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A REVIEW ON ANTI- PESTICIDAL EFFECTS OF COW DUNG MICROBIAL CONSORTIUM

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ABSTRACT:
The production and use of pesticides in India is increasing exponentially. The waste produced by the pesticide industry has turned into an environmental. Issue due to the current limitations and inefficiencies of waste treatment method, such as physico-chemical and biological approaches. Human use and abuse of drugs, pesticides and petrochemicals destroys nature, as they persist as such or in the form of their toxic metabolites. Based on Ayurveda, Cow Dung is an effective bio-treatment method. Therefore, using readily available dung in the form of slurry or after composting in rural areas can serve as a viable solution for bioremediation of harmful pollutants. This review shows the anti-Pesticidal effects of cow dung microbial consortium.

Keywords: - Cow dung Bioremediation, Pesticides.

INTRODUCTION :

The significant increase in human population and demand for food has increased the reliance on chemical fertilizers and pesticides in traditional agriculture. (Santos, E.A.; M.C.S.; Aspiazu, et al;2012). Deterioration of soil quality has biodiversity and increase water and air pollution, and overuse of chemical fertilizers has also affected human health.(Swapna,A.L.et al; 2013). Excessive use of chemical pesticides affect agro-ecosystem, soil fertility and growth of cultivated crops. (Rahman, K.M.A.; Zhang, D.et al; 2018). In Indian village , people use dung directly for cooking purposes. It is also used to plaster walls and floors in rural homes to provide insulation in winter and summer. It is an old practice to used burnt cow dung to repel mosquito and the subsequent ash to clean kitchen utensils. Accordingly, the different uses of dung by the people of the village reflect the local knowledge related to it. The cow play important role in the village economy and high socio-economic value.(Dhama et al.2005a).

In India cow dung is utilized in agriculture as a by-product, serving various roles such as a bio fertilizers, biopesticide, pest repellent and an energy source (Dhama et al.2005a). Additionally in Ayurveda, it is believed to function as a purifier of natural waste materials.(Randhwa and Khullar et al; 2011). Biopesticiderefer to use of beneficial microorganisms for pest control. However, availability of biopesticideis a major constraint compared to total crop area. Some pesticides are made from natural sources, including plant , animals, bacteria and specific minerals.(Sharma and Thakur. et al; 2018).

Bioremediation:

Bioremediation involves the use of naturally occurring or genetically microorganisms, such as bacteria and fungi, to break down pollutants created by human activity. Earthworms are capable of accumulating heavy metals in their body tissues, which makes them potential bioindicators for monitoring environmental contamination. (R. Ogden and D.A. Adams,et al; 1989). Using dung, rather than Chemicals,

promoters healthy crop growth. (Chauhan et al.2006). Additionally, due to its high Nutrient content and the presence of microorganisms, the Bioremediation process is accelerated. (Geeta et al., 2008; Singh et al., 2010). The growing the use of pharmaceutical products, pesticides and petrochemicals by human is leading to their accumulate in nature ,as these substances build up they release harmful gases and other product causing environmental pollution. Dung when used as fertilizer or after composting, can present risk due to its potential toxicity, mutagenicity. Carcinogenicity, and genotoxicity. However, in rural regions, it serves as an affordable and efficient option for the Bioremediation of harmful pollutants.(Ank. 1995).

Bioremediation of Pharmaceuticals and pesticides:

In human medicine, antibiotics account for 6% of prescriptions, whereas in veterinary medicine, over 70% of prescriptions involve antibiotics.(S. Thiele- Bruhn, 2003). Degradation of antibiotics could theoretically lead to the development of multidrug resistance strains that could potentially contribute to the emergence of multidrug resistant stains, which may indirectly infect humans, resulting in higher rates of illness and death.

Manure, including cattle dung, may serve model ecosystem to study drug fate, as same known coprophilous basidiomycetes are capable of degrading enrofloxacin. In a study conducted by Wicklow and colleagues, two such basidiomycetes, were isolated from aged cattle. (D.T. Wicklow, et al. (1992)And R.W. Detroy and B.A.Jessee, et al; (1980). Also explored these types of fungi.

