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POSSIBILITIES FOR UTILIZATION OF WASTE PRODUCTS OF SERICULTURAL INDUSTRY IN ANIMAL/ POULTRY FEEDS

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ABSTRACT
Proximate composition was conducted to investigate the nutrient quality of mulberry silkworm pupae and excreta. The results obtained on the chemical composition showed that silkworm pupae contained Dry matter 91.33%, Crude protein 61.25%, Ether extract 18.66%, Crude fibre 2.5%, Total ash 3.33%, Calcium 0.63%, Phosphorus 0.83% and the Silkworm excreta contained Dry matter 88.66% , Crude protein 18.15%, Ether extract 2.5%, Crude fibre 12.5%, Total ash 23.33%, Calcium 0.56%, Phosphorus 0.23%. The results on proximate composition of mulberry silkworm pupae and excreta shows that it could be incorporated in to the poultry feed.

KEY WORDS: Chemical composition, Mulberry silkworm pupae, mulberry silkworm excreta.

INTRODUCTION

The compelling need to harness the potentials of the numerous agro-industrial by–products and the so-called "Wastes" as part replacement for the more expensive conventional feed ingredients have been seriously expressed (Aletor,1986; onifade and Babatunde,1998). This need has arisen mainly from the increasing demand for and supply deficit of conventional feed resources with a concomitant sharp rise in their cost prices. The net effect of increasing unit cost of the conventional feed resources is increased cost of the compound rations which by extension gives rise to increased cost of meat and animal products. It becomes highly imperative that other sources for rapid livestock output to meet the growing human demand for animal protein foods to be sourced. Such other sources should be cheap and nutritionally adequate for feeding birds / animals with the aim of lowering cost of producing meat. One of such measures is the recycling of major reeling and rearing waste of sericulture industry *i.e.* Silkworm pupae (SWP) and silkworm excreta (SWE) as part replacement for conventional and expensive grains used in the live stock nutrition. Proper utilization of waste products of sericulture industry can also generate an extra income in addition to silk, the main output, which may also be considered as an alternative way to solve partly the problem with the decline of silk production and the efficient utilization of the existing sericulture human capacity, research and production facilities.

MATERIALS & METHODS

Collection and processing of material

For the present study the mulberry waste in the form of silkworm pupae meal was obtained from Himalayan silk reeling and weaving factory Mouchu Srinagar and silkworm excreta meal was obtained from the Temperate Sericulture Research Institute and silkworm farmers of village Chinabal, Pattan. The test materials were dried and stored appropriately for future use.

Proximate composition

The percentage crude protein, ether extract, total ash, crude fiber content of the silkworm pupae and excreta were determined as per standard procedure of Association of Official Analytical Chemists (AOAC, 2005). Calcium and phosphorus were estimated by Talapatra method (1948).

Dried mulberry silkworm pupae

Dried mulberry silkworm excreta

RESULTS & DISCUSSION

The results of chemical and mineral compositions of mulberry Silkworm pupae and excreta are presented in Table -1. The values obtained of mulberry silkworm pupae (MSWP) for Dry matter, Crude protein, Ether extract, Crude fibre, Total ash Calcium and Phosphorus were 91.33%, 61.25%, 18.66%, 2.5%, 3.33%, 0.63%, and 0.83% respectively. The values obtained of mulberry silkworm excreta (MSWE) for Dry matter, Crude protein, Ether extract, Crude fibre, Total ash Calcium and Phosphorus were 88.66%, 18.15%, 2.5%, 12.5%, 23.33%, 0.56%, and 0.23% respectivelly.

TABLE 1 : Proximate composition of silkworm pupae and silkworm excreta

S. No.	Attributes (%)	Silkworm pupae	Silkworm excreta
1	Dry matter	91.33	88.66
2	Crude protein	61.25	18.15
3	Ether extract	18.66	2.5
4	Crude fibre	2.5	12.5
5	Total ash	3.33	23.33
6	Calcium	0.63	0.56
7	Phosphorus	0.83	0.23

