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Cow Urine: - A Blessed Gift of God to Agriculture

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Introduction

During the last two decades, there has been a significant sensitization of the global community to look into environmental conservation and safe food. Organic Agriculture (OA) is now becoming the main stream all over the world. The indiscriminate use of agrochemicals since green revolution resulted in adverse effect on the soil fertility, crop productivity, quality of produce and more, specifically on the environmental system. The current scenario under such situations firmly emphasizes the need to adopt eco-friendly agricultural practices for food production by considering the sustainability of soil and environment. The use of cow urine can be considered as a low cost agricultural practice or low cost farming for farming

communities and has been extensively used in traditional agriculture in India for medicinal and agricultural purposes since *Vedic* period.

Among different organic sources, cow urine is good source of nitrogen, besides, it contains Sulphur, phosphate, potassium, sodium, manganese, carbolic acid, iron, silicon, chlorine, salt,

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enzyme and hormones. It strengthens the fact that cow's urine is not a toxic effluent as 95% of its content being water, 2.5% urea and the remaining 2.5% a mixture of minerals, salts, hormones and enzymes. In organic farming, cow urine is used for preparation of number of growth promoter and bio-pesticides, which are effective in improving soil fertility, and management of large number of pests and diseases in varied group. The biochemical content of the plants increased with cow urine application. Therefore, the use of cow urine provides better alternative to synthetic chemicals which are expensive and pose potential danger to the farmers, marketers, consumers, and environment. It is a natural disinfectant and pest repellent and forms the main component of *Panchagavya*, an organic crop booster, prepared and sprayed by Indian farmers. As products of ecological sanitation, urine is therefore in many ways suited for use as fertilizer as they contain essential nutrients needed for plant growth. Favourable effect of cow urine application has been reported in enhancing the productivity of different crops viz. maize, mustard, rice etc.

Cow urine as a fertilizer:

Cow urine can be used as a foliar spray or applied to the soil. Nitrogen, phosphorus and potassium are the three major nutrients required for healthy plant growth. Cow urine contains significant amounts of both nitrogen and potassium.

- ✓ Research shows that only 20% of nitrogenous materials consumed by cattle is absorbed and 80 % is excreted in urine and dung.
- ✓ 52% of Nitrogen returns in the form of urine while 28% return in form of dung.
- ✓ 61-87% phosphorus and 82-92% potash were also obtained from cow urine.
- ✓ In 24 hours, a cow can give 6 litres of urine. If a farmer can have 2 cows in her/ his farm, it gives 4380litres of urine in one year which equals 65 kg nitrogen, that amount of nitrogen equals to 136 kg urea.

Need of the Day?

- Substantial losses from pests, diseases and weeds persist, despite billions of lbs. of pesticides are used annually.
- Sustainability in agriculture is one of the major concerns of humanity as on today.
- To find farming systems which works in harmony with nature rather against it.

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Salient Features of Cow Urine:

- An approach towards sustainability.
- Expense-free farming.
- Producing quality and poison-free food.
- Agriculture without external input.
- Farming in tune with nature.
- Protecting soil fertility and soil health.
- Maintaining the level of organic matter.
- Encouraging biological activity in soil.
- Providing nutrients through the microbial action.

Positive Impacts of Cow Urine on soil properties and plants:

- Micronutrients increase in soil after application of cow urine.
- Color of leaves is more green compare with the use of urea application.
- Residual effect of cow urine is present in next crop.
- Improves the Soil texture.
- Creates good environment in soil for earthworm growth.
- It serves as growth promoter of plants.
- Cow urine sprayed after 14 days of storage in cool place works as an insecticide against aphids and other insects.
- The spraying of urine not only provides nitrogen for plants but also protects the plants from aphid and other insects and provides resistance to diseases.

Role of Cow Urine:

Cow Urine plays a vital role in cow based natural or organic farming. It is very important for making of different liquid organic manures or bio enhancers like *Panchagavya, Jeevamrut*and *Beejamrut etc.* In addition, Cow urine is used for making different *Asthras* for pest management like *Agniastra, Brahmastra* and*Neemastra.*

1) ***Panchagavya:***

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Panchgavya is a term used to describe organic product produced by using five different by-products of cow like cow dung, cow urine, cow milk, cow ghee, cow curd. It has the potential to play the role of promoting growth and providing immunity in plant systemthereby, it provides resistance against pest and diseases. Panchagavya contains several nutrients i.e. macronutrients like N, P, K and micronutrients which are required for the growth and development of plants and also contains various amino acids, vitamins, growth regulators like Auxins, Gibberellins and also beneficial microorganisms like pseudomonas, azotobacter and phospho bacteria.

