

International Journal of Agriculture Extension and Social Development

Volume 4; Issue 2; Jul-Dec 2021; Page No. 106-109

Received: 10-06-2021
Accepted: 12-08-2021

Indexed Journal
Peer Reviewed Journal

Exploitation of *Mucuna pruriens* seeds incorporated in the diets of Akoho gasy chicks

Rakotomanana Olga Rachel

DRZVP/ FOFIFA Ampandrianomby Antananarivo BP 04; 101 Madagascar

Abstract

The breeding of local chicks called "Akoho Gasy" shows a slow growth. Which food, not in competition with human food, found naturally and available locally, must be supplemented?

Does the use of *Mucuna pruriens* IRZ seeds in the diets of these chicks answer this question?

The incorporation of these seeds in their feed was done at different rates of 0, 8, 13 and 18%. Five types of feed were allocated to each batch of chicks. The roasted preparation of the seeds was replaced by an overnight soaking in water, followed by boiling for 30 minutes and finished by removing the skins, following the death of some chicks after one week of experimentation.

The different types of feed are analysed bromatologically and the chicks are weighed weekly.

The weight gains obtained are proportional to the increase in the rate of seed incorporation. Control chicks reared in the field had slow growth. The feed composed of 18% *Mucuna* meal was the most effective.

Cooked *Mucuna* seeds being non-competing seeds to human food, available locally and in abundance are food that can feed well and increase the local breed chicks.

Keywords: food, growth, cooked, efficient, incorporation, roasted and valorized

Introduction

Poultry farming is taking an important place in the world of breeding. As a counterpart to the intensive breeding requiring elaborate techniques and important investments, the traditional extensive breeding of the local breed of chicken called "Akoho Gasy" remains undertaken. The life and the production of the Akoho Gasy are almost in the state of nature with their meagre food in the surroundings of the houses and fields. The growth rate of 900g to 1 kg for sale is only five months of breeding. The hen lays late (Raoelarisoa, 2004).

If the local breed of chicken is raised for a long time, what feed should it be supplemented with, not in competition with human food, found naturally and available locally?

During a Support Project for the Dissemination of Agroecological Techniques in Madagascar with GSDM, *Mucuna pruriens* IRZ legume seeds were obtained from one of the plants used in direct seeding under plant cover (DSC) and could answer this question. Locally available raw material (Dahouda *et al.*, 2009) [2], not used in Madagascar yet rich in protein (Farougou *et al.*, 2006) [7] and a relatively high proportion of amino acid (Josephine and Janardhanan, 1992; Ravindran V and Ravindran G, 1988) [11, 12] was undertaken with the collaboration of the nutrition chemistry laboratory of the Department of Zootechnical, Veterinary and Fish Research Antananarivo with the Laboratory of Biochemistry Applied to Food Science and Nutrition (LABASAN) in the GSDM-funded IAE project.

To this end, studies on its nutritional value and its use as a feed supplement for Akoho Gasy chicks were conducted as a substitute for certain expensive raw materials. As a result,

these seeds have a nutritional quality whose protein content is quite high with an average of about 43.71% of DM.

Previous studies show that untreated seeds have toxic effects in humans and birds (1, 2, 6, 10). Thus, these seeds are roasted to reduce the anti-nutritional factors present such as L-Dopa (Bell *et al.*) (3,4-dihydroxyphenylalanine is a non-protein amino acid) (Siddhuraju, Becker and Makkar, 2000) [13]. This treatment caused a number of chicks to die so the treatment is changed, the seeds are soaked in water overnight then followed by boiling for 30 minutes and then the skins are removed. Heat can extract more L-Dopa (Del Carmen, 1999) [4] 6, 10. Chicks fed the feed supplemented with these seeds received a significantly positive weight gain ($p < 0.005$).

Materials and Methods

The seeds of *Mucuna pruriens* IRZ constitute our study material. At the stage of maturity, the seeds are harvested and dried. After dehulling, the seeds are roasted and ground and incorporated into the feed of local chicks.

