



INFLUENCE OF WHOLE POULTRY CARCASS MEAL ON CERTAIN GROWTH PARAMETERS OF CHILLI PLANTS

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In order to mitigate the environmental pollution and disposal of dead poultry birds environment friendly methods and to reduce the indiscriminate usage of inorganic fertilizer the cost of fertilizer and increase the usage level of organic manure to inorganic manure for the agricultural purpose, this study was conducted with aim to manage study whole poultry carcass based meal on the growth parameter of chilli crops, as organic fertilizers on growth, yield and quality of green Chilli. The dead birds were collected from poultry farm and the carcass meal was prepared by dry rendering process. The prepared carcass meal (25%, 50%, 75%, 100% and 125%) was applied as a fertilizer along with farm yard manure and inorganic manure in different proportion to chilli crop. The height of the chilli plant at 30 and 60 days after planting were recorded. As a result, with the incorporation of carcass meal the height of the plant was increased compared to inorganic fertilizer applied. The increase in plant height was found in 100% (T5) and 125% (T6) of carcass meal application was comparable with other doses of carcass meal and recorded significantly taller plant with higher yield.

Key words: Whole Poultry Carcass meal, Rendering, chilli crop, Plant height.

A rampant application of inorganic fertilizers in agriculture has deteriorated the soil quality apart from the environmental degradation. The improper disposal of dead poultry birds leads to poses great threat to environment and spread of diseases and pollution of water sources. Organic fertilizers are organic materials which are more environment friendly compared to chemical fertilizers. In order to qualify as an organic fertilizer, the materials must naturally occur in nature. Usually, organic fertilizer is typically made of single ingredients. Thus, the types of organic fertilizers are derived from plant, animal, or mineral sources. The organic fertilizers may supply nutrients to soil but, differences type of source of fertilizer can give some different effect on plant. Organic farming provides several benefits to the growers. It reduces production cost and it is an environmentally friendly method of cultivation (Sparky by, 2006). Addition of organic fertilizers improves soil structure and enhances activities of useful soil organisms. In recent times, consumers are demanding higher quality and safer food and highly interested in organic products (Howard *et al.*, 1994). Agricultural commodities resulted from organic cultivation are good for human health (Vimala *et al.*, 2008). In developing countries like India the major problems faced by the large scale poultry farmers were the disposal of dead birds. The improper disposal of dead birds causes environmental pollution

(Mullens *et al.*, 2002). Hence a proper disposal of dead birds is by rendering was recommended to the farmers. About 700 layer poultry farms are there in Namakkal zone alone, the chick and grower is about 1 crore and layer population is about 3 crore. The bird's mortality is mainly attributed to infectious and nutritious diseases. Daily mortalities are common irrespective of age groups mortality is about 0.4 per cent. Hence about 1.20 lakh dead poultry birds are available for disposal per month. The mortality in chicks and grower is about 6 per cent up to 20 weeks. Out of total mortality a large number dead birds were unused (90.91%) while the rest were utilized for manure and animal feed supplements. In order to utilize the dead poultry carcass after processing in an efficient manner and mainly to reduce the environmental degradation it can be used as an organic manure for agricultural purposes.

Chilli plants response well to inorganic fertilizers in terms of early vegetative growth but it decreased at later stage. Farmers nowadays keep on applying inorganic fertilizer for their crop as it can provide rapid nutrition but it will increase cost of production (Nakhro *et al.*, 2010). Inorganic fertilizer is made up from synthetic materials, when excess of application, the soil will become toxic. Thus, this study intends to provide an alternative method by using carcass meal as organic treatment

for enhancing growth, yield and quality of chilli crop.

MATERIALS AND METHODS

Experimental site: Field experiments were conducted in the agriculture field of Livestock Farm Complex (LFC), Veterinary College and Research institute, Namakkal during Oct.-Nov. 2014. The farm is located in the Western agro climatic zone of Tamil Nadu at 11.2° N latitude, 77.2° E longitude and at an altitude of 401 M above mean sea level. The average rainfall is rainfall was 764 mm.

