

Cow Urine: A Potential Benefits and Uses in Agriculture

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Abstract: *A cow has high socio-cultural values, plays significant role in rural Economy, represent cattle wealth and bio-diversity. Cow urine is the most effective substance of animal origin with innumerable therapeutic values. Various kinds of pathogens such as bacteria, fungi, viruses, nematodes, and Mycoplasma causing diseases remain a major threat to public health. Despite tremendous progress in human medicine. Many researches have been done and have shown cow urine use for treatment of skin diseases, stomach diseases, diabetes, etc. It is also useful in agriculture for preparation of vermicompost, bio-fertilizers and bio pesticides. It plays a significant role in production of vegetables and control of plant diseases. Researches on cow urine are summarized in this article. However, more well-planned researches are required to prove its qualities and benefits in Agricultural production as well as medicinal importance in Botswana. Public awareness is also required to share knowledge and promote the importance and wide applications of cow urine.*

Keywords: Cow urine, Bio-pesticide, bio-fertilizer, growth and soil fertility

I. INTRODUCTION

The exploitative agriculture for centuries in our country has brought down the fertility status of the soil to a level that even the application of fertilizers at higher rates is unable to sustain the productivity of soil. Intensive use of chemicals gives an immediate effect on crop production for small duration but creates long term ill effects on both ecosystem and soil health leads to environmental problems and increased production costs. So it was renewed by the use of organic manures which not only helps to sustain the productivity of soil.

Livestock is the oldest resource for mankind. With small holdings and small scale farming, there is no other better alternative than involving cattle in farming system. The abundant quantity of cattle excreta consisting of dung and urine is available at farm level. Though part of cattle dung is used as manure after decomposition but cow urine usually drains out as waste material from farmer household. Cow urine is a unique product with multiple uses. It has many beneficial properties particularly in the area of agriculture. Cattle urine has a good manurial value and can be utilized as a bio fertilizer (Ledgard et al., 1982). It has a rich source of macronutrients, micronutrients, disinfectants and prophylactic properties thus purify the atmosphere and improve soil fertility. In organic farming, cow urine is used for preparation of number of bio-enhancers and bio-pesticides, which are effective in improving soil fertility, quick decomposition of organic wastes and management of large number of pests and diseases in varied group. It can be sprayed at critical growth stage of crop to overcome the problem of the slow release nutrients of organic sources affecting crop growth. It also make a possibility elective to fertigation which is becoming common in most of the crops (Verma et al., 2017).

II. USES OF COW URINE IN AGRICULTURE:

In different research and studies conducted in India, it has been found out that cow urine play a significant role in production of vegetables and control of diseases. Cow urine is reported as a growth enhancer of plants and widely used as a bio fertilizer for different crop plants. Foliar application of cow urine is considered to be the best way of supplying nutrients. Cow urine uses is proved to enhance the resistance of plants against a wide range of plant pathogens like mycoplasma, viruses, bacteria, fungi, nematodes and insects causing diseases and damages to cultivated plants. The Nurturing effect of these products on useful soil bacteria enhances their activity resulting in better growth of plants and higher crop yield. Urine has applications in gardening and agriculture as a fertilizer.



III. COMPOSITION OF COW URINE

Cow urine contents are water 95%, urea 2.5%, minerals, salt, hormones and enzymes 2.5%. It contains iron, calcium, phosphorus, potassium, urea, uric acid, amino acids, enzymes, cytokines and lactose etc. Cow urine is an aqueous solution of nitrogenous and sulphurous compounds, minerals, and other minor components. Concentrations of carbon in cow urine are low, and measurements of $3.1\text{--}20.4\text{ g C L}^{-1}$ (mean = 9.9) have been made. The pH of ruminant urine is usually between 8.4 and 8.6 but may be as low as 7.2.

