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STUDIES ON EFFECT OF COW DUNG ASH IN AQUEOUS MEDIUM AS FOLIAR SPRAY ON *Zea mays* (POACEAE)

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ABSTRACT
Present work deals with study on effect of cow dung ash in aqueous medium as foliar spray on commercial crop and experimental crop plant *Zea mays* (Poaceae). We discovered that using cow dung ash as a foliar spray in an aqueous medium improves plant development. In comparison to 1% to 3% and 6% to 10%, the 4% and 5% cow dung ash sprouts are more successful, exhibiting robust development, dark green colored leaves, and pest-free healthy plants. Cow dung ash sprouts between 1% and 3% demonstrate a steady rise in plant height and color. While 6% to 10% of the ash from cow manure is less effective or withering.

INTRODUCTION

Since ancient times, cow dung has been utilized in India for a variety of direct and indirect human functions, including medicine, manure, ground covering, and finishing techniques. Traditional compost is created in rural India using cow dung that has completely or partially decomposed, leftover food and feed, and ash from a traditional heater or stove. Thus, the ash from cow dung is added to the land either directly or indirectly as manure. There is a danger that the manure will be lost from the soil, decreasing its effectiveness. You can apply 1 kg ash to 1 acre via spray. However, applying the same amount of fertilizer directly to the soil, or even less, is quite challenging. The foliar spray generated from cow dung ash can be extremely helpful in overcoming this because it functions as both an insecticide and a fertilizer. According to Arslan *et al.* (2008) and Vakili *et al.* (2015), cow dung ash is rich in at least 16 elements as in oxide and phosphate form. Calcium, Phosphorus, Silicon, Potassium and Magnesium are the chief or major fraction of cow dung ash along with many trace element like boron, zinc, iron, Sulfur and many more (Szymajda *et al.*,2020; Randhawa and Kullar 2011). The percentage and presence of elements varies with diet of cattle but above elements are common in cow dung ash. Cow dung is rich in mineral and undigested cellulose fibers. The paper deals with use of cow dung ash as foliar spray in aqueous medium, and evaluated its nutritional and pesticidal effect.

MATERIALS AND METHODS

The experiment was conducted during the year of 2022 at Sagav, Tehsil: Battis Shirala, District: Sangali.

Plant material

Zea mays was chosen as an experimental plant because of it is fast growing C4 plant, can complete life cycle in less than 4 months (hybrid var.). This plant possesses amphistomatic leaves. This will helpful for effective accumulation of minerals from spray.

Solution / suspension preparation

The fully burned cow dung ash was crushed and sieved through fine pore sieve. Fine ash powder was stored in air tight polythene bags and was kept away from moisture (Sharma *et al.*, 2017). The solutions were freshly prepared with concentrations of 1, 2, 3, 4, and 5 percent (W/V) by dissolving the fine ash in 100 ml distilled water. Solution has pH is in between 9 to 10.

Experimental design

The treatments were done following the methodology of Aziz *et al.* (2019) with some modifications. *Zea mays* plants in six rows of five plants each were chosen for the study; the first row is the control or untreated row, and the next five rows are sequentially treated with aqueous ash solutions of concentration gradients ranging from 1 to 5 percent. The first dose was given to the crop when it was 15 days old, and it was repeated every 8 days after that. Plant height, leaf number,

leaf width, and leaf color change are all noted simultaneously.

RESULTS AND DISCUSSION

Results are as shown in the table 1 showing Effect of Cow Dung Ash spray on Plant height and Leaf Color of *Zea mays*, below. The increasing concentration of cow dung ash in aqueous solution shows positive effect on improvement in plant growth over time of period. Qualitative improvement including color of plant and pest free plants can also be observed.

The effective use of dung would contribute to increase energy security and reduce environmental degradation and greenhouse gases (Raj *et al.,*2014). As cow dung ash has oxides which turns in to hydroxide after hydration and become weak alkali or base. Due to slight or weak base nature of ash, pH and soil flora will be affected but soil become rich in mineral and become more prolific but many of the minerals from ash gate converted in to insoluble form when ash is mixed with soil or prolonged expose to air, light and moister. Quoc *et al.* (2018) showed that more P was extracted with 2% citric acid (90% of the total P) than with 2% formic acid (72–84% of the total P). Most of the cow dung ash is almost oxides of several metal and few nonmetal elements like Ca, Si, Al, Mg, K, Fe. As well as most of them soluble in water and form base while some remain in the form of suspension. It is difficult to say all will gate accumulate in plant but we found plant growth enhancement by their application as foliar spray. The plants treated are also sowing healthy and pest free leaves it may indicate foliar ash spray have some insect-repellant properties. Nutritional value of cow dung ash is as sources of several minerals but in addition it plays some additional roles. The plants treated are also sowing healthy and pest free leaves it may indicate foliar ash spray have some insecto-repellant properties. Similar results were obtained by Sharma and Singh (2015). The probable mechanism behind this is that, aqueous solution of cow dung ash has basic pH, it will resist herbivory by the leaf surface environment alteration. Most of the insect shows pinocytism or external digestion these can be effectively controlled by foliar application cow dung ash in limited concentration. Tesema *et al.* (2015) tested locally available treatments (cow dung ash, leaf powder of neem and leafpowder of basil) and were found to be effective in reducing the damage inflicted by bruchidcompared to the control. Similar results were found by Narayan Swamy *et al.* (2019) showing cow dung ash powder at 2 percent leads to 89.33 percent germination and did not differ significantly. The results obtained in this simple experiment shows aqueous solution of cow dung ash in limited concentration can substituted as spray fertilizer. As compared with direct filed application of ash (in any form compost or pure ash) comparatively very less amount is required for foliar application by aqueous solution spray; this is most important remarkable advantage over direct use of it.