Preparation of poultry carcass meal: The dead poultry birds would be collected from various poultry farms. After collection of dead poultry birds, hygienic processing and utilization of dead carcass involves rendering. Dry rendering cooker is a horizontal steam jacketed cylinder equipped with a set of agitators which keep the charge in continuous motion. The steam is applied into the jacket only and not to the materials to be processed. In this process all the unwanted moisture is eliminated without the loss of any nutrients. The dry rendering process yields 20% higher than the wet rendering. The capacity of dry melter is 800 lit i.e. loading capacities are 500 kg at a time. It is a batch process and the material is first cooked at 100°C for 20 min, sterilized at 140°C (45 psi) for 20 min and then dried at 100°C for one hour. The average yield of finished product- carcass meal is about 30-40% and of technical fat is about 3-4 %.

The whole carcass poultry meal was obtained by batch dry rendering the dead poultry birds. Nutrient and heavy metal analysis of carcass meal was carried out in the Department of Environmental Sciences, Tamil Nadu Agricultural University, Coimbatore and Animal feed Analytical and Quality Assurance Laboratory, Namakkal. Based on the nutritive value, whole carcass meal incorporated at different levels replacing other inorganic fertilizer to horticultural as a source of fertilizer from animal sources. Further, as animal protein sources, it is expected that one would compensate the other better. The

inclusion of carcass meal as fertilizer for horticultural crops would be highly useful both poultry and horticultural farmers by reducing the cost of disposal and moreover the cost of fertilizer and reduce the environmental degradation.

Experimental Design:

The experiments were laid out in a Randomized Complete Block Design with three replications. The experiments consisted of six treatments involving five doses of carcass and recommended in organic fertilizer as a control treatment.

About 250 g / ha seed of Namathari was sown in nursery bed during September. Before sowing, the seeds were treated with *Trichoderma viride* @ 4 g / kg and the field was prepared thoroughly. Ridges and furrows were formed at a spacing of 75 cm. The field was irrigated and 45 days old seedlings were transplanted at 60 cm distance on the ridges. Irrigation was given at weekly intervals after establishment of the seedlings. Need based plant protection measures were taken up against pest and diseases.

As per the treatment, the fertilizer doses were calculated and applied as basal and top dressing. The control plot was applied with recommended FYM and recommended dose of inorganic fertilizer. Details of fertilizer application are furnished in Table 2.

For each crop within the net plot area, five plants were selected at random, tagged and subsequently used for recording all biometric observations. Biometric observations were recorded at 60 and 90 Days after planting and at harvest stages of crop growth. The vigor and growth of the crop were measured in terms of plant height. The representative plants were selected in each plot and height measurements recorded from the ground level to the third visible leaf of the plant (Dauda *et al.*, 2005).

RESULTS AND DISCUSSION

Plant height for each treatment on 30 and 60 days after planting

Table 1: Treatment Details

T1 -	Recommended FYM + recommended dose of inorganic fertilizer as control
T2 -	Recommended FYM + 25 % Carcass meal + 75 % Inorganic fertilizer
T3 -	Recommended FYM + 50 % Carcass meal + 50 % Inorganic fertilizer
T4 -	Recommended FYM + 75 % Carcass meal + 25 % Inorganic fertilizer
T5 -	Recommended FYM + 100 % Carcass meal
T6 -	Recommended FYM + 125 % Carcass meal

