

Residual Impact of Triazophos on the germination of wheat (*Triticum aestivum* L.) Var. Lok-1

Khanday Arshid Ahmad ** Dwivedi H.S. * and Dwivedi P. *

**Research Scholar, Dept. of Botany, M.V.M, Ujjain.

* Dept. of Botany, M.V.M, Ujjain.

E-mail: garshidkhanday@gmail.com

Abstract

Increased demand for food and fiber has led to the chemicalization of agriculture with an increased input of chemical fertilizers and synthetic pesticides for amplified returns. It is estimated that India approximately loses 18 % of crop yield valued at Rs.900 billion due to pest attacks, against which specific pest management chemicals are applied frequently. Present study evaluates the effect of Triazophos (Organophosphorous broad spectrum insecticide and acaricide) on the germination of Wheat (*Triticum aestivum* L.) Var. Lok-1. The pesticide is mostly used on Soyabean for pest suppression; its residual nature can influence the subsequent germination of the cereal crop and diminish the returns there from. The effect of two concentrations of Triazophos, 0.5% and 1%, were assessed for a period of 14 days on the germination of Wheat seeds. Compared with the control, the results showed a significant decrease in the rate of germination with the increasing concentration of the pesticide. Also germination time increased drastically when compared with control.

Key words: Triazophos, agriculture, Pest suppression, Residual nature

Introduction

Pesticides are the different types of chemical or biological agents that through their effect deters, incapacitates or kills the target pests. Most of these pesticides are beneficial when handled properly and applied as per the references of the manufacturer. Specific pest management chemicals were introduced with the establishment of a plant of BHC near Calcutta in 1952 and now India is the second largest producer of pesticides in Asia after China and rank twelfth globally (Mathur,1999). However, over the years, there has been a mounting fear and concern that indiscriminate and impropportionate use of pesticides may lead to their residues in food chain which may exert their harmful effects in human beings and animals. Therefore It becomes necessary to understand the links between development and environment in order to make choices for development that will be economically efficient as well as environmentally sound. The studies on the mechanics of action of pesticides are exceedingly important, accumulative knowledge in this field will facilitate the development of more effective, efficient and presumably safer pesticides.

Various pesticides are often employed during the maturation of seeds on the parent plant. Such treatment can influence the subsequent germinability of the succeeding crop and reduce the output by significant amounts. It becomes a necessity to evaluate the residual nature of these pesticides in the treated soil and plant parts, mainly parts used for future propagation, and try to check the amounts to critical limits.