The study was conducted on 140 chicks. They were dewormed and vaccinated (fowl and poultry plague) at the beginning and during the experiment. During the ten weeks of the experiment, these animals were weighed every week.

After one week, 10 chicks died. The chicks do not tolerate roasted *Mucuna* seeds. So the method of preparing the seeds is changed. After being soaked in water overnight, the seeds are boiled for 30 minutes. The skins around the seeds are removed before drying them. They are ground and incorporated into their feed. As a result, no more chicks died.

The feed is prepared for 100 Kg. Five types of feed are assigned to each batch of 13 chicks and each was performed

in two replicates. The experimental set-up is shown in Figure 1.

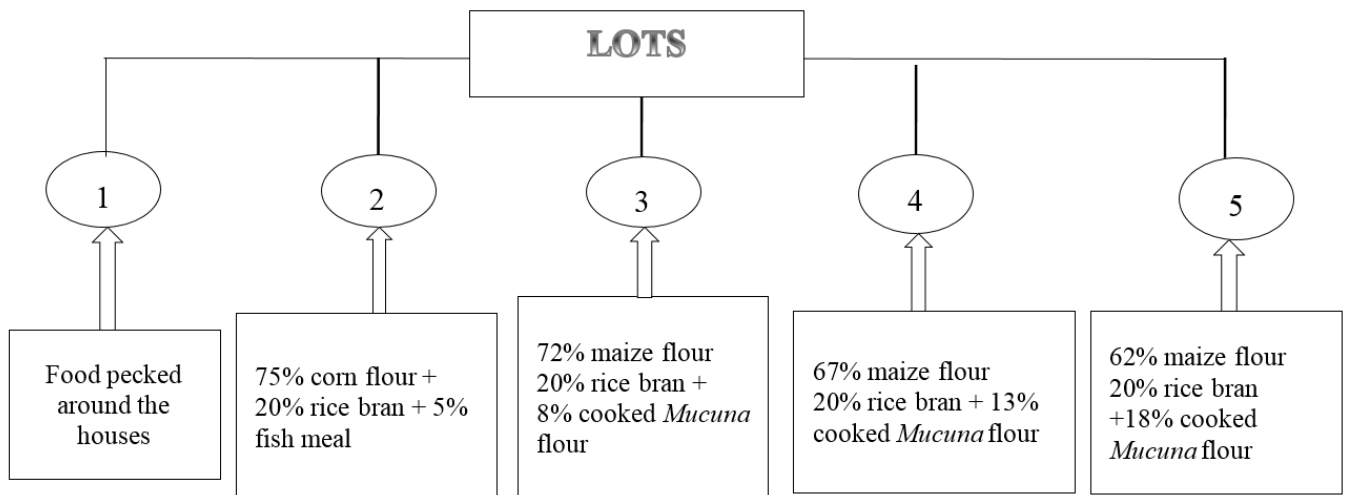


Fig 1: Experimental setup

Mucuna seeds are introduced in the chicks' feed at rates varying from 0%, 8%, 13% and 18%. A control batch is raised in a stall. At the beginning 80g of these compositions are given to the chicks and the quantity is increased according to their weight. The raw materials and types of feed are analysed bromatologically in the laboratory. The experiment compares the weight of chicks fed these 5 types of food.

Results and Discussion

The results of the average chemical composition of feeds supplemented with *Mucuna* seeds are recorded in Table 1. Despite the presence of L-dopa as a predominant factor in *Mucuna* (Gurumoorthi and Vadivel, 2008; Tuleun *et al.* 2008) [8, 14], and other toxic compounds having also been reported (Ezeagu *et al.* 2003; Siddhuraju and Becker, 2005; Tuleun *et al.* 2008) [6, 14], feeds supplemented with *Mucuna* seeds have better nutrient values

Table 1: Nutritional value of foods incorporated at different rates of *Mucuna* seed