Pesticides:

Pesticides currently, India is the leading producer of pesticides in Asia. In the 2005- 2006 period, the Indian pesticide Industry ranks second in Asia, just behind china, with a production of 82000MT Globally India holds the twelfth position In pesticides production contributing 90,000 tonnes annually for pesticides use. (H.Boricha and M.H.Fulekar, et al, 2009).

Only 2%- 3% of pesticides are effectively utilized, while the remaining amount persists in soil and water contributing to environmental pollution and toxicity. Pesticides Residues can accumulate in surface soil, potentially contaminating groundwater. Given that 56.7% of India's population is involved in agriculture, they are at risk of exposure to these pesticides.(R.S.Chauhan and L.Singhal, et al 2006).

In a particular study, the insecticides chlorpyrifos cypermethrin, fenvalerate and trichloropyrbutoxyethylester were examine, for Bioremediation using a slurry of dung (without specifying the cow breed). A fresh slurry was prepared at a 1:10 ratio with distilled water to serve as a source of microbial biomass. This Slurry was aerated for three days and supplemented with nutrients such as glucose (150 mg/L), potassium dihydrogen phosphate 80Mg/L and ammonium sulphate 80mg/L. To activate the process. The High nutrient content and abundant microbial population in the cow dung Slurry, when mixed with the soil pesticides combination were found to significantly enhance the Biodegradation of pesticides under controlled environmental conditions.(M. Geetha and M.H. Fulekar, et al, 2008).

The removal of pesticides residues from soil and water is crucial to prevent environmental contamination. Pseudomonas plecoglossicida has emerged as a novel organisms for the Bioremediation of hazardous substances, including chloropyrifos (Organophosphate insecticides) and cypermethrin with the involvement of pseudomonas aeruginosa as well.(H. Boricha and M.H. Fulekar, et al, 2009 and M H. Fulekarand M. Geetha, et al,2008).

Activated dung slurry was utilized as a microbial consortium to facilitate the Bioremediation of fenvalerate contaminated soil. (M.Geethaand M.H. Fulekar, et al, 2010). Organic farming offers a sustainable approach to prevent pesticides contamination in the environment by eliminating the need for chemical pesticides in agriculture. In this practice, products like Panchgavya. (A mixture of cow dung, cow urine, curd, and other cow- derived substances) along with Milk, ghee and local agricultural waste, are commonly used. These materials are readily available and inexpensive making them effective for improving soil and plant health and supporting sustainable agriculture.

Microbial pesticides:

Microbial pesticides are being quickly developed, with genetically modified, organisms like algae, protozoa, fungi viruses and bacteria being commonly employed. Unlike conventional, insecticides, these biopesticides produce insect-specific toxins, that can cause disease, inhibit the growth of other microorganisms or operate through different non- toxic mechanisms of action (Bellinger, R.G. et al, 2007). Common microbial biopesticide include live microorganisms, That are pathogenic to specific pests, such as bioinsecticides (Bt), bioherbicides (Phytophthora), and bio fungicides (Pseudomonas, Trichoderma, and Bacillus). (Quarles, W. et al, 2011).

Microbial biopesticides include organisms like protozoa, bacteria, fungi, viruses, and oomycetes, which are commonly used for the biological control of weeds, insect pests, and plant diseases. These are available in the market, bacterial biopesticides account for 74% fungal biopesticide, make up 10% , viral biopesticide, also represent 10%, predatory biopesticide contribute 8% and the remaining 3% is used for a variety of other crops.(Thakore, Y. et al, 2006). Microbial pesticides can suppress target pests through the production of toxic metabolites or various other mechanisms,. (Bellinger, R.G. et al, 2007). The Species used as microbial insecticides are typically non pathogenic and non toxic to other organisms and their impact extends beyond just the target insect.(C.D. Bailey A.S. Tatchell, G.M. Davidson G. Greaves, J. Grant. W.P.et al, 2011).

CONCLUSION:

Cow dung serves as an effective and affordable method for Bioremediation, being readily available in rural areas of India. Further research is required to explore the bioremediation of active pharmaceutical agents particularly those drugs that are non-biodegradable and persistent. By doing so, the harmful impact of these chemicals on plant and animals can be reduced, promoting a healthier and safer future. These effect can be better understood and confirmed through advanced research techniques.

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