Online Journal of Animal and Feed Research

Volume 2, Issue 1: 23-26 (2012) *ISSN 2228-7701*

SURVEY OF PRODUCTION AND USE OF POULTRY LITTER IN KHARTOUM STATE, SUDAN

M.B. ELEMAM[1*], A.M. FADELELSEED[2], O.M.A. ABDELHADI[3], A.O. IDRIS[4], I. BUSHARA[5], A.M. SALIH[2]

[1]*Department of Animal Production, Faculty of Agriculture and Natural Resources , University of Kassala, POBox 12, New Halfa, Sudan.*
[2]*Department of Animal Nutrition, Faculty of Animal Production, University of Khartoum, Sudan*
[3]*Department of Animal Production, Faculty of Natural Resources, University of Kordofan, POBox 716, Khartoum, Sudan*
[4]*Department of Animal Production and Range, Faculty of natural Resources and Environmental Studies, Peace University, Sudan*
[5]*Department of Animal Production, Faculty of Agricultural Sciences, Dalanj University, Sudan*

*Email: murtadaelemam@yahoo.com

ABSTRACT: *A survey of chicken litter production was undertaken by hand submitted questionnaire. The survey covered 219 farms out of 612 registered in Khartoum state to provide information on amount and use of litter. The survey revealed that most poultry farms followed similar management practices. About 58.94% of litter production was estimated to come from broiler houses and 41.06% from layer houses. It was estimated that 70% of the litter production is litter-based and about 30% are droppings collected without litter. The amount of litter produced was estimated to be 95097.58 ton/year and 87.1% of this amount was used as fertilizer. Samples of broiler litter were collected and proximate composition was conducted to investigate the nutrient quality of broiler litter. Results obtained on dry matter (DM) and ether extract (EE) showed that there are significant (P<0.05) differences among three locations (Khartoum, Khartoum-North and Omdurman). However, there are no significant differences on other chemical compositions.*

ORIGINAL ARTICLE

Key words: *Poultry litter, survey, chemical composition.*

INTRODUCTION

Poultry litter contains a mixture of chicken manure, feathers, spilled food and bedding material. The rate of litter production and nutrient content can be affected by many factors, including the type and amount of bedding material used, number of flocks reared on the litter, feed formulation, litter management techniques, type of housing, ventilation rates and management, bird health, performance parameters, stocking density, and age of birds (Malone, 1992).

The last survey of poultry farms in Khartoum State revealed that there were about 612 farms with 8.2 million broiler chicken and 1.3 million layers. These large numbers of growing chicks implies large amount of poultry wastes. The quantity of manure excreted from chicken depends on feed intake and diet digestibility (Elemam, 2011). The treatment of broiler litter by deep stacking was effective in the destruction of pathogens as stated by (Elemam et al. 2010)

There is a powerful need to control the potentials of the numerous amounts of the litter as replacement for feed ingredients. This need has arisen mainly from the increasing demand and supply deficit of conventional feed resources. The net effect of increased unit cost of the conventional feed resources is increased accordingly the cost of the compounded rations, which increased the cost of animal products (Elemam et al. 2009a). It then becomes highly vital that other sources for rapid livestock output to meet the growing human demands for animal protein foods are secured. Such other sources should be cheap and nutritionally adequate for feeding animals with the aim of lowering the cost of animal products. One of such measures is the recycling of broiler litter as partial replacement for conventional cheap feed sources used in livestock nutrition. Broiler litter differs in composition from layer manure mainly because of the differences in diets fed and the bedding material that is mixed with broiler excreta.

The utilization of the waste through ruminant animals became a convenient option of disposing of the waste (Elemam et al. 2009b). The product is readily accepted by the cattle and sheep farmer, not because of any superior feeding qualities, but simply because it is cheaply available and is easily utilized by the digestive system of the

To cite this paper: Elemam M.B, Fadelelseed A.M, Abdelhadi O.M.A, Idris A.O, Bushara I, Salih A.M. 2012. Survey of production and use of poultry litter in Khartoum state, Sudan. *Online J. Anim. Feed Res.*, 2(1): 23-26.
Scienceline/Journal homepages: http://www.science-line.com/index/; http://www.ojafr.ir

ruminants. The purpose of this study was to provide some sectors with current basic information on the poultry litter produced in the State and to determine the chemical composition of the litter.

