

Cow Dung for Improving the Ecosystem of Soil and Cow Importance from Vedic Scriptures

Dr. Sunil B. Thakare, Sachin. J. Yadav, Abhay. B. Shelar, Supriya. B. Shinde

Department of Civil Engineering, Anantrao Pawar College of Engineering & Research,
Parvati, Pune (MH)

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Abstract— Now a day's pollution is increasing rapidly whether it is related to land or it is related to soil, water and air. This is due to increase in industrial activities in which some industries releases their waste without treating them and ultimately polluting the environment and if these pollutants pollutes the soil than it will be consumed by plants through roots which ultimately affects the members of ecosystem or environment and also due to use of chemical pesticides soil gets polluted and also these pollutants enter the plants through roots and ultimately affects the members of ecosystem and environment. So we have to search for better alternatives for chemical pesticides. Now as soil are polluted so we have to search for treatment which does not pollute the environment but also helpful to change some soil properties. In this research cow dung was used for treatment of polluted soil which was polluted by sulphuric acid. Due to addition of sulphuric acid pH of soil lowers down but with the addition of cow dung pH of soil increases which is good sign of treatment for soil. Now in case of leachate when it is acidic in nature it will further pollute the soil and groundwater by increasing the solubility of metal ions which are toxic in nature. Here ecosystem of soil consist of soil biology, soil fertility and soil physical properties. Soil biology consist of microorganism and macro organism like earthworm, etc which are responsible for improving the fertility of soil which are killed by the pollutants. Soil fertility consist of organic matter and humus which are minimised by the pollutants. Soil physical properties consist of textures and structure which are destroyed by pollutants. Hence the experimentation work performed with the cow dung and polluted soil shows that cow dung helps to improve the ecosystem of the soil. Hence when we mix cow dung with soil it will help to increase the Ph of soil as well as leachate, ultimately minimising the soil and groundwater pollution. The historical importance of Indian Cow from vedic scriptures and her effective utilization of panchgavya (mixture of urine, milk, ghee, curd and dung of Indian Cow) and individual products mentioned in various vedic book like Bhagwat Geeta, Mahabharat, Sant Tukaram Gatha was written by Sant Tukaram, who was a 17th-century poet-saint of the Bhakti movement in Maharashtra., The Dnyaneshwari is a commentary on the Bhagavad Gita written by the Marathi saint and poet Dnyaneshwar in the 13th century, etc were studied which was suggested by the known holly persons who were using cow dung as a medicine ,as a thermal insulator, as a plaster, flooring etc.

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1. Introduction

The land, ground water and surface water all are very important in maintaining ecosystem and if any one of them is polluted it's pollutes the environment. Now suppose land is polluted with some pollutants like pesticides than it is further consumed by plants which in turn consumed by animal and human being thus entering the ecosystem which will further introduce problem of decrease in immunity of human being. Hence due to decrease immunity chances of people being affected by diseases increases and for that best example is that of Bhopal gas tragedy. In this tragedy methylisocyanate (MIC) gas was released which was toxic in nature which kills many peoples. [1]

If we live in peace and harmony with nature the nature will give us positive result. For example with the organic fertilizers soil fertility also increases but also various other properties of soil like water holding capacity, porosity, softness, etc increases for longer duration but with chemical fertilizer productivity is high but quality of food grains, fruits, etc is less as compared to organic fertilizers applied soil. So human activities motives should have consideration for environment protection also which will have good result in future for future generation. For example for treating any polluted medium the treatment should consider maximum portion of bioremediation as it not only helpful for protection of environment but also helpful for maintaining ecosystem. [2]

Cow dung is very helpful as micro organisms present in Cow dung are helpful for decreasing the value of total petroleum hydrocarbons and also helps in improving the soil properties like pH and electrical conductivity. This technology not only decreases the amount of pollutants in soil but also helpful in increasing nutrients of soil as well as helpful in enhancement of soil properties like water holding capacity, softness etc for enhances growth of plant. [3]

Panchgavya meaning mixture of mixture of urine, milk, ghee, curd and dung of Indian Cow. It is used for treatment of diseases like cancer, skin diseases, etc. [4]

Finally it can be said that cow plays important role in protection of environment.