% of DM	Control feed	8% <i>Mucuna</i> seed	13% <i>Mucuna</i> seed	18% <i>Mucuna</i> seed
Dry Matter	89.1	88.5	88.2	87.9
Mineral Matter	4.5	3.5	3.7	3.8
Fat Matter	6.7	9.2	8.8	8.4
Gross Protein	13.7	14.0	15.7	17.3
Gross Cellulose	3.7	4.2	4.3	4.5
Calcium	0.40	0.09	0.10	0.11
Phosphorus	0.66	0.58	0.62	0.68
Insoluble Ash	0.7	0.4	0.4	0.4

As *Mucuna* seeds are rich in Protein, these contents in Gross Protein of the compound feed increase proportionally with the rate of incorporation of *Mucuna* seeds (Figure 2).

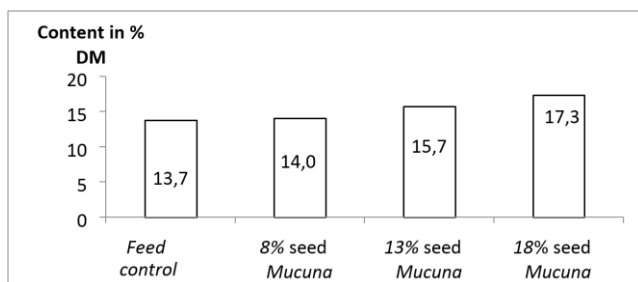


Fig 2: Crude Protein content of different diets at different rates of incorporation of *Mucuna* seeds

The FM content is inversely proportional to the *Mucuna* seed incorporation rates (Figure 3)

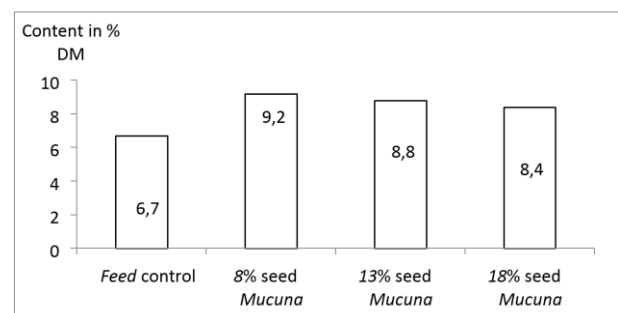
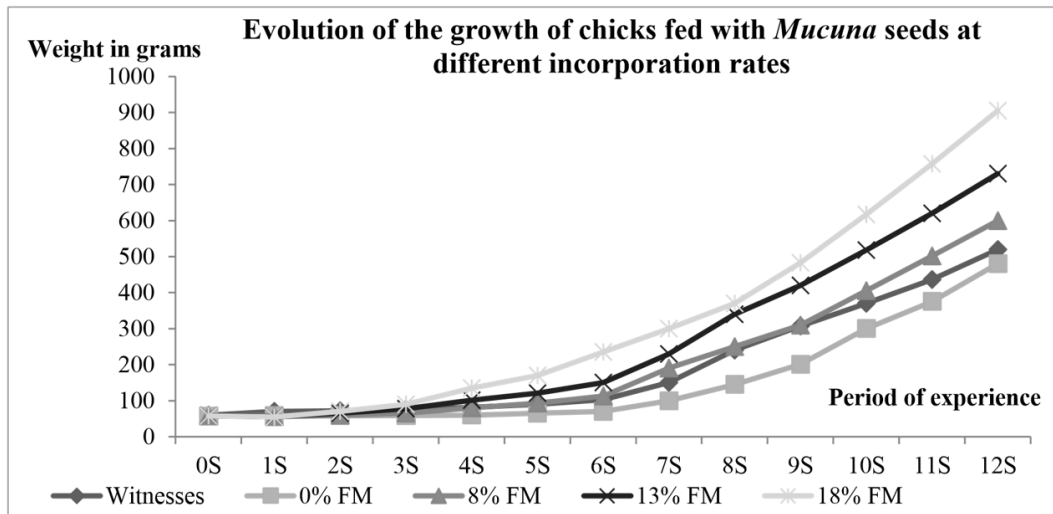


Fig 3: Fat content of different diets at different rates of incorporation of *Mucuna* seeds

After being fed with these different types of food incorporated with cooked *Mucuna* seeds, the evolution of the growth of the chicks obtained are presented in figure 4.