MATERIALS AND METHODS

Farms survey

A hand submitted questionnaire was designed to answer some questions by poultry farmers in Khartoum State to gather information about litter production, after that the received data was collected and analyzed.

Chemical composition

Broiler litter was collected from commercial broiler houses in Khartoum state. The litter was then spread under the sun from 8:00 am to 6:00 pm for heating and drying. Then representative samples of sun-dried broiler litter were taken and proximately analyzed was made on dried ground samples as outlined by (AOAC, 1990).

Statistical procedure

The data were subjected to the analysis of variance with the general linear model procedure of (SAS, 1994).

RESULTS

Farms survey

A total of 219 questionnaires were returned, representing a 35.78% response rate. The survey revealed that most poultry farms in Khartoum state practice the same management protocols in term of Detergent, cleaners and pesticides were usually applied to poultry houses before administer of a new batch. Litter type was sawdust shaving and application rate was not clearly known.

Poultry litter commonly collected after each production period in plastic sacks and sold as fertilizer (land application). No storage locations and handling practices. No medicinal or metabolic additives were used except for coccidiostat. The total litter produced from Khartoum state was 95097.58 ton/year based on information of poultry farm producer's.

Omdurman area secured the largest statistics of broiler, broiler growers, chicks and parents in comparison to the other two areas Table 1 and therefore there is a large quantity of litter produced about 68.42% from total litter produced in Khartoum state and this due to the existence of big companies there (Figure 1). Commonly most of poultry litter produced (87.1%) in Khartoum state was used as fertilizer and only 0.71% was used in animal feed (Figure 2).

Table 1 - Khartoum state poultry farms survey with the number of birds and annual poultry litter output.

No. / Locations	Khartoum	Khartoum-North	Omdurman	Total
Farms	89	103	27	219
Chicks	34000	18800	700000	752800
Layer growers	71241	27437	34765	133443
Broiler growers	31639	15463	32235	79337
Layers	277986	613233	21150	912369
Broilers	191950	210480	2400000	2802430
Parents	7500	2000	65000	74500
Poultry litter (ton/year)	12286.32	17748.26	65063.00	95097.58

Chemical composition

Results in Table 2 show the chemical compositions of broiler litter. The values obtained for dry matter (DM) and ether extract (EE) were significantly ($P<0.05$) different for the three locations. However, there were non-significant ($P<0.05$) difference between organic matter (OM), crude protein (CP), Crude Fibre (CF), Ash, nitrogen free extract (NFE) and metabolizable energy (ME) among the three location.

Table 2 - Chemical composition (%) of broiler litter collected from different broiler houses in Khartoum state.

Items	Khartoum-North	Khartoum	Omdurman	SEM[1]
Dry matter (DM)%	87.67[a]	86.81[ab]	87.09[b]	1.44
Organic matter % DM	76.05	70.89	68.30	2.83
Ether extract % DM	2.53[b]	0.41[c]	4.09[a]	0.44
Crude protein % DM	26.38	27.45	26.35	2.76
Crude fiber % DM	16.80	17.31	15.39	1.91
Ash % DM	17.62	20.93	19.78	2.86
NFE % DM [2]	30.35	25.74	22.48	4.15
ME (MJ/kg DM) [3]	9.04	7.89	8.35	0.41

[1]S.E.M= Standard error of mean; [a-b] means with different superscripts in the same row were significantly different (P <0.05). NFE: Nitrogen free extract. [3]ME was calculated according to the equation: ME (MJ/kg DM) = 0.012CP + 0.031EE + 0.005CF + 0.014NFE (Maff, 1975).

