

# Reviving Indian indigenous agricultural practices with cow (bovine) based products: An attempt towards sustainability in the chemical based environment

Sambit SHOME<sup>1</sup>, Dipika MAL<sup>2</sup>

<sup>1</sup>Graduate Student, Lovely Professional University, Phagwara, Punjab-144411 and  
Exchange Student at Department of AgriSciences, Mendel University, Czech Republic

<sup>2</sup>Assistant Professor, Lovely Professional University, Phagwara, Punjab-144411

## *Abstract*

*Amidst the strive for higher productivity to support the ever-growing population, Indian farmers have mostly forgotten the indigenous techniques that our classical treatise behold. This paper provides a quick review of more than 55 abstracts and 30 full text articles that deal with cow products based indigenous technologies which are used in sustainable crop production in various ways. Studies show that cow based products can be used for seed treatment, seed hardening, pest and disease management and yield enhancement. Few studies suggest that when cow urine solution (100ml fresh cow urine and 900ml cold water) is mixed with seed in 1:1 ratio, it results in seed hardening thus making it drought-tolerant. It has also been found effective against serious soil borne disease like smut of Ragi (Eleusine coracana). It also helps in pest management when 1kg of crushed leaves consisting of Pungam (Pongamia pinnata), Neem (Azadirachta indica), Eruku (Calotropis gigantean), Tulsi (Ocimum tenuiflorum) and 100 liters of cow urine are mixed, fermented for 10 to 15 days, filtered and sprayed. Cow urine when used in combination with PSB's (Phosphate Solubilizing Bacteria) shows a significant increase in yield parameter as when used in combination of Azolla. Furthermore, processed products like buttermilk is used for the management of Whitefly (Bemesia tabacci), a vector of TMV (Tobacco mosaic virus) which has an effectiveness of 60 % in controlling the infestation and also helps in lessening TMV attack. When dry land conditions persist, farmers face problem of cotton seeds stickiness which can be managed by making a semisolid mixture of cowdung (for every 1kg cow dung 250 ml of water is added) followed by rubbing of cotton seeds thereby removing fuzzy hairs and making dibbing of*

*cotton seeds more easy. Accompanying this, farmers also use Panchagavya and Beejamrit for having a more sustainable and chemical free crop production in India. While Panchagavya (a mixture of cow-dung, cow-urine milk, curd, ghee and water) is used as a growth promoter and increasing the immunity system of plant, Beejamrit (a mixture of water, cow dung, cow urine, gram flour, lime and rhizospheric soil of banyan (Ficus benghalensis) tree is used as an organic solution for seed treatment. Overall, cow-based products are highly beneficial for both pest management and yield improvement. Policy makers in India are emphasizing on zero-budget farming as a pathway towards sustainable agriculture. This work will help policy makers to understand various benefits of cow based indigenous products and frame policies which will not only foster zero-budget agriculture but also pave the path towards sustainable development in agriculture sector.*

*Keywords: Indigenous methods, Sustainable, Zero budget farming, Cow based products*

## 1. Introduction

India is primarily an agricultural country where more than 60% of the country's population depends on it for livelihood. The Green Revolution in the mid 1960's came up with the aim to feed the ever increasing population which was followed by indiscriminate use of chemicals to get higher yield in a shorter period of time. Thus this excessive use of chemicals irrationally has led to an increase in chemical residues in food which has directly harmed the human food chain especially the health of human beings.

Now a days precisely where human want to seek out results much faster than its anticipation, the farmers are also using harmful banned chemicals either to speed up the procedure or to find a shorter way to reach the goal of higher productivity. The result is that this led to the working of the declining factor of productivity in the most fertile and productive plain of the Indian Peninsula: the Indo Gangetic Plain.

This has forced to shift the focus from the mainstream chemical agriculture to our roots – the ancient organic agriculture which have had supported the Indus Valley Civilization. Thus pondering on ancient knowledge we cannot forget about “Astha Mutra’ or eight (Astha) types of urine along with their functioning properties and composition as described in our classical treatises. Among this Eight types, cow urine is one type and also the major

component of Panchagavya .Now a days farmers and researchers are trying to retrieve the age old practices of applying cow dung, cow urine, and their products in the form of manures and pesticides.(Anonymous, 2011; Devakumar et al., 2014; Singh et al., 2014; Veerasha et al., 2014; Sharma et al., 2016; Choudhary et al., 2017). There are mainly small farmers in India and about 70% of the population is engaged in agriculture. Hence mechanization being difficult in small land holdings, using cattle as an alternative source is the only option for the farmers.

Cow urine a type of ‘Astra Mutra’ as described in our classical treatise and a major component in Panchagavya which have been used comprehensively in traditional Indian agriculture for medicinal and agricultural purpose since the Vedic periods. More over cow urine consist of nitrogen, sulphur, phosphate, sodium, manganese, iron, silicon, chlorine, magnesium, maleic, citric, tartaric and calcium salts, vitamin A, B, C, D, E, minerals, lactose, enzymes, creatinine, hormones and gold acids. (Bhadauria,2002). This builds up the reality 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. (Arif et al., 2012).This shifted the focus to use organic sources keeping in mind not only sustainability but also food security. Moreover not only this will help to regain the soil health and sustain the cop production for generations to come but will also help to lessen the cost of cultivation as compared to expensive inorganic chemicals and may also gave a way for zero budget farming.