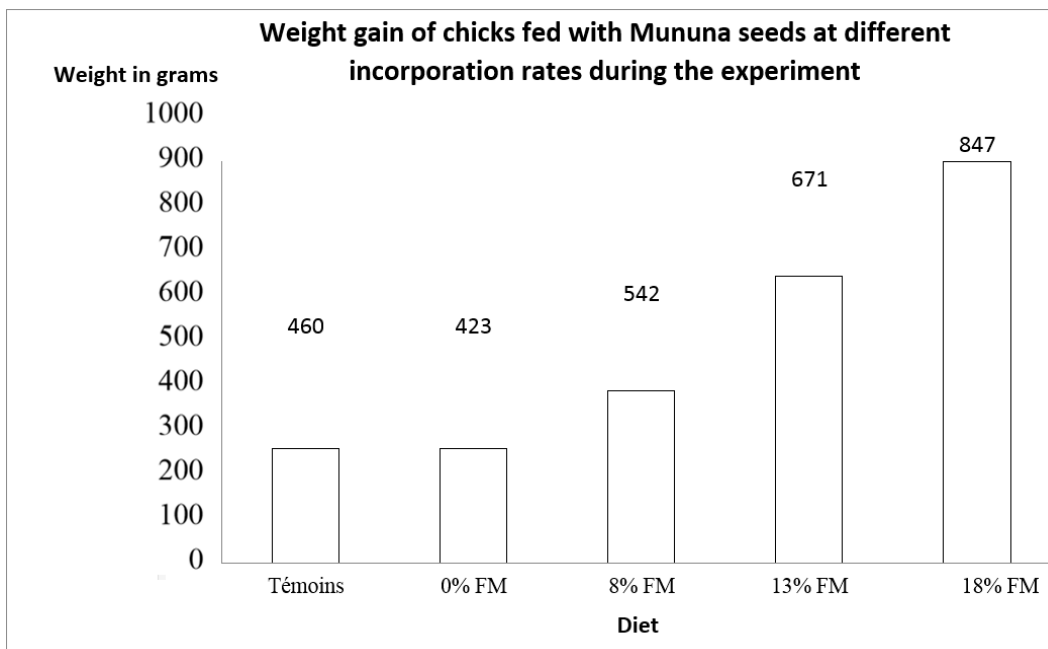


S: Week; FM: *Mucuna* flour

Fig 4: Growth of chicks fed *Mucuna* seeds at different incorporation rates

The chicks fed with feed supplemented with 18% cooked *Mucuna* seeds have the fastest and highest weight growth. The chicks left to wander and fed with 0% *Mucuna* seeds have a slow and low growth.

Thus, from the body weights obtained during the experiment, we could calculate the weight gain of the chicks.



FM: *Mucuna* flour

Fig 5: Weight gain of chicks fed with *Mucuna* seeds at different incorporation rates during the experiment

The weight gain of the chicks fed with feed incorporated with 18% of *Mucuna* seeds proves the growth speed of these chicks. This gain is about double that of the control chicks.

Acknowledgements

We would like to thank

- To the Head of Department and teams of the nutrition chemistry laboratory of the Department of Zootechnical and Veterinary Research (DRZV) Antananarivo
- To all the officials of the National Centre for Applied Research in Rural Development (CENRADERU/ FOFIFA)

- To the teams of the Centre de Recherches Zootechniques (CRZ) of Kianjasoa
- Groupement Semis Direct de Madagascar (GSDM)

Conclusion

The weight gain of the chicks increased with the rate of incorporation of *Mucuna* meal and the efficiency of the feed composed of 18% *Mucuna* meal is well verified by the weight gain. *Mucuna* seeds being non competing seeds to human food, are food that can feed well the local breed chicks.

