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Eco-Friendly Disposal of Pesticide Remenants From Utensiles

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Abstract

India is a agricultural country, most of the people depend on the agriculture field but now a day's Indian farmers facing the big problem of Soil pollution, water pollution, etc. This occurred mainly due to large amount of pesticides and chemicals used in the farm, and now a day use of pesticides in farm is very high. When pesticides used according to label instructions and with the appropriate precautions, pesticides present minimal risk to the environment. But Contamination arising from non-approved use, poor practice, illegal operations or misuse is however increasingly recognized as contributing to water contamination. Generally soil gets polluted by improper disposal of pesticides and chemicals which are remaining part in utensils, Sprayer, Bottles etc. If these utensils, Sprayer, Bottles are washed under tap water or directly in the Pond, wel, river & other open water resources, then water get extremely polluted as well as it disturb the aquatic eco-system. Therefore, there is need to disposed this remnants of pesticides by eco-friendly.

Keywords:- Bio-Bed, Fungus, bacteria, pesticides or chemicals, eco-friendly disposal.

Introduction

The concept of Bio-Bed was firstly developed in Sweden in 1990s now a day's number of Bio-Bed is by Sweden country and it is very use full for degradation of pesticides. India is agricultural country most of the people depend on agricultural. Now a day's Indian farmer facing big problem of soil pollution, water pollution decrease in crop yield and changes in aquatic ecosystem this is only due to excess use of chemical fertilizers and pesticide in agriculture. The remnants of pesticides or washing the sprayer of pesticide was polluted the particular area. To sustained this condition, there is need of degrades remnants of pesticides properly. Therefore, a new affordable technology is develop to degrade pesticides i.e. Bio-Bed. This concept is generally used in foreign countries like Sweden, Canada, Japan, USA, Netherland, Finland etc. But it is new for the Indian farmers. For this, the Bio-bed, Biofilter or Biomixture method are advised to control the pollution. Out of these, Bio-Bed method is very convenient method and suggested for Indian farmers. Pesticide inputs to the environment can be reduced by either implementing measures to reduce the potential sources of pesticide contamination, or by treatment. A number of treatment systems are available for but formation of bio-bed is one of the best and convenient methods for Indian farmer. In this study, biobed should be used for protecting of environment against point source pesticide pollution, during filling, mixing, and cleaning of sprayers.

Materials And Methods

The required surface area for bio-bed was 4 x 4 ft and 2 ft depth in form of rectangular pit area and as per use of pesticides. It is simply made up by using a mixture of straw (Wheat or Rice), top soil, and peat. The biomixtures was prepared by mixing soil (25%) firstly, and then

equally spread the bio-mixture of chopped straw (50%) equally on the soil and finally the peat soil (25%) cover the straw & on the top the grass layer is grown.

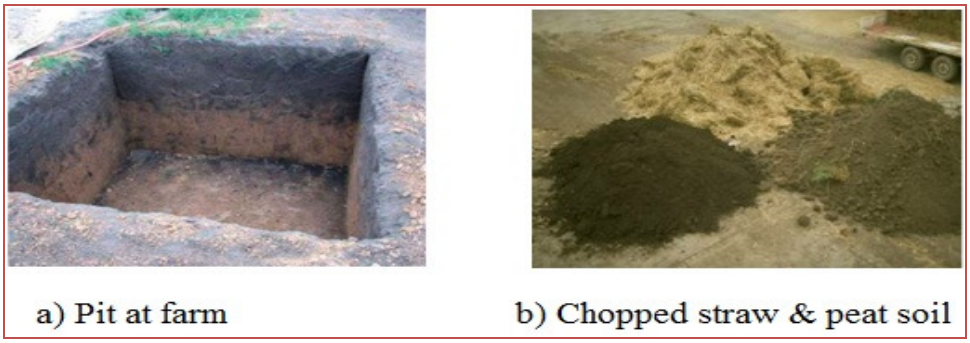

Figure-1- a) Pit at farm b) Chopped straw & peat soil

Factors responsible for good degradation -

- **Water Level:** more remnants pesticides are disposing in the bio-Bed at moisture level of 65-68% water holding capacity (WHC) than 40 and above 90% water holding capacity.
- **Temperature:** It is also effect on the Bio-Bed the 22-25^{0}C it shows higher dissipation rate than 10-15^{0}C.
- **Growth of Microorganism:** Increase in the numbers of microorganism, the rate degradation or consumption of pesticides, herbicides and insecticides are increases. Thus the growth of microorganism is an important factor.
- **Duration:** Good degradation depending upon the above factors, if above factors is as per condition degradation within one to two years.

The rate of degradation of or consumption of pesticides, herbicides and insecticides totally depends on above factors.

Working

After spraying pesticides on the crop, the utensils, sprayer, and bottle of remnants pesticides are washed on the Bio-bed. Biodegradation by bacteria, actinomycetes, fungi and specific protozoa is considered primary mechanism for transforming pesticides in to soil. The top soil serves as source for micro-organism in the system. The peat soil included for its absorption having high water holding capacity and provides large organic matter surface area for adsorption. Now the straws serve as carbon source of lignin degrading micro-organism. Fungus and bacteria use pesticide as food source. The soil fumigants Methyl bromide, the herbicide dolapon and fungicide Chloronen are example of pesticides which are degrade by micro-organism. The bacterial group member genera Alcaligenes flavobacterim pseudomonas and Rhodococcus, the fungi Penicillium citrum, Aspergillus fumigates, Trichoderma harzianum, fusarium, lentinula, etc. Degrade the Pesticides. The Bacteria like Streptomycium, Sterium hirsutum, for degradation of Atrazine, Trametes versicolor is degrade Phenoxide. Bio-bed provides excellent condition for stopping the movement of pesticides in to water source by adsorbing the pesticides.

