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Nutritional quality of dried maggot meal in western Burkina Faso

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INTRODUCTION & AIM

Animal protein is the limiting factor in livestock production in Sub-Saharan Africa. The inaccessibility of conventional sources to local producers and their high cost are leading to pronounced protein deficiencies in traditional livestock farms, which are major suppliers of animal products (meat, fish and eggs) to urban centres (Sanou *et al*., 2019; Traore *et al*., 2020). A number of non-conventional sources of protein are being proposed to address this problem, including invertebrate meals, particularly from insect larvae such as houseflies.

Houseflies have great potential in terms of bio-ecology in that, during their development cycle, the immature stages of these flies or maggots degrade decomposing organic matter and mobilize nutrients which they convert into high-quality proteins containing several essential amino acids at appreciable levels (Makkar et al., 2014; Bosch et al., 2019). These larvae or maggots appear to be an interesting alternative to conventional sources of animal protein used in the feed of farmed monogastric animals (van Huis et al., 2013; Kenis et al., 2018). Thus, knowledge of their nutritional quality could guide potential users in supplementing the ration of stray poultry.

The aim of this study was to determine the bromatological composition of sun-dried fly larvae.

METHOD

Housefly larvae production:

The fly larvae were produced in a station on the site of the Institut du Developpement Rural (IDR) located in Nasso, a village about fifteen kilometres from the town of Bobo-Dioulasso (Burkina Faso). A mixture of eight (8) kg of poultry droppings and 14 litres of water was mixed per bed and exposed for 24 hours to be seeded by the flies. Eight beds were used for each production cycle. After 24 hours, the mixture was covered with a tarpaulin made from cereal sacks (providing an aero-anaerobic medium) to prevent late oviposition. Maggots were harvested on the 5th day after exposure using the 'migration' method with sieves of suitable mesh (Sanou *et al*., 2019). Maggots that passed through the sieve mesh were collected in iron bins, then cleaned and sun-dried in iron plates before being packaged and transported to the laboratory.

Metabolizable energy calculation (INRA, 1987):
ME (Kcal/kg DM) = 3,951 + 54.4 FM - 88.7 CC - 40.8 MM
where: FM = fat CC = crude cellulose, MM = mineral matter.

Bromatological analyses :

To assess their potential for animal nutrition, bromatological analyses were carried out on samples of sun-dried housefly larvae packaged for transport at the animal nutrition laboratory of INERA (Institut National de l'Environnement et des Recherches Agricoles) Kamboinsé in Ouagadougou (Burkina Faso). These analyses were carried out in accordance with the analysis methods developed by AFNOR (2000) for animal feed. The parameters determined were dry matter (DM), organic matter (OM), fat (FM), crude protein (CP) and mineral matter (MM) content, crude cellulose (CC), calcium (Ca) and total phosphorus (P).

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RESULTS & DISCUSSION

The results of the bromatological analyses carried out are shown in the following table.

Table : Chemical composition of dried housefly larvae

Organic and mineralogical constituents		Housefly larvea
Chemical composition (% of dry matter except gross energy in Kcal/kg of dry matter)	Dry matter (DM)	91.87
	Crude protein (CP)	48.85
	Crude cellulose (CC)	9.16
	Fat matter (FM)	3.93
	Mineral matter (MM)	21.10
	Metabolizable energy (ME)	2.491.42
Mineralogical composition (in mg/kg of dry matter)	Calcium (Ca)	5.96
	Phosphorus (P)	2.18

The results show that the crude protein content of dried maggots is close to the 50.4% obtained by Makkar et al. (2014) from a total of 29 housefly studies. On the other hand, lipid content and metabolizable energy are lower than those reported by the same authors, who found values of 18.9% and 5469.57 Kcal/kg DM respectively. These differences could be related to the production nutrient substrate used, the storage time after drying, the drying method and the methods and accuracy of the analysis equipment used (Tendonkeng et al., 2017).

CONCLUSION

These results indicate appreciable levels of crude protein and trace elements, making maggot meal an excellent source of animal protein. The results suggest that maggot meal can be incorporated into the feed of monogastric animals, including poultry, to improve productivity and reduce production costs.

FUTURE WORK / REFERENCES

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