Table 1:- Chemical Composition of *Panchagavya:*

pH	**5.45**
EC dSm^2	**10.22**
Total N (ppm)	**230**
Total P (ppm)	**210**
Total K (ppm)	**235**
Fungi	**38800/ml**
Bacteria	**1880000/ml**
Lactobacillus	**2260000/ml**
Total anaerobes	**10000/ml**
Acid formers	**360/ml**

2) Jeevamrut:

Jeevamrut is an organic manure. This is a fermented microbial culturewhich is prepared by natural resources. *Jeevamrut* helps to increase the microbial activity in the soil .The 48 hrs. fermentation process multiplies aerobic and anerobic bacteria present in the cow dung and urine, as they eat organic ingredients and a handful of undistributed soil acts as inoculate of native species of microbes and organisms. It can be applied through irrigation water or foliar spray. While transiting from conventional input-intensive agriculture, the application of *Jeevamrut* to the soils and plants is required only for the first three years because after that the system becomes self-sustaining.

3) Beejamrut:

4) This is an organic manure which is prepared from locally available natural resources for the propose of treatment for seeds, seedlings or any planting material. It reduces the possibility of seed infestation by pests and protects young roots from fungus, soil-

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borne diseases, and seed-borne diseases that generally affect the plants after monsoon. In the ingredients, the dung and urine from the indigenous breed cow act as a powerful fungicide, and anti-bacterial agent, respectively.

Table 2:-Microbial studies of *Beejamrut* and *Jeevamrut*

Microorganisms (CFU/gm)	*Beejamrut*	*Jeevamrut*
Bacteria (10^5)	523	825
Fungi (10^4)	17	47
Actinomycetes (10^3)	08	09
N-Fixer (10^3)	46	55
P- Solubilizer (10^3)	50	54

Effects of Cow Urine on different aspects:

1) **Growth parameters:**

Application of cow urine accelerates the different aspects of growth in several crops. Cow urine at 5 and 10% concentration significantly improve all vegetative growth like increasing emergence of plant, height, number of leaf, length and width of leaves (Tamaraker 2016).

In traditional farming, cow urine had been in the form of FYM after mixing in cow dung. Application to soil at 20 ml/plant, cow dung slurry solution helps to increase the growth of plants.

2) **Nutrient content and uptake:**

The nutritional effect of cow urine showed increased chlorophyll and protein content with increased concentration of urine as compared to control (Jandaik *et al.,* 2015). The Urine increased the N, P and K uptake concentration of grass.

3) **Physical and Chemical properties of soil:**

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 (Aguilera *et al.,* 2010).

Significantly 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) with application of FYM 12.5 t ha1+cattle urine at 34300 l ha-1 (Veeresha *et al.,* 2014).

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4) **Soil microbiology:**

Compost tea (cow dung + cow urine + water) contains high amounts of microbes which have complementary effect on the native microbes and alsofavors decomposition of organic matter at a faster rate which, result in better transformation of nutrients and their availability to crops (Pathak and Ram, 2002). Showed that after regular use of cow urine in the crops farmers found that soil microorganism population increased along with the crop yield.

5) **Biopesticides:**

Due to high content of urea in it which is toxic to most of the organisms, the pests etc. will not attack the leaves and buds of the crop plants. Due to pungent and bad smell of the extract, most of the pests and insects, which are attracted due to nectar and fragrance, get repelled, preventing the plant.

6) **Post-harvest parameters:**

Cow urine at 5 and 10% concentration significantly improved all post-harvest parameters of gladiolus viz.- percent opened flower in vase, diameter of basal floret, shelf life and vase life of cut spikes as compared to control (Tamaraker *et al.*, 2016).

Conclusion

From the above enumeration, increasing prices of chemical fertilizers and non-efficient role in long term sustainable production, there is a need of application of organic source of nutrients including cowdung and cow urine for enhancing maximum productivity in sustainable way with better soil health. It is an effective tool to improve physio-chemical and biological properties of the soil with higher yield of plants in sustained basis without deleting the fertility of soil. Let's hope the use of cow urine could open the door of sustainable agricultural production because it is eco friendly, economically viable, and easily available at abundance.

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