proteins chicken feed additive. Most of the farmers expressed lack of innovation as an issue compromising the adoption of cull bee brood in feed poultry.

Lack of innovation

From our interviews, we found out that most farmers lacked innovation in making feeds for their poultry. They instead relied on purchasing feeds from the companies specialized in making these feeds. A significant seemed not recognize the role of cull bee brood in feeding poultry as protein additive and instead considered them as wastes. Those who kept both poultry and bees seem not to recognize the need for integrating the two projects.

Bee brood is a waste

Study findings show that most farmers considered bee brood as a waste of time as they considered them of less significant value. This finding is confirmed by findings from one of the participants who had the following to say;

When you collect honey from the brood, the rest is dumped. I hear some people make candles from these waxes but I do not know how they do it. What else can you use them for? (A 33-year-old farmer, Mbarara district)

Feeds are bought from processors

Findings show that most farmers buy poultry feeds from processors and vendors. They lack knowledge on how to manufacture these feeds from their farms. One of the farmers was quoted emphasizing this point in the following;

I have been rearing poultry for the last 12 years, and in all these years, I have been buying feeds from town. I do not have the capacity to make these feeds myself because they require machinery and expertise which I can't afford. Then, when you talk of mixing bee brood, I do not how this can be handled. (A 59-year-old farmer, Sheema district)

Lack of farming integration approaches

From our interviews, we found out farmers with more than one projects were handling them separately from one another without any component of integration. Farmers with bee keeping never had it in mind that poultry can be supported by bee keeping. They therefore never considered bee brood as an important element in poultry feeding. These findings are supplemented by views from one of the participants who had this to say;

I have been practicing both poultry and bee keeping for the last 20 years but I have never tried to think that bee brood can be fed on to chicken. It has never even crossed my mind for once. When I was young, I used to see eat the larva but these days, people abandoned them. (A 66-year-old farmer, Mbarara district)

Discussion

From this study, we found out that there is limited awareness among farmers on whether cull bee brood can be used as protein additives in poultry feeds. Most farmers revealed that they buy poultry feeds for poultry. This partly explains why most of them are not aware that cull bee brood could be used as protein additive in poultry feeds since they don't participate in making feeds for their poultry. These findings are in line with Sebatta, Ssepuuya [10] who expressed that farmers' unwillingness to adopted alternative sources of poultry is attributed to the fact that most farmers in Uganda rear poultry on free range and have no intention of knowing and finding out what their poultry will eat. They reported that farmers have little knowledge and willingness to use insects as an alternative source of proteins in protein after all they do not whether poultry need proteins in the first place.

In contrast, the study by Chia, Macharia [11] on Smallholder farmers' knowledge and willingness to pay for insect-based feeds in Kenya revealed that a significant number of farmers 60-70% were aware that insects including bees could be fed to poultry. Findings show that these farmers considered insects as good component of feeds to feed poultry, fish and poultry. They further accepted the willingness to pay for feed additives from poultry and use them as components for feeding the livestock. These results stress a discrepancy between Ugandan and Kenyan farmers in the context of using components of insects, in this cull bee brood as protein additives for feeding poultry.

We further found out that there is limited appreciation of farmers towards the use of cull brood as an alternative source of proteins in feeding poultry. This was mainly attributed to the fact that most farmers had a belief that bees are kept as a source of honey and that collecting cull bee brood would time waste. These findings have a different perspective from one Chia, Macharia [11] who found out that farmers were unwilling to accept the use of insects in their poultry feed rations for fear of the implications. In the two scenarios, one group have some level of knowledge whereas the other has no knowledge about the use of alternative source of feeds. This shows a discrepancy in the level of knowledge on the use of insects especially bees beyond just honey but as a source of feeds in livestock to provide protein additives.

Findings further found out that most farmers were reluctant to adopting cull bee brood due to low levels of technology and innovations. Most farmers who rear exotic poultry rely on poultry feeds manufacturer and have less knowledge on how these feeds are mixed. They therefore pay little attention on whether cull bee brood can be an alternative source of proteins in poultry feeds. This would be possible in an event that these farmers were using some level of technology in processing feeds for their poultry. These findings are not line with the study by Khusro, Andrew [12] who expressed that farmers use insects in feeding birds that produce meat and eggs in their farms. The study found out that these farmers showed some level of acceptance of feeding their birds to insects owing to their economic viability. This study was conducted in Australia a developing country and this further paint a discrepancy between the level of knowledge on the use of alternative sources of protein additives between farmers in developing and developed countries.

Conclusion

The present study found out that: there was inadequate of awareness of bee brood as feed additive to poultry, its protein importance, limited appreciation and lack of innovation were among the factors compromising farmers' use of culled bee brood as an alternative source of proteins in chicken feed additives. It can be concluded that limited awareness is a major factor propelling farmers' negative towards the use cull bee brood as an alternative source of protein additives for feeding poultry among farmers in rural south western Uganda.

Recommendations

The study identified limited awareness as a major inhibitor for farmers' adoption of cull bee brood as an alternative source of proteins in poultry feeds. This therefore calls for sensitization of farmers by stakeholders involved in promotion of livestock farming in communities such as agricultural extension workers about the importance of alternative sources of protein additives in poultry rearing.

Additionally, farmers need to integrate bee keeping with poultry farming for purposes of enterprise complementarity and expanded income source. Farmers who had the two enterprises were looking at them as different and incompatible. The use of integration approach will help these farmers appreciate the use of cull bee brood as another important aspect in feeding poultry birds and a source of protein additives.

This study revealed that farmers had little knowledge on processing feeds for themselves but rather depended on buying from processors and traders. This requires that stakeholders involved in agricultural development invest much training these farmers about the need for farmers to engage in processing feeds for their poultry projects. This will eventually help to promote the use of cull brood as an alternative source of protein additives in feeding poultry.

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