## 2. Effect of cow urine

In Thondamuthur Village of Tamil Nadu where red soil is predominant and annual rainfall is 700mm: seed hardening of Ragi (*Eleusine coracana* Gaertn.) is followed by the dry land farmers. Here Ragi(Poor man’s Crop) is grown under rained conditions. To cope up with the adverse climatic conditions and the soil water moisture constraints, a native technique is followed wherein seeds of the crop is hardened using cow’s urine. Seed hardening , as in this case of Ragi seeds, fresh cow’s urine is taken (100 ml) and mixed with 1L cold water( make up volume to 1 litre i.e. 100ml cow urine + 900 ml cold water to make a solution)(Karthikeyan et al., 2006). The solution to seed ration should be 1:1 and the solution should always be kept 3-4 cm above the seed level. This allows the seed ample

amount of moisture to be taken up. Before sowing the seeds are soaked for 16 hours and then 24 hours of shade drying is followed. After the completion of shade drying sowing operation is followed. The results were stunning and positive as it was found to be effectual against diseases like smut (seed borne). This has also helped in the induction of drought resistivity in plants.

## **2.1 Controlling pest with cow urine**

In Samamlapuram village of Coimbatore District of Tamil Nadu where again red soil is predominant and having an annual rainfall of 680 mm: an innovative yet ancient method is being used to control the pest by using the locally available green leaves of Neem, Pungam, Eruku and Tulsi. (Karthikeyan, Veeraragavathatham, Karpagam, & Firdouse, 2006). Farmers first prick the young leaves from the trees and let them dry and then crush them with the help of a granite stone available in an indigenous milling tool called ural. After crushing the leaves the farmers mix them with cow urine and ferment it for 10-15 days. The standard measure is for each 1 kg of crushed leaves taken 100 L of cow's urine. The solution is stirred using nonmetal or wooden sticks still an obnoxious odor is obtained by fermentation. After 10-15 days when the fermentation has taken place properly, the resultant solution is taken and filtered through a cotton cloth to avoid any suspension formed. Then the solution is sprayed in the field on one and a half month old crops like brinjal (*Solanum melongena*), okra (*Abelmoschus esculentus*)

## **2.2 Effect of cow urine on yield parameters of various crops**

Tamaraker *et al.*, (2016) reported that all post-harvest parameters of gladiolus i.e. percent opened flower in vase, diameter of basal floret, shelf life and vase life of cut spikes as compared to control significantly increased when cow urine was used at 5 and 10 % concentration whereas Devakumar *et al.* reported that there has been a significant increase in yield characteristics when cow urine is applied with phosphate solubilizing bacteria (PSB's) as compared to Azolla and phosphate solubilizing bacteria (PSB's) mixture (Abraham and Lal, 2004; Veerasha et al., 2014; Qibtiyah et al., 2015; Tamaraker et al., 2016; Sharma et al., 2016; Choudhary et al., 2017). Damodar et al., (2010) reported that when cattle urine having concentrations of 25%, 35% and 55% respectively were sprayed, the spray with 55%

concentration yielded highest fruit weight, volume, no. of fruits, fruit yield kg/plant and yield tons/ha of Mango (*Mangifera indica*) (Khanal, 2010). Hence, this shows that specific concentration of cow urine can be suggested to the farmers which will help them in increasing the yield.

### 3. Seed treatment with cow dung

#### 3.1 Chilli seed treatment with cow dung slurry

The farmers Viraliyur village in Coimbatore district, Tamil Nadu use cow dung for the treatment of chilli seeds. Chilli is an important commercial crop grown in rain fed conditions in this village having red soil with an annual rainfall of 680 mm. (Karthikeyan et al., 2006). The ratio for preparing the solution is 1:2 i.e. for every 1 kg of cow dung 2 l of fresh water is required. Notably fresh cow dung should be used as it enhances its capability of fully mixing with water and thus results in less wastage. For every 1 acre of land 400gm of chilly seeds are required which are tied in a cotton cloth or a muslin cloth and are soaked in the prepared solution for 24 hours. After soaking them, shade drying is done and then sowing. This had increased germination in chilly seeds 5 days prior and also has made the soaking process easier and also reported that this process is effective (80 %) in inducing the germination of seeds and control of seed borne diseases like fruit rot. (Karthikeyan, Veeraragavathatham, Karpagam, & Firdouse, 2006). Thus in farmers from other part of the country where chilli is grown in rain fed conditions can adopt this technique in order to treat the seed rather than opting for chemical pesticides for seed treatment.