To cite this paper: Elemam M.B, Fadelelseed A.M, Abdelhadi O.M.A, Idris A.O, Bushara I, Salih A.M. 2012. Survey of production and use of poultry litter in Khartoum state, Sudan. *Online J. Anim. Feed Res.*, 2(1): 23-26.
Scienceline/Journal homepages: http://www.science-line.com/index/; http://www.ojafr.ir

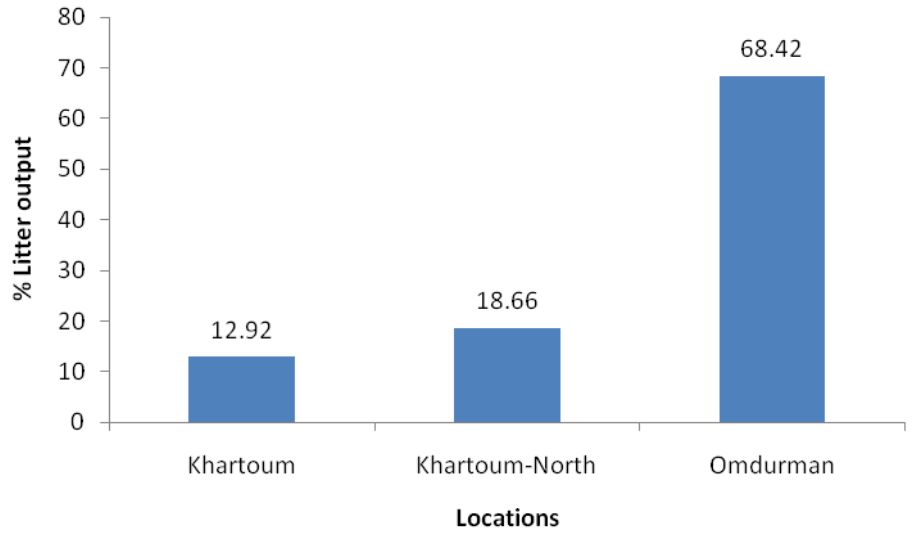

Figure 1 - Proportion of poultry litter produced from Khartoum state

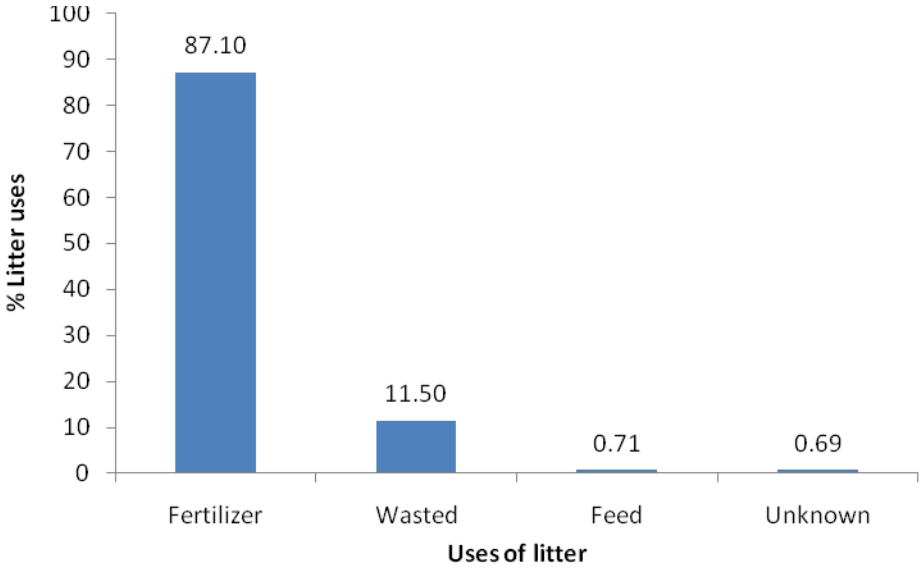

Figure 2 - The use of poultry litter in Khartoum state

DISCUSSION

The crude protein (CP) contents of broiler litter as reported in this study were 26.38, 27.45 and 26.35% for Khartoum-North, Khartoum and Omdurman respectively. Various authors have reported various values of CP for poultry litter. Adegbola et al. (1990) reported 16.5% CP for the value of layer litter. Ensimnger, (1977); Devendra and Rooghavan, (1978); Lamidi, (1995) all reported approximately 25% CP for poultry litter. However, these results were lower than the findings of Saleh et al. (2003) who compared the nutritive contents of poultry litter from three locations in Egypt and obtained crude protein scores of 19.4, 20.2 and 23%, respectively. The metaboilzable energy of the litter was lower than that obtains in most conventional feedstuffs. This is probably because of the high ash content of the litter Lowman and Knight, (1971); Ruffin and McCaskey, (1991) resulting from the use of sawdust as bedding material. The ash content provides important information about the quality of poultry litter. This is because it measures the mineral content of the litter. Ash is normally high in poultry litter because of the wood shavings or sawdust. In this study, the ash content of the litter was 17.62, 20.93 and 19.78% for Khartoum-North, Khartoum and Omdurman respectively. Ash samples between 15-25 percent are acceptable (Ruffin and McCaskey, 1991). This finding is in line with their recommendation and they further observed that high ash content (above 28 percent) will result in poor consumption in cattle and subsequent poor animal performance. With respect to the dry matter content, the study observed a DM content of 87.67, 86.81 and 87.09% for Khartoum-North, Khartoum and Omdurman respectively. From earlier reports Ruffin and McCaskey (1991); Burdine et al. (1993); Bagley et al. (1994), concluded that moisture in the litter should be between 12 and 25%.

To cite this paper: Elemam M.B, Fadelelseed A.M, Abdelhadi O.M.A, Idris A.O, Bushara I, Salih A.M. 2012. Survey of production and use of poultry litter in Khartoum state, Sudan. *Online J. Anim. Feed Res.*, 2(1): 23-26.
Scienceline/Journal homepages: http://www.science-line.com/index/; http://www.ojafr.ir