2. Literature Review

Indian cow is of great importance in Indian society. Indian cow is considered as holy since ancient time. Its dung is known as best manure and best soil fertilizers throughout the world. Indian Cow has been considered as symbol of wealth since ancient time. The crop grown in soil which has used cow manure have high yield and have better quality grains as compared to artificial manure. In this research property of soil was checked before and after adding of cow dung. P. Agamuthu, Y.S. Tan, S.H. Fauziah (2013): Have discussed that the cow dung can play an important role in treatment of soil polluted with lubricant oil and concluded that bioremediation can play an important role in treating soil polluted with petroleum hydrocarbon. [5]

Uwumarongie-Ilori, E.G Aisueni N.O, Sulaiman-Ilobu, B.B ,Ekhatior, F. Eneje, R. C. and Efetie-Osie, A. (2012): They have discussed that in cases of metal contamination ,accumulation of heavy metals from regular application of inorganic fertilizer

to soils cultivated with oil palm, cow dung can be used to immobilize the heavy metals in the contaminated soil. [6]

K. Prapagar, S.P. Indraratne and P. Premanandharajah (2012): The study revealed that addition of gypsum and organic amendments (CD, PH) acted as ameliorant to saline-sodic soils. It also revealed that individual or combined effect of gypsum and simple leaching was more effective in changing EC and SAR. Gypsum application in combination with organic amendments improved the soil chemical properties by reducing the EC, SAR (Sodium Adsorption Ratio) and pH, than the applying gypsum alone. [7]

P. M. V. Subbarao and V. K. Vijay: They have discussed the importance of cow dung in production of biogas which can be used for running vehicles after removing carbodioxide from biogas.[8]

Now days living creature's likes animals, birds, etc are on the verge of extinct which helps in maintaining the ecosystem. For example cows which plays very important role in protection of environment as they feed on the dry and wet both grasses and helps in solid waste management. They also provide with milk, and from that milk ghee, curd, etc are produced which provide the human being with good variety of food.

3. Materials and Methods

Soil samples, salt, distilled water, pH meter, fresh cow dung, electrical conductivity instrument, chemical required for testing pH and electrical conductivity of soil and plastic samples bottles were required for doing experiment.[9]

From college campus only red garden soil was taken and in 5 plastic pots 2 kg each soil was taken and in five plastic pot acidic water of Ph 1.2 was added to soil samples and immediately small amount of soil was taken for measuring pH and electrical conductivity and than cow dung was added in succession of 200g, 400g, 600g, 800g and 1000g in acidic soils plastic pots and than after 15 days and 40 days soil Ph and electrical conductivity was measured.[10]



Figure 1: Plastic pot containing acidic solution added soil



Figure 2: Plastic pot containing acid added soil with cow dung added



Figure 3: Plastic pot containing acid added soil mixed with cow dung

For knowing the importance of cow from vedic scriptures books like Bhagwat Geeta, Shrimad Bhagvatam, Saint Tukaram Gatha, Nyaneshwari, Puranas, websites related to vedic scriptures were viewed and studied.

4. Result and Discussion

4.1 Result and discussion for treatment of acidified soil

In this as soil is acidified by sulphuric acid than on addition of cow dung there is increase in pH value which shows that cow dung can be used in treatment of acidifies soil when acid rainfall occur or when some industries directly discharge there acidic effluents on soil which result in pollution of soil and make the leachate more acidic in nature and thus increasing the soluble rate of toxic metals. In this test initial soil Ph was 6.02 and electrical conductivity was 0.117 Ms/cm and afterward acid was added in order to pollute the soil which lowers the pH thus making the soil more acidic in nature which is harmful for normal plant growth and also on addition of cow dung electrical conductivity of soil sample increases which shows positive sign of freely available nutrients ions from cow dung helpful for plant growth. Due to addition of acids metal like arsenic precipitates and freely movable which can pollute the soil, ground water and near by water bodies and if living being consumes that polluted water than there immunity will decrease and chances of getting cancer increases. Hence with the research work done it can be concluded that cow dung can be used for protection of environment.

Fresh Cow Dung Ph =6.62 and EC =1.910				
Normal Soil pH and Electrical conductivity of soil is Ph =6.02 and EC =0.117				
Acidified Soil Ph = 3.38, EC = 2.19				
pH and Electrical conductivity of soil after addition of cow dung after 15 days				
Sr.No	Sample Name	Cow Dung Added (gram)	Ph	EC(Ms/cm) milliSiemens / centimeter

1	AAS1	200	4.38	1.924
2	AAS2	400	4.4	2.01
3	AAS3	600	4.42	2.05
4	AAS4	800	4.49	2.36
5	AAS5	1000	4.6	2.46

Table no 1: ph and Electrical conductivity of acidified soil samples after addition of cow dung after 15 days

ph and Electrical conductivity of soil after addition of cow dung after 40 days				
Sr.No	Sample Name	Cow Dung Added (gram)	Ph	EC(Ms/cm) milliSiemens / centimeter
1	AAS1	200	4.33	2.38
2	AAS2	400	3.86	2.4
3	AAS3	600	4.02	2.3
4	AAS4	800	4.28	2.63
5	AAS5	1000	4.41	2.92

Table no 2: ph and Electrical conductivity of acidified soil samples after addition of cow dung after 40 days

