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POULTRY WASTES AS FEED FOR RUMINANTS: I EFFECTS OF HEAT TREATMENTS ON THE NITROGEN CONTENT AND MICROFLORA OF CAGED LAYER DROPPINGS

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Effects of different heat treatments on the nitrogen content and microflora population of caged layer droppings were investigated. Application of heat in the form of steaming or autoclaving had little or no effect on the total and uric acid nitrogen content of caged layer droppings. Air-drying alone resulted in the production of material that still contained some micro-organisms, but steaming or autoclaving destroyed all micro-organisms present in the manure.

Key words: poultry wastes, heat treatment, pathogogens

A total of 36 samples of accumulated poultry manure were taken from three caged layer houses, using a 3.5 cm diameter steel pipe. All collections were bulked and sub-sampled for determination of total nitrogen (AOAC 1970) and uric acid nitrogen (Buys & Potgieter 1959). Microbiological tests were carried out using the fresh samples and using a modification of the procedure outlined by Alexander et al (1968). A 10 g sample was suspended in 100 ml of phosphate - buffered saline at pH 7.2 in a stoppered 250 ml Erlenmeyer flask and agitated for 30 minutes. Different dilutions of the supernatant were prepared and used as inoculum on different culture media (6.5 ml 4% boric acid solution in 250 ml sheep blood agar), MacConkey agar (Difco)[2], and Selenite-F broth (Difco)[1]. All inoculated media were incubated at 37°C and inspected for growth for six days.

The remaining fresh manure was sub-divided and either air-dried(force draught oven at 65°C for 3 days) (DPD), steamed (wrapped in tin foil and steamed for one hour) (SDP) or autoclaved (1.06 kg/cm^2 at 121°C for 30 mins) (ADP). All the heat-treated samples were similarly subjected to micro-biological examinations.

The results of the trial are shown in the Table.

Nitrogen content and microbiological examinations of untreated and heat treated poultry droppings

Criteria	Treatment			
	Untreated	DPD	SPD	APD
Total - N (% DM basis)	5.09	4.97	5.04	5.08
Uric acid - N (mg/g)	21.4	21.1	21.3	21.4
Uric acid - N as % of total N	42.0	42.5	42.3	42.1
Microbiological studies:				
Sheep blood agar	++	+	-	-
MacConkey agar	++	+	-	-
Selenite - F broth	-	-	-	-

++ = many growth colonies; + = few growth colonies; - = no growth colonies

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Results and Discussion

Application of heat(drying, steaming or autoclaving) had little or no effect on the total or uric acid nitrogen contents. The observed slight decrease in total nitrogen content as a result of heat treatment could be due to volatilization of ammonia during the application of heat.

A large number of bacterial colonies and mould were observed in the media inoculated with the air-dried droppings (DPD), indicating that dry - ing alone at low temperatures for a few days might be sufficient for total destruction of all the micro-organisms present in poultry droppings. This observation is in agreement with the findings of Alexander et al (1968) that storage of manure for more than a month could destroy certain species of bacteria. There were no bacteria or mould colonies observed in the steamed (SPD) and autoclaved (APD) poultry droppings. These heat treat - ments were sufficient in destroying all micro-organisms present in the man ure.

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