Table 2: Fertilizer application details for chilli

R1	R2	R3
T2	T6	T2
Carcass meal -2368 g Urea- 117 g Super phosphate -592 g Potash -160 g	Carcass meal - 11840 g Urea- nil Super phosphate -592 g Potash -160 g	Carcass meal -2368 g Urea- 117 g Super phosphate -592 g Potash -160 g
T4	T5	T3
Carcass meal - 7104 g Urea- 39.1 g Super phosphate -592 g Potash -160 g	Carcass meal - 9472 g Urea- nil Super phosphate -592 g Potash -160g	Carcass meal - 4736g Urea- 78.0g Super phosphate -592 g Potash -160 g
T1	T2	T1
Carcass meal - nil Urea- 156 g Super phosphate -592 g Potash -160 g	Carcass meal -2368 g Urea- 117 g Super phosphate -592 g Potash -160 g	Carcass meal - nil Urea- 156 g Super phosphate -592 g Potash -160 g
T6	T1	T6
Carcass meal - 11840 g Urea- nil Super phosphate -592 g Potash -160 g	Carcass meal - nil Urea- 156 g Super phosphate -592 g Potash -160 g	Carcass meal - 11840g Urea- nil Super phosphate -592 g Potash -160 g
T3	T4	T5
Carcass meal - 4736g Urea- 78.0 g Super phosphate -592 g Potash -160 g	Carcass meal - 7104 g Urea- 39.1 g Super phosphate -592 g Potash -160 g	Carcass meal - 9472 g Urea- nil Super phosphate -592 g Potash -160g
T5	T3	T4
Carcass meal - 9472 g Urea- nil Super phosphate -592 g Potash -160g	Carcass meal - 4736 g Urea- 78.0 g Super phosphate -592 g Potash -160 g	Carcass meal - 7104 g Urea- 39.1 g Super phosphate -592 g Potash -160 g

Design: RBD; Replication: 3; plot size: 5 x 4 m

Table 3: Effect of different doses of carcass meal on plant height of Chilli

Treatment	Plant height (cm)	
	30 DAP (Day after planting)	60 DAP (Day after planting)
T1- Recom. FYM + 100% inorganic fertilizer as control	47.84	96.9
T2- Recom. FYM + 25 % Carcass meal + 75 % Inorganic fertilizer	48.67	97.8
T3- Recom. FYM + 50 % Carcass meal + 50 % Inorganic fertilizer	49.60	98.8
T4- Recom. FYM + 75 % Carcass meal + 25 % Inorganic fertilizer	53.94	101.1
T5- Recom. FYM + 100 % Carcass meal	55.28	101.4
T6- Recom. FYM + 125 % Carcass meal	56.63	101.8
S.Ed	0.342	0.686
C.D (0.05)	0.761	1.528

was recorded and the data presented in Table 3. During the crop growth, carcass meal application significantly influenced the plant height at day 30 and 60 days. During 30 days after planting the maximum height of 56.63 cm was recorded in T6. During 60 days after planting the highest plant height of

101 cm was recorded with recommended FYM + 125 % Carcass meal (T6), recommended FYM + 100 % Carcass meal (T5) and recommended FYM + 75 % Carcass meal + 25 % Inorganic fertilizer (T4) and it was comparable with that of the highest dose of carcass meal application. Lower doses

of carcass meal (T2 and T3) and control treatment recorded significantly lower plant height. This shows that application of organic fertilizers help to improve growth of chilli plant. Natesh *et al.* (2010) state the organic fertilizer influenced significantly the growth parameter. This might be due to the improvement in soil physical condition for the plant growth along with increased availability of N, P and K at the early stage of crop growth (Patil *et al.*, 2004). Nitrogen, phosphorus and potassium contained in organic fertilizer have great effects in plant growth and development. Plant need high concentration of this primary nutrient as any deficiency of these essential nutrients will prevent good plant growth (Gholizadeh *et al.*, 2009). Thus, sufficient nitrogen, phosphorus and potassium supplied by organic fertilizer help in producing sturdy and taller chilli plant.

CONCLUSION

Carcass meal at 100% and 125% concentration dose shown highest result for plant height on 30 and 60 days after planting compared to chemical fertilizer and control plots. Effective results were obtained after application of carcass meal as compared to chemical fertilizer in the field. Maximum difference can be observed in control and carcass meal plot which indicates not only soil fertility, the rate of productivity has also enhanced with the use of carcass meal. Thus, 100% carcass meal is beneficial for plant growth as well as it will be useful economically. Organic fertilizer when applied at appropriate dose acts as growth promoter for the crop.

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