

Review Article

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Bio-Pesticide: A Clean Approach to Healthy Agriculture

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ABSTRACT

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Today, when we talk of agriculture, it is imperative to go to pesticides. There has been a constant change in the selection and use of pesticides by the time. For example, 4500 years ago Sumerian found evidence of the use of sulfur as a pesticide for agriculture. Mainly these were natural compounds, but after the Second World War a wave was used in the use of chemical pesticides, which has arsenic, hydrogen cyanide and D.D.T. like chemicals promoted. This study has been done in keeping in mind above facts to understand the awareness of farmers related to biological pesticides in the current scenario. As the current trend is moving towards organic food, the tendency has given new direction to the use, development and indispensability of biological pesticides and measuring this tendency is the primary goal of this study. To achieve this goal, we will need different types of information, for collecting this type of data we required various ways which are like interviews, questionnaires and surveys, observation, ethnographies, oral History, Case Studies, documents and records etc.

Introduction

We all know that agriculture is a business full of uncertainties, yet we get enough production in every area related to agriculture, because the agricultural conditions in our country are very good. An average of 15-25% of total agricultural production of the country is destroyed by pests, which is 1/4th of the country's annual production (2016). First, in India, the production of chemical pesticides started in 1951, due to the time and demand today it has become so much that India is at second place in the production of pesticides on the global plate and because average 18-26%

of the crop at the time of production and 5-13% of the crop after production is destroyed by insects for these reasons, the use and production of chemical pesticides has increased in India as well as in the entire world.

Food security has become an issue of awareness in the present. IAFP, Food Safety Conference and sixth national agrochemical conference are examples of global social awareness. Increasing food pollution is currently a matter of concern and it continues till the conservation of food from the production of the crop, because the chemical

pesticides are used every phase to keep different insects away from different crops and this is the reason for the use of growing chemical pesticides annually.

Why bio-pesticide?

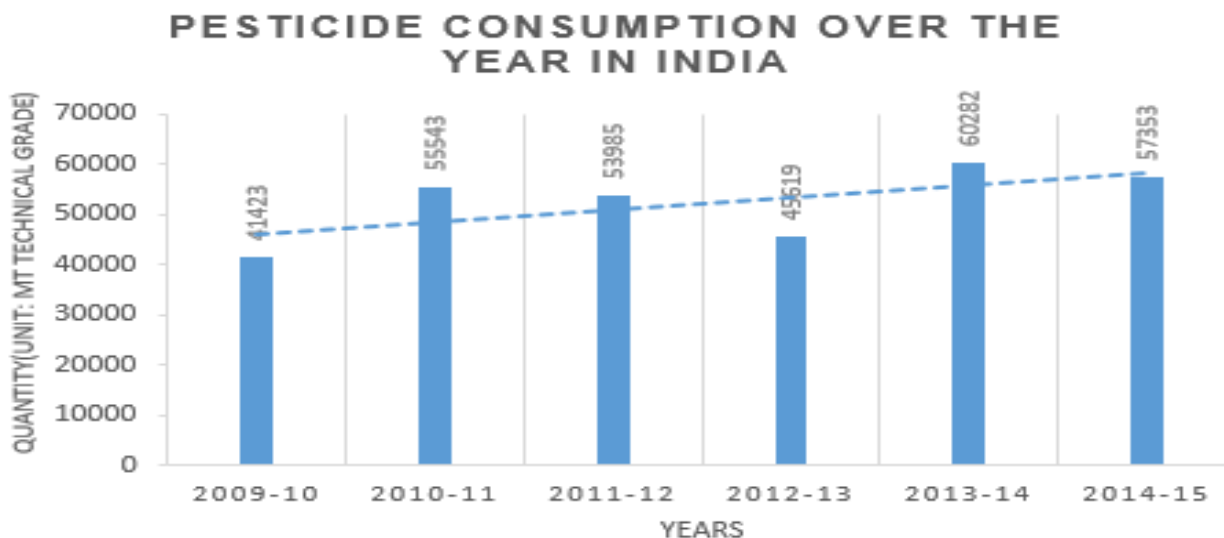
Deteriorating soil quality, poisonous soil water are the some side effects of indiscriminate use of chemicals in agriculture. Increment in yield by chemicals can be recorded but in the case of quality this yield is less than the other and somewhere, the chemical components present in the crop make them even harmful to human health. We can understand the effects of these chemical pesticides on human health through many past and present events like that, according to recently released a report of W.H.O.,the highest amount of D.D.T. has been found in indian women’s brest milk. The next event is “the Supreme Court, on January 10/2017, directed the Kerala government to pay Rs 500 crores in three months as compensation to over 5,000 victims of the use of endosulfan pesticide.” Similarly, the side effects of chemical pesticides can be assessed across the country at different levels like Punjab and Haryana are an example in this case, most cancer patients in the country are in Punjab because they use the most chemical