Table1: Effect of Cow Dung Ash spray on Plant height and Leaf Color of *Zea mays*

Character	Concentration of Cow Dung Ash in spray																									
	Control					1%					2%					3%					4%					5%				
	W1	W2	W3	W4	W5	W1	W2	W3	W4	W5	W1	W2	W3	W4	W5	W1	W2	W3	W4	W5	W1	W2	W3	W4	W5	W1	W2	W3	W4	W5
Plant Height (cm)	36.3	43	78.6	138	158.6	38.1	55.6	80.3	151.2	195.8	38.6	57	85.7	157.4	202.9	45.2	98.3	139.9	178	219.6	58.7	165.4	197.9	209.3	231.1	57.6	170.2	205.7	240.1	219.9
Leaf Color	PG	PG	LG	G	G	PG	LG	LG	G	G	PG	PG	LG	G	G	PG	PG	LG	G	G	PG	PG	LG	G	G	PG	PG	LG	G	G

W_ = Week, PG = Pale Green, LG = Light Green, G = Green

Adegunloye, D.V., Adetuyi, F.C., Akinyosoye, F.A., Doyeni, M.O. Microbial analysis of compost using cow dung as booster. *Pak. J. Nutr.* 2007.**6(5):**506–510.

Adegunloye, D.V., Adetuyi, F.C., Akinyosoye, F.A., Doyeni, M.O. Microbial analysis of compost using cow dung as booster. *Pak. J. Nutr.* 2007.**6(5):**506–510.

Arslan, E.I., Öbek, E., Kirba, S., Pek, U and Topal, M. 2008 Determination of the effect of compost on soil microorganisms. *Int J Sci Technol.* **3:**151–159.

Aziz, M., Yaseen, M. and Abbas, T. 2019. Foliar application ofmicronutrients enhances crop stand, yield and the biofortifi-cation essential for human health of different wheat cultivars.*J integr agric* **18:** 1369-1378.

Shivkumar, G. 2012. Studies on Silica obtained from cow dung Ash. Advanced material Research. **584:** 470-473.

Kebebush Tessema., Henok Kurabachew and Tadesse Fikre Teferra 2015. Evaluation of the Efficacy of Plant Powders, Cow Dung Ash and Malathion Dust against Callosobruchus Chinensis L. (Coleoptera: Bruchidae) On Chickpea in Jole Andegna: Southern Ethiopia. March 2015 *J. Agricultural Studies.* **3(2):**129

Narayana Swamy, K., Hanumanthaswamy, B., Shivanna, B.K and Manjunatha, M. 2019. Efficacy of botanicals and animal origin bio products against lesser grain borer Rhyzopertha dominica (Fab.) in stored maize. *J. Pharmacognosy and Phytochemistry*. **8(1):** 2386-2390

Quoc Thinh Tran., Morihiro Maeda., Kazuyuki Oshita., Masaki Takaoka and Kuniyuki Saito. 2018. Phosphorus and potassium availability from cattle manure ash in relation to their extractability and grass tetany hazard, *Soil Science and Plant Nutrition*. **64:** 3, 415-422.

Raj, A., Jhariya, M. and Toppo, P. 2014. Cow Dung For Ecofriendly and sustainable Productive Farming. *International J. Scientific Research*. **3(10):**201-202.

Randhawa, G.K and Kullar, J.S. 2011 Bioremediation of pharmaceuticals, pesticides, and petrochemicals with gomeya/cow dung. ISRN Pharmacol.

Sharma, B., Singh, M. Isolation and characterization of bacteria from cow dung of desi cow breed on different morpho-biochemical parameters in Dehradun, Uttarakhand, India. *Int. J. Adv. Pharm. Biol. Chem.* 2015.**4:**276–281.

Sharma, P., Panchal, V. and Patel, B. 2017. To Analyze the Effectiveness of Cow Dung Ash As Natural Adsorbent For Tertiary Wastewater Treatment. *International J. Engineering Sciences and Research*. **6(4):**

Szymajda, A., G. Laska and M. Majewaski. 2020. Characteristics of Ashes from the combustion of cow Dung Biomass. *Proceedings*. **51:** 14.

Vakili,M., Zwain, H., Rafatullah, M., Gholami, Z and Mohammadpour R. 2015. Potentiality of palm oil biomass with cow dung for compost production. *KSCE J Civil Eng.* **19:**1994–1999.