REFERENCES

Adegbola AA, Smith OB and Okendo NJ (1990). Response of West African dwarf sheep fed cassava peel and poultry manure based diet. Proceedings of the 1 joint workshop, Lilongwe-Malawi, 16-19 December, pasture Network for Eastern and Southern African (PANESA) and African Res. Network for Agric. By-products (ARNAB).

AOAC (1990). Official Methods of Analysis. Association of Official Analytical Chemistry (15thEd), Washington, D.C., U.S.A.

Bagley CP, Burdine WB and Evans RR (1994). Intake and performance of beef heifers fed broiler litter and soyabean hull supplements. Journal of Animal Science. 77: 381-387.

Burdine WP, Bagley CP and Evans RR (1993). Weanling Heifer performance on chicken Litter supplements. Livestock Day Report. MAFES Bulletin, 243: 24.

Devendra C and Rooghavan CV (1978). Agricultural by-products in East Asia: Availability, utilization and potential value. World Review of Animal Production, 14: 11-27.

Elemam MB (2011). Use of deep stacked poultry litter in sheep rations. Ph.D thesis, Department of Animal Nutrition, University of Khartoum, Sudan.

Elemam MB, Fadelelseed AM and Salih AM (2009a). Growth performance, digestibility, nitrogen balance and rumen fermentation of lambs fed different levels of deep-stack broiler litter. Research Journal of Animal and Veterinary Sciences, 4: 9-16.

Elemam MB, Fadelelseed AM and Salih AM (2009b). Blood parameters of lambs fed graded levels of deep stack broiler litter. Online Journal of Veterinary Research,13(2): 93-104.

Elemam MB, Fadelelseed AM and Salih AM (2010). The effect of deep stacking broiler litter on chemical composition and pathogenic organisms. Livestock Research for Rural Development. 22(4): http://www.lrrd.org/lrrd22/4/elem22065.htm

Ensimnger ME (1977). Animal science. 7 ed. The Interstate printers and publishers, Pp: 860-871.

Lamidi OS (1995). Poultry Manure as Supplement for Cattle Grazing the Natural Pastures. M.Sc thesis, Department of Anim. Sci., Ahmadu Bello University, Zaria-Nigeria.

Lowman BG and Knight OW (1971). A note on apparent digestibility of energy and protein from dried poultry waste. Animal Production, 12: 525-528.

Malone GW (1992). Nutrient enrichment in integrated broiler production systems. Poultry Science, 71: 1117–1122.

Ruffin BG and McCaskey TA (1991). Feeding broiler litter to beef cattle. Alabama Cooperative Extension Service Circular. ANR-557.

Saleh HM, Elwan KM, El-fouly HA, Ibrahim II Salama AM and Elashry MA (2003). The use of poultry waste as a dietary supplement for ruminants. Egyptian Journal of Nutrition and Feeds, 3: 1-8.

SAS (1994). Statistical Analytical Systems, Users guide (Version 6), SAS Institute Inc., Cary, North Carolina, USA.