IV. EFFECTS OF PLANTS GROWTH AND YIELD

Cow urine could be a potent source to improve soil fertility, crop productivity and quality. This can also be a potential alternative for fertigation which is becoming common in most of the crops. Application of 125 kg N per ha through urine significantly increased vegetative characters and application of 100 kg N per ha through urine significantly increased yield and quality characters, fifty percent substitution of urea by urine produced better morphological, yield and quality character than other combinations of urine and urea. A study was conducted on the effect of two foliar sprays of different concentrations of cow urine (2%, 4%, 6%) at 25 and 40 days after sowing on soybean. Results showed that concentrations of 6% were more effective in enhancing the morpho-physiological, chemical, biochemical and yield and yield contributing parameters when compared with control. Application of cow urine on chickpea at the rate of 10% at flowering initiation and 15 days after flowering recorded higher plant height (35.78 cm), number of branches (4.82), leaf area index (1.30), number of pod plant⁻¹ (60.86), and grain yield (2114 kg ha^{-1}) as compared to control. Enhance flower production in bush jasmine, using cow urine in various concentrations at monthly intervals. The grain and stover yield of maize varied significantly under different levels of panchagavya spray and cow urine levels. Maximum grain yield of 18.6 q ha^{-1} and 17.6 q ha^{-1} were recorded with application of cow urine and panchagavya respectively. Application of nitrogen @ 90 kg ha^{-1} with 60 kg ha^{-1} potassium and phosphorus + cow urine was found to be the best treatment regarding growth, yield and nitrogen content of paddy. Different sources of urine applied to the soil as fertilizer improved soil nutrient status and agronomic yield parameters of maize (Nwite, 2015).



Figure 1: Efficacy of Cow Urine as Plant Growth Enhancer

V. EFFECTS ON NUTRIENT CONTENT AND UPTAKE

The nutritional effect of cow urine on *Trigonella foenum-graecum* and *Abelmoschus esculentus* (Bhendi) plants shows increased chlorophyll and protein content with increased concentration of urine as compared to control. Urine

increased the N concentration Of grass and increased the potassium concentration of grass and clover. The highest value of N, P and K uptake and its content on mustard recorded with combine application of 100% recommended dose of fertilizer with 1200 lha⁻¹Cow urine as basal and foliar Spray of 50% Urine.

VI. EFFECT ON SOIL PHYSICAL AND CHEMICAL PROPERTIES

Cow urine application has also reported to improve the soil texture and structure. High dose of liquid cow manure application resulted in increased pH and EC values, nutrients and dissolved organic carbon content of amended soils. Application of FYM 12.5 t ha⁻¹+cattle Urine at 34300 l ha⁻¹significantly increase soil organic carbon (0.58%), available nitrogen (272.4 kg ha⁻¹), phosphorus (23.5 Kg ha⁻¹) and potassium (199.9 kg ha⁻¹). Significantly higher total nitrogen, available phosphorus and Exchangeable Ca and Mg in soil are recorded with different sources of urine application compared with the control. Although, there were not significant differences among the treatments in pH, organic carbon, exchangeable K and Na, the values for these parameters are higher than the control ones.

VII. EFFECT ON SOIL MICROBIAL POPULATION

Compost tea (cowdung+cowurine+water) contains high amounts of microbes which have complementary effect on the Native microbes and also favour decomposition of organic matter at a faster rate which, result in better transformation of nutrients and their availability to crops showed that after regular use of cow urine in the crops. Farmers of vadodara found that soil microorganism population increased along with the crop yield. They concluded that cow urine worked as growth promoters. There was no occurrence of any insect pest and diseases. Incorporation of increasing dose of LCM (liquid cow manure) Resulted in increased respiration activity, C-CO₂ evolution and Soil enzymatic activities of amended soils . significantly higher soil microbial population viz., Bacteria (47.0 × 10⁵ cfu/g), fungi (34.6×10⁴ cfu/g) and Actinomycetes (40.0×10³cfu/g) were obtained with the application of FYM 12.5 t ha⁻¹+cattle urine at 34300 l ha⁻¹ as compared to control(Veereshaet al.,2014).

VIII. CONCLUSION

For sustainable agriculture we need to follow organic methods in agriculture from the above discussion, it can be concluded that cow urine could be potent source to improve soil fertility, crop productivity and quality. For organic agriculture, nutrition management without fertilizer is a challenge. Combined with manures and fertilizer frequent use of cow urine can address many challenges of agriculture and will be pave way for sustainable agriculture. Future research focus on the interaction of other permitted inputs in organic farming with cow urine to enable integrating of cow urine for enhanced crop productivity and profitability.

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