pesticides in the country in proportion to their area.

Status of bio-pesticide in India

At present, organic pesticides are only 4.2% of the entire pesticide market in India & also CAGR is likely to increase by 20.2% from 2010 to 2020. In India, organic pesticides have been estimated to have market value of about 23.92 million USD (2015). Now the price of bio-pesticides has increased due to GST being implemented, government has fixed 18% GST on pesticides and bio-pesticides also fall in this category. In India, 12 types of bio-insecticides are registered under Insecticides Act, 1968 and there are about 150 bio-pesticide producing companies in India. Maharashtra is the most consuming state of bio-pesticide in India and *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus thuringiensis* are the best-selling bio-pesticides in India.

India's Department of biotechnology provides cooperation in research and production of bio-pesticide, ICAR and DBT support 31 and 22 producer units, respectively. Bio-control labs have been set up in different states of the country to promote bio pesticides.



Source: Agrariancrisis.in & pib.nic.in

Bio-pesticide

Sl. No.	State	Total pesticides consumed	Area(km ²)
1	Uttar-Pradesh	39948	243,286
2	Punjab	29235	50,362
3	Haryana	21908	44,212
4	Maharashtra	16480	307,713
5	Rajasthan	15239	342,239
6	Gujrat	13430	196,024
7	Tamil Nadu	12851	130,060

Source: Indiaforsafefood.in

Status of bio-pesticide in India

S. No.	Name of bio-pesticide
1	<i>Bacillus thuringiensis</i> var. <i>israelensis</i>
2	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>
3	<i>Bacillus thuringiensis</i> var. <i>galleriae</i>
4	<i>Bacillus sphaericus</i>
5	<i>Trichoderma viride</i>
6	<i>Trichoderma harzianum</i>
7	<i>Pseudomonas fluorescens</i>
8	<i>Beauveria bassiana</i>
9	NPV of <i>Helicoverpa armigera</i>
10	NPV of <i>Spodoptera litura</i>
11	Neem based pesticides
12	Cymbopogon

Source: DPPQ&S Faridabad

Challenges with bio-pesticides

In present use of bio-pesticide is beneficial for society as well as for environment but it is also hard to promote. There are many reasons for this, as the market of chemical pesticides is off the peg and they are more easily found in almost every store than bio-pesticides, all the more chemical pesticides are cheaper than bio-pesticides and has more field efficiency.

In addition to this, the chemical pesticides' life span and target area is more than bio-pesticides. It is difficult to motivate the farmers for use of bio-pesticides due to above reasons.

Efforts to promote organic pesticides

To make the market accessible to bio-pesticides, the government should give different facilities to the manufacturers such as easier & cheap registration process. For the farmers to move more and more organic farming, the government should give exemption to bio-pesticides and For the farmers to adopt it more and more, the government should use the mediums like K.V.K, K.C.C. and agri-clinic more effectively. Various awareness programs and occasional farmers' festivals can also be contributing in this. Awareness and interest of bio-pesticides can also be generated by

farmers through RAWE, which is done by agricultural graduate students of universities and colleges, along with this, good research infrastructure, constructive support and policies can play vital role in the promotion of bio pesticides.

India has always been a country full of prospects for agriculture and farmers, where diversity occurs in our country's agriculture, there wide range of pests is also found, and we are dependent on various chemicals to keep them under control. But now Indian citizens have become aware of health and organic food and this awareness has given rise to the rapid demand of bio-pesticides. Now it is time that we must integrate our ancient knowledge with the new science, which will create awareness among the farmers for

healthier and chemically free agriculture with the help of bio-pesticide.

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