Values represent mean of triplicate determination

The moisture content of silkworm pupae and silkworm excreta was found to be 8.67 and 11.34%, respectively. The crude protein content of Silkworm pupae was 61.25% and that of silkworm excreta was 18.15%. Ether extractable fat of silkworm pupae and silkworm excreta was 18.66 and 2.5% respectively. The crude fibre content of silkworm pupae was 2.5% and while silkworm excreta contained 12.5%. The ash content of silkworm excreta was at a higher level *i.e*., 23.33% while as it was lowest in silkworm pupae (3.33%). The content of calcium and phosphorus in silkworm pupae was 0.63 and 0.83%, respectively. The true crude protein content of Silkworm pupae was 8.05 and while silkworm excreta contained 3.20 per cent. The results of crude protein, crude fibre, moisture contents of silkworm pupae are in harmony with the results of Ahamad *et al*. (2000) who reported that Silkworm pupae contains 9.8% of moisture, 62.2% of crude protein, 7.6% of crude lipid, 1.3% of crude fibre, 17.2% ash. The results of ether extract are harmony in with the results of Choudry *et al.* (1990), who estimated the biochemical composition of silkworm pupae and found that per cent moisture, crude protein, crude fibre , total ash, calcium, phosphorus and ether extract as 6.13, 58.40, 4.76, 4.62, 0.10, 0.46 and 21.88 respectively. The results of phosphorus are corroborating with the results of Bora and Sharma (1965). They reported that calcium and phosphorous contents in silkworm pupae (Assam muga silkworm) as 0.26 and 0.80 per cent respectively. The results of crude protein, crude fat, Moisture contents of Silkworm excreta are harmony with the results of Chen Yaowang (2003) who reported that the nutrient composition of silkworm excreta was 12.2 % moisture, 15.4% crude protein 2.6% crude fat, 19.6% crude fiber, 36.2% non-nitrogen extracts and 4.5% minerals. Wijayasinghe and Rajaguru (1977) reported that the proximate composition of silkworm pupae contains moisture 8.50%, crude protein 63.30%, crude fibre 3.10, ash 4.50%, nitrogen free extract 1.13%, P_2O_5 2.03, $CaCO_3$ 0.545. However, According to Panda (1968) The Silkworm Pupae contain 55% crude protein, 25% ether-extract and 3% crude fiber. Majaonkar and Bjambure (1987) reported that silkworm pupae contain 48.12% protein, 34.20% ether extract, 1.84% crude fiber, 11.40% nitrogen free extract and 4.44 per cent total ash on dry matter basis. Hossam *et al.* (2011) reported that the chemical analysis of silkworm excreta as 6.08% moisture, 93.92% dry matter,

24.67% ash, 1.9% either extract,18.74% crude protein and 13.84% crude fiber. The variation in the chemical composition of silkworm pupae and silkworm excreta may be due to the race variation of silkworm (*Bombyx mori*), the leaf of different mulberry verities used during rearing of silkworms and also due to the difference in season.

CONCLUSION

It can be concluded that this study which evaluated the proximate composition of the major silk reeling waste (pupae) and silkworm rearing waste (excreta) has explored the practical possibility of incorporation of these two major silk industrial wastes in to Animal/ poultry feeds hence reducing the cost of production of feed consequently reducing the unit cost of animal products. Thus the proper utilization of these major waste products of sericulture industry can also generate an extra income in addition to silk the main output.

REFRENCES

Ahamad, A.S., Gopal, C. & Ramana, J.V. **(**2000) Shrimp feed processing and production technology. *CIBA Bulletin* No. 13, March 2000. Central Institute of Brackish-water Aquaculture, Chennai, India, pp. 20.

Aletor, V.A. (1986) Some agro-industrial by –products and wastes in livestock feeding; areview of prospects and problems. World Review of Anim. Prod., 22: 36-41.

AOAC (2005) Animal feed. Official Methods of Analysis of the Association of Official Analytical Chemist international, 18th edition. Suite 500, 481 North Frederick Avenue, Gaithersburg, Maryland, USA.

Bora, I.R. & Sharma, P.K. (1965) Assam muga silkworm pupae as protein supplement in chick ration. *Indian Veterinary Journal* **42**: 354-359.

Chaudhary, K., Das, J., Saikia, S., Sengupta, S. & Chaudhary, S.K. (1990) Supplementation of broiler diets with antibiotic and probiotic fed muga Silkworm pupae meal. *Indian Journal of Poultry Science* **33**: 339-342.

Chen, YaoWang (2003) Animal raising and plant cultivation on an integrated fish farm. Integrated fish farming in China, NACA Technical Manual 7, A world food day, 1989 Publication of the network of aquaculture centres in Asia and the Pacific, Bangkok, Thailand.

Hossam M.A. & Safwat, A.A.G. (2011) Evaluation study for the impact of oultry drops, silkworm wastes and fresh rumen contents in *Nile tilapia* culture. *Journal of the Arabian Aquaculture Society* **6**(1) : 33-46.

Majoankar, S.B. & Biamber, C.V. (1987) Utilization of silkworm pupae meal in broiler diets. Sovenior, Institute of Poultry Management in India, Pune, pp 72-75.

Onifade, A.A. & Babatunde, G.M. (1998) Comparison of the utilization of palm kernel meal, brewer's dried grain and maize offals by broiler chicks. Br. Poult. Sci., 39: 245-250

Panda, B. (1968) Silkworm pupae meal. *Indian Poult. Gazette* **53** : 29-30.

Talapatra, S.K., Raz, S.C. and Sen, K.C. (1948) The analysis of mineral constituents in biological materials. 1. Estimation of phosphorus, calcium, magnesium, sodium and potassium in food stuffs. *Journal of Veterinary Science & Animal Husbandry* **10**: 243-258.

Wijayasinghe, M.S. & Rajaguru, A.S.B. (1977) Use of silkworm (*Bombyx mori* L.) pupae as a protein supplement in poultry rations. *J. Nat. Sci. Counc. Sri Lanka* **5**: 95-104.