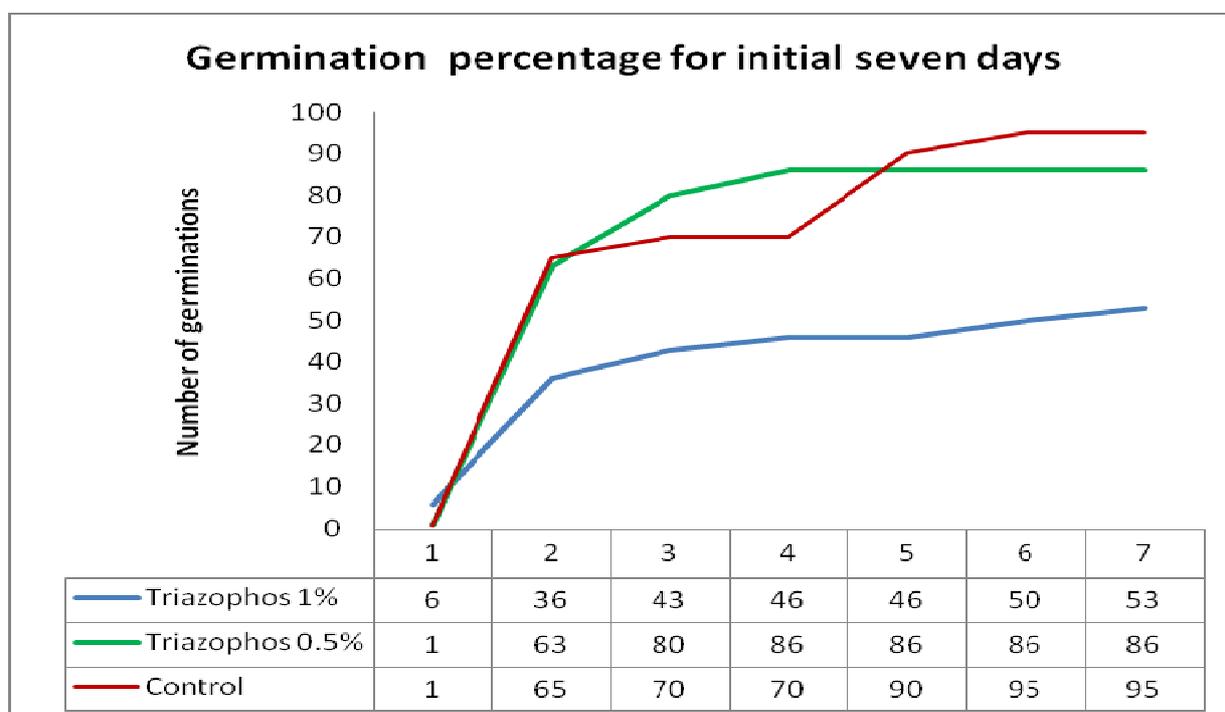
Material methods

Healthy certified seeds of Wheat (*Triticum aestivum* Var. Lok-1) were bought from the market of Ujjain. Seeds were surface sterilized with 1% solution of mercuric chloride for five minutes in order to restrict any fungal growth. The seeds were then washed 4-5 times with distilled water. Meanwhile petriplates were furnished with two layers of blotting paper as an adsorbent. Seeds randomly selected, were placed equidistant and each petriplate occupied equal number of seeds. Two concentrations, 1ppm and .5ppm, of the pesticide "Triazophos" were prepared and treatments were given at regular intervals to three replicates of each. No treatment was given to the control. The petriplates were incubated at 36.7 ± 1 and regular readings taken. The appearance of radicle was considered as successful germination.

Results and discussion

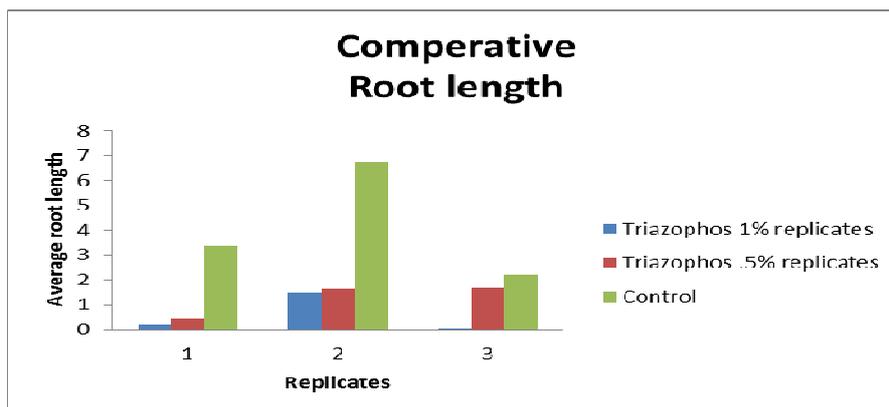
In the present investigation, the results clearly indicate the suppressive effect of Triazophos on seed germination in the Lok-1 variety of Wheat. Among the different concentrations of the pesticide applied, 1% Triazophos had the most deteriorating and suppressive effects.

	Triazophos 1%	Triazophos .5%	Control
Day 1	6	1	1
Day 2	36	63	65
Day 3	43	8	7
Day 4	46	86	7
Day 5	46	86	9
Day 6	50	86	95
Day 7	53	86	95
Day 8	53	86	95
Day 9	53	86	95
Day 10	53	86	95
Day 11	53	86	95
Day 12	53	86	95
Day 13	53	86	95
Day 14	53	86	95
Total average germination %	46 approx.	78 approx.	82 approx.