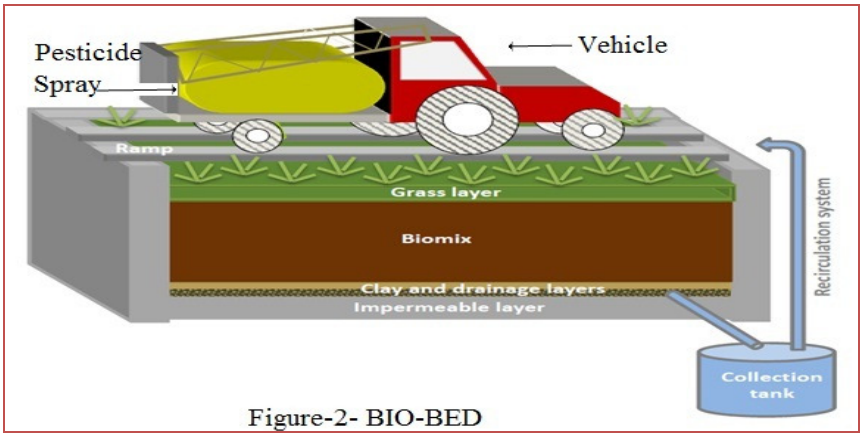

Figure-2- Internal different layers in bio-bed

Result And Discussion

Bio-Bed is a cost effective technique consider as an economic solution for pesticide disposal. The remnants pesticides are properly disposed by the micro-organism developed in Bio-Bed. The Bio-Bed save the aquatic ecosystem, decease soil pollution and water pollution, and it has a low cost also it has 5-6 year of durability. It is also helpful for control and save the N2- fixing bacteria. After complete degradation the compost manure is produce which is used to increase fertility of soil. Regarding to result it was concluded that Bio-Bed should be used for eco-friendly against soil pollution & water pollution.

Conclusions

The peat soil included for its absorption having high water holding capacity and provides large organic matter surface area for adsorption. Fungus and bacteria use pesticide as a food source. The absorption of pesticides in biobed was statistically and significantly different from farm-soil. Biodegradation by bacteria, actinomycetes, fungi and specific protozoa is considered primary mechanism for transforming pesticides in to soil. In this study, the authors concluded that biobed should be used to reduce pesticide contaminated waters during filling, mixing, and cleaning of sprayers in farm.

Future Work

In order to transfer the biobed technology from a semi-field controlled environment to an uncontrolled working farm situation this type biobed should be constructed and operated in such a way as to above type of waste disposal operations on a working farm. Methods of treatment should be the same as those proposed for a final on farm biobed with leachate samples collected to monitor biobed performance. The prototype should be operated for more than one growing season to enable the long-term performance and management requirements of the system to be determined. The biobed system needs to be transferable from one farm to another without any compromise in performance.

References

1. Yousaf, R., Cheema, M. A. and Anwar, S. Effects of pesticide application on the health of rural women involved in cotton picking. Int. J. Agric. Biol. 2004. 6:220-221.
2. The Voluntary Initiative. Design Manual: Pesticide Handling Areas and Biobeds. 2006.18 pp
3. B.C. Marwaha & S. C. Jat, Fert, News, 2004. 49, 11, 41-48.

4. Castillo, M. D. P., Torstensson, L. and Stenström, J. Biobeds for environmental protection from pesticide use - A review. J. Agric. Food Chem. 2008. 56:6206-6219.
5. Isin, S. and Yildirim, I. Fruit-growers' perceptions on the harmful effects of Pesticides and their reflection on practices: The case of Kemalpasa, Turkey. Crop Protection 2007. 26:917-922.
6. De Schamphelerie, M., Spanoghe, P., Brusselman, E. and Sonck, S. Risk assessment of pesticide spray drift damage in Belgium. Crop Protection 2007. 26:602-611.
7. Vischetti, C., Capri, E., Trevisan, M., Casucci, C. and Perucci, P. Biomassbed: A biological system to reduce pesticide point contamination at farm level. Chemosphere 2004. 55:823-828.
8. Amaresh Das. Agri culture today, oct. 2007. pp-22-24.
9. De Wilde, T., Spanoghe, P., Sniegowksi, K., Ryckeboer, J., Jaeken, P. and Springael, D. Transport and degradation of metalaxyl and isoproturon in biopurification columns inoculated with pesticide primed material. Chemosphere 2010. 78:56-60.
10. S. P. Wani and K.K. Lee, Fertilizer Development and consultation Organisation, New Delhi; India, 1992. 91-112.
11. Brown, C, Hodgkinson, R, Rose, D, Syers, J K and Wilkinson, S Movement of pesticides to surface waters from heavy clay soil. Pesticide Science. 1995, 43 131-140.
12. Rose, S, Carter, A and Basford, B Development of a design manual for agricultural pesticide handling and washdown areas. Environment Agency R&D project 2000 No. P 2-200.