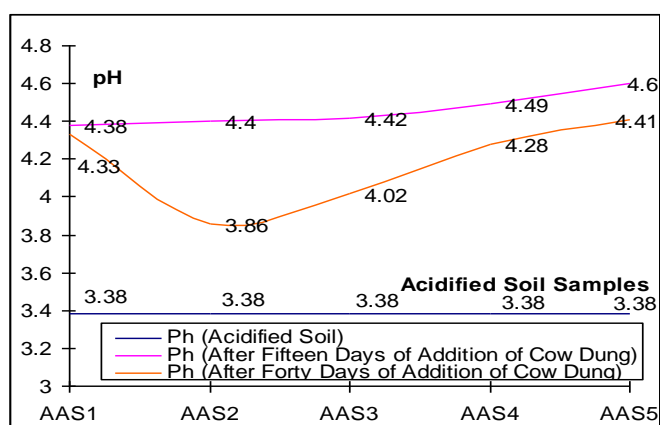


Figure 4: Chart showing effect on pH of 5 acidified soil samples after polluting and after treatment period of 15days and 40 days.

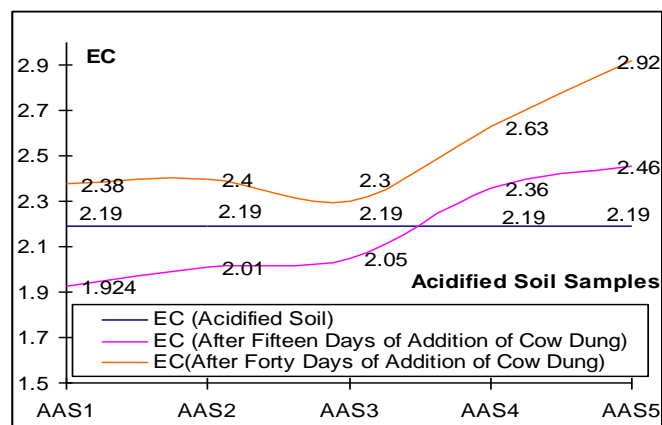


Figure 5: Chart showing effect on EC of 5 acidified soil samples after polluting and after treatment period of 15 days and 40 days.

From the above graphs it can be concluded that cow dung helps in increasing the pH of acidified soil.

4.2 Importance of Cow from vedic scriptures.

Krsi-go-raksya-vanijyam vaisya-karma svabhava-jam

The Supreme Personality of Godhead, Lord Krishna has instructed in the Bhagavad Gita, "Farming, Cow Protection & Trade are the natural work for the vaisyas". - Bhagavad Gita (18.44). This verse states it is the duty of business class people and farmers to protect cow which is said by the Supreme Personality of Godhead. [11]

Obstructing provision of water to thirsty cows should be considered equal to the sin of killing Brahmins which is stated in Mahabharata, Anushasana Parva 24-7 which convey us that if we are not providing water to thirsty cow then it will be equal to the sin of killing of Brahmins or holy person. [12]

Caitanya Mahaprabhu confirms:

go-ange yata loma tata sahasra vatsara

go-vadhi raurava-madhye pace nirantra

Cow killers and cow eaters are condemned to rot in hell for as many thousands of years as there are for each hair on the body of every cow they eat from. In this verse the importance of cow can be understood that if we kill cow then we have to live for long span in hell. [13]

A guru, a teacher, a father, a mother, a brahmana, a cow and a yogi all should never be killed. [14]

Conclusion

It can be concluded that cow dung helps in improving the ecosystem of soil and also helps in increasing the pH of acidified soil and leachate as it helps to increase the pH of acidic water flowing through it, ultimately helps in treatment of polluted soil and to increase the pH of

acidic leachate. If pH of soil increases ultimately it will help in increasing the pH of acidic leachate flowing through it. Hence it is helpful in treating the acidic leachate. It helps in supplying nutrients to polluted soil. The cow dung remediation for polluted soil is not only beneficial to farmers whose soil got polluted with the help of chemical pesticides but also beneficial to those people who want to live in harmony with nature. It is an eco-friendly method of treatment which is cheaper one. Cow dung is used for biogas manufacturing, plastering, sacred ceremonies, etc. Cow importance's is also mentioned in olden Vedic scriptures and hence cow should be protected in our society. Now further work should be done in case of bioremediation by cow dung. Hence cow dung is helpful in improving the ecosystem of soil.

List of Symbols & Abbreviations

- 1) AAS1 – Acid Added Soil 1
- 2) AAS2 – Acid Added Soil 2
- 3) AAS3 – Acid Added Soil 3
- 4) AAS4 – Acid Added Soil 4
- 5) AAS5 – Acid Added Soil 5
- 6) EC – Electrical Conductivity
- 7) PH - Potential Of Hydrogen
- 8) SAR - Sodium Adsorption Ratio
- 9) MIC - Methylisocyanate

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