From the above results, it also becomes clear that all the seeds germinate in the initial seven days and thereafter no germination is observed either in treated or in control seeds. Highest germination percentage was observed in control, 2nd highest in .5% concentration of Triazophos and lowest germination percentage was shown by 1% Triazophos treated wheat seeds making it clear that the pesticide has a repressing effect on germination. The results for root length were also evaluated after seven days of incubation.

	Triazophos 1%	Triazophos .5%	Control
Replicate 1	.22cm	.44cm	3.36cm
Replicate 2	1.48cm	1.62cm	6.7cm
Replicate 3	.06cm	1.64cm	2.2cm
Overall average	.586cm	1.233cm	4.086cm



Reduction in the use of pesticides can only be achieved by using Integrated Pest Management (IPM). Resent trend employs physical, mechanical, cultural, biological, and educational practices to keep pest numbers low. Least-toxic pest control methods are used as a last resort. Moreover persistent pesticides leaving more residual matter (above their prescribed MRL) after cropping season should early be screened and feasible alternates suggested. More innovative technology to be developed in application of pesticides, a special care shall be given on the nozzles, sprayer or applicator with an intention to minimize the loss of applied pesticide to non-target organisms. Minimization of residue load in ecosystems should be tried to attain at any economic cost to secure the biological diversity of the planet.

Conclusion

The study proves the residual toxicity of the pesticide “Triazophos” on wheat seedlings of Variety Lok-1. Even though the use of pesticides is considered good for rising yield of crops but it affects the biochemical parameters like protein, carbohydrate and chlorophyll content of the non-target plants also. Residual nature of pesticides left after the cropping season also affects the successive crop yields generally by activation of metabolic processes in plant cells in response to chemical stress. It is vital to confirm that the usage of pesticides should be subject to control since they may have a toxic effect on farmers and on humans consuming the plant. It also point to the significance of toxicity testing of the applied chemicals like pesticides before use on the crops.

Acknowledgment

The authors are very thankful to the Head of the Department of Botany, MVM to provide the lab facilities.

References.

1. Akoy O, Deveci A, Kizilirmark S and Akdeniz G.B(2013). Phytotoxic effect of Quizalofop-P-Ethyl on Soyabean(*Glycine max* L.). J. Bio. Environ. Sci. 7(19): 49-55.
2. Bhadbhade B. J.,Sarnaik S. S and KonekavP. P(2002).Biomineralization of an organophosphorus pesticides monocrotophos by soil bacteria.Journal of Applied Microbiology. 93: 224-234.
3. Bhattacharyya A, Barik S.R and Ganguly P(2009). New pesticide molecules, formulation technology and uses: Present status and future challenges. The journal of Plant protection science. 1(1):9-15.
4. BlighE.G& Dyer, W.J (1959). A rapid method for total lipid extraction and purification. Can. J. Biochem. Physio. 37:911-917.
5. Briggles, L.N and Reitz, L.P,(1963).Classification of Triticum Species and of Wheat VarietiesGrown in the United States, Unites States Department of Agriculture bulletin No. 1278, 1-9.
6. BonnyS (2011). Herbicide-tolerant transgenic Soyabean over 15 years of Cultivation: Pesticide use, weed resistance and some economic issues. The case of USA.*Sustainability*. 3: 1302-1322.
7. Pratap V. and Sharma Y.K., Impact of osmotic stress on seed germination and seedling growth in black gram (*Phaseolus mungo*), J. Envi. Bio., 31(5), 721-726 (2010)
8. Siddiqui Z.S. and Ahmed S., Effects of Systemic Fungicides on Protein, Carbohydrate, Amino Acids and Phenolic Contents of Susceptible (Mexipak) and Resistant(Povan) Varieties of *Triticum aestivum* L., Turk J Bot., 26, 127-130, (2002)
9. Yadav S.K (2010). Pesticide applications- Threat to ecosystems.Journal of Human ecology. 32(1): 37-45.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