Even in the presence of anti-nutritional factors (L-dopa), the growth of the chicks was good and moreover, superior to the control chicks without *Mucuna*.

As the protein content in the feed containing the maximum rate of incorporation of *Mucuna* seeds does not fully cover the needs of the chicks, we will plan in the future to mix it with another component rich in protein but which is not expensive and easily found such as amaranth seeds.

References

1. Bell EA, Janzen DH. Medical and ecologial considerations of L-DOPA and 5-HTTP in seeds. *Nature* 1971;229:136-137.
2. Dahouda M, Toléba SS, Senou M, Youssao AKI, Hambuckers A, Hornick JL. Nonconventional feed resources for poultry production in Africa: nutritional values and constraints. *Formation continue - Article In : Ann. Vet*, 2009;153;5-21
3. Daxenbichler ME, Vanetten CH, Hillinan EA, Earle FR, Baclay AS. Seeds as sources of L-DOPA. *J. Med. Chem* 1971;14;463-465.
4. Del Carmen J, Gernat AG, Myhrman R, Carew LB. Evaluation of raw and heated velvet beans (*Mucuna pruriens*) as feed ingredients for broilers. *Poult. Sci* 1999;78:866-872.
5. Dossa CS, Mensah GA, Adoun C. Influence of various physico-chemical treatments of *Mucuna pruriens* seeds on their chemical nutrient composition. *Tropicultura*, 1998, 16-17, 141-146.
6. Ezeagu IE, Maziya-Dixon B, Tarawali G. Seed characteristics and nutrient and antinutrient composition of 12 mucuna accessions from Nigeria. *Trop. Subtrop. Agroecosyst* 2003;1:129-139.
7. Farougou S, Kpodekon M, Tokannou R, Djossou VD, Akoutey A, Youssao IAK. Utilisation de la farine de *Mucuna pruriens* (L.) DC dans l'aliment de croissance des pintades (*Numida meleagris*). *revue Méd. Vét.* 2006;157(10):502-508.
8. Gurumoorthi P, Janardhanan K, Myhrman RV. Effects of differential processing methods on LDopa and protein quality in velvet bean, an underutilized pulse. *Lebensm. Wiss. Technol* 2008;41:588-596.
9. Harms RS, Simpson C, Waldroup PW. Influence of feeding various levels of velvet beans to chicks and laying hens. *J nutri.* 1961;75:127-131.
10. Houghton PJ, Skari KP. The effect on blood clotting of some west African plants used against snakebite. *J Ethnopharm*, 1994;44:99-108.
11. Josephine M, Janardhanan K. Studies on chemical composition and antinutritional factors in germplasm seed materials of the tribal pulse, *Mucuna pruriens* (L) DC. *Food Chem.* 1992;43:13-18.
12. Ravindran V, Ravindran G. Nutritional and antinutritional characteristics of *Mucuna (Mucuna utilis)* bean seeds. *J Sci. Agri* 1988;46:71-79.
13. Siddhuraju P, Becker K, Makkar HP. Studies on the nutritional composition and antinutritional factors of three different germplasm seed materials of an under-utilized tropical legume, *Mucuna pruriens* var. *utilis*. *J Agric. Food Chem* 2000;8:6048-6060.
14. Tuleun CD, Carew SN, Ajiji I. Feeding value of velvet beans (*Mucuna utilis*) for laying hens. *Livest. Des.* Rural Deo, 2008, 20. URL: <http://lrrd.org/lrrd20/5/tule2008.1.htm>
15. Vijayakumari K, Siddhuraju P, Janardhanan K. Effect of different post-harvest treatments on antinutritional factors in seeds of the tribal pulse, *Mucuna pruriens* (L) DC. *Int. J Food Sci. Nutr* 1996;47:263-272.