#### 3.2 Cotton seed treatment with cow dung

Cottonseed treatment with cow dung is being practiced by the farmers of Periyakallipatty village. This region is characterized by red soil and receives an annual rainfall of 680 mm. As conditions are that of dry land, farmers face the problem of stickiness of cottonseeds creating problem during dibbling of the seeds. To overcome this problem, a practice of seed treatment is followed with cow dung slurry locally called as *Sanipal pidithal*. (Karthikeyan, Veeraragavathatham, Karpagam, & Firdouse, 2006). Farmers mix the cowdung with water in the ratio of 1:1/4, i.e. for every 1 kg cow dung dissolved there is 250 ml of water needed so

as to make a resultant semisolid mixture. The semisolid mixture is then rubbed with the seeds. This treatment separates one seed from others easily during sowing. This helps in sowing along with easy establishment of seeds (Kumar, 2014). This practice was further adopted for the purpose of removing the fuzzy hairs and also to make dibbling of cottonseeds more easy. Nearly 60% farmers adopt this technology as no extra cost is involved. It is both safer and cheaper method to facilitate sowing operation. It is moderately effective (60%) in sowing seeds.

#### 4. Whitefly control with buttermilk in Bhendi (*Abelmoschus esculentus*) crops:

In order to control the whitefly (*Bemisia tabacci*) in Kanoorputhur village: Avinasi taluk at the farmers use buttermilk. After keeping 10 L of buttermilk for fermentation for about 2 days in a closed earthen pot an aliquot of 1 L fermented solution is mixed with 9 L water and is then sprayed on 25 days old *Bhendi* crops. Whiteflies, leaf-sucking pests attacking the crop usually in the vegetative stage serves as a vector in transmitting TMV (Tobacco Mosaic Virus) (Karthikeyan, Veeraragavathatham, Karpagam, & Firdouse, 2006). Hence by controlling the whitefly, transmission of viral disease is controlled and also reported that 50% *Bhendi* growers have adopted this low cost technology and its effectiveness is 60 % in controlling the whitefly infestation.

### 5. Conclusion

Thus from this paper we can infer that specific concentrations of cow urine can be recommended to the farmers for using as a catalyst for yield enhancement. Moreover, cow urine acts as a natural disinfectant, pest repellent and also forms the main component of Panchagavya, an organic crop booster prepared and sprayed by ancient Indian farmers. Being a product of ecological sanitation, urine is therefore in many ways suited for use as fertilizer as it contains essential nutrients needed for plant growth. Favourable effect of cow urine application has been reported in enhancing the productivity of different crops.

## References

- Annonymous. 2011. ICAR, Vision 2030, pp. 2-3. <https://icar.org.in/files/ICAR-Vision-2030.pdf>
- Arif, M., Ali, A., Umair, M., Munsif, F., Ali, K., Inamullah, M., Saleem and Ayub, G. 2012. Effect of biochar, FYM and mineral nitrogen alone and in combination on yield and yield components of maize. *Sarhad J. Agri.*, 28(2): 191-195.
- Bhadauria, H. 2002. Cow Urine- A Magical Therapy. Vishwa Ayurveda Parishad. *Int. J. Cow Sci.*, 1: 32-36.
- Damodhar, V.P. and Shinde, V.V. 2010. Effect of cattle urine sprays on yield and quality of mango (*Mangifera indica L.*) cv. Alphonso. *The Asian J. Horticulture*, 5(2): 307-308.
- Devakumar, N., Shubha, S., Rao, G.G.E. and Imrankhan. 2014. Studies on soil fertility, cow urine and panchagavya levels on growth and yield of maize. Proceedings of the 4th ISOFAR Scientific Conference. 'Building Organic Bridges', at the Organic World Congress 2014, 13-15 Oct., Istanbul, Turkey.
- Karthikeyan C, D. V. (2006). Cow Based Indigenous technologies in dry farming. *Indian journal of Traditional Knowledge*, 47-50.
- Khanal, A. 2010. Effects of cattle urine, urea and their combinations on yield and quality of cauliflower (*Brassica oleracea var. botrytis L.*) M.Sc. Thesis, Department of horticulture, Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.
- Kumar, M. 2014. Influence of seed priming with urine, phosphorus and zinc on maize (*Zea mays L.*) yield in an acid soil of Northeast India. *Indian J. Hill Farming*, 27(1): 132-137.
- Sharma, Shah, S.C., Adhikari, K.R., Shah, P. and Shrestha, J. 2016. Effects of cattle urine and FYM on yield of broccoli and soil properties. *J. Agri. Search*, 3(3): 157-160.
- Singh, M.K., Singh, R.P., Rai, S. 2014. Effect of nitrogen levels and cow urine on soil N status, growth and yield on paddy (*Oryza sativa L.*). *Environ. Ecol.*, 32(4): 1277-1281.

Sunita Choudhary, M. K. (2017). Cow Urine: A Boon for Sustainable Agriculture .  
*International Journal of Current Microbiology and Applied Sciences* , 1824-1829 .

Veerasha, Sharanappa, Gopakkali, P. 2014. Effect of organic production practices on yield and soil health of irrigated maize (*Zea mays L.*) as influenced by various levels of FYM and cattle urine application. *Environ. Ecol.*, 32(2A): 627-630.