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Evaluation of Plant Growth Parameters, Enzymatic ROS Scavenger and Non-Enzymatic ROS Scavengers in Soybean *("Glycine Max.(L.) Merril")* Under Pesticides Stress (Triazole)

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ABSTRACT

In the present investigation field experiments were conduct during the crop seasons in the months of February, 2016 using the Completely Randomized Block Design (CRBD) methods. After growing the plants were treat with three different Pesticides (Triazole) concentration i.e (100ppm, 200ppm, and 400ppm).Low concentration (100ppm) of pesticide increase leaf growth components as compare to control. Here our experiments were conduct to determine the effect of different concentration (100ppm, 200ppm, and 400ppm) of Pesticides (Triazole) on the Plant growth, Enzymatic ROS scavenger i.e Guaicolperoxidase (GPOD), and Non-Enzymatic ROS scavengers i.e Total phenol content, and Non-protein thiol of ("*Glycine max. (L.) Merril*"). Therefore, further research to determine that the dietary antioxidants could be beneficial to human health.

KEYWORDS: *Pesticides Stress (Triazole), Soybean ("Glycinemax. (L.)Merril") Guaiacolperoxidase (GOPD), Total phenol content, Non- protein thiol (NPT), and Plant Growth*

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INTRODUCTION

Soybean *("Glycine max.(L.)Merril")* is an important dicot crop due to the high content of oil and protein in seeds. Because it is potential for large-scale production, soybean has excelled in the world agricultural economy such as a major oilseed crop. Here, At present study that soybean are high protein meal for animal feed **(Singh et al., 2010).**soybean has a protein content of approximately 40%, and an oil content of approximately 20%. Soybean production has been enhanced from about 26 million tons in 1960**(Li-Juan et al., 2010).**

Overuse of pesticides in soil can be degraded, and community of organism living in soil. Some pesticides are toxic to soil organisms than others. In our study that when pesticides concentration (100ppm, 200ppm, and 400ppm) apply to soil. Some pesticides may break down fastly, while other pesticides for longer periods. Here, we are already know that soil contain rich variety of plants, and to produce vegetables, fruits, and green spaces. When you maintain healthy soil, so you can reduce the need for fertilizers, and pesticides but high concentration of pesticides can damage your soil. The use of synthetic pesticides as a crop protection chemicals has become the accepted ecological weapon for assure crop production with the restricted use of the organo chlorine insecticides, and organo phosphorus compounds are taking the major share of insecticide consumption in India **(Aditya et al., 1997).**Triadimefon is a triazole compound having fungicidal as well as plant growth regulating properties. Triazole makes changes in plant by preventing the enzyme activity of CytP450 (**Zhu, 2004).** Antioxidants are the substance, and protect cells from the damage caused by the free redical. Futhermore, plants are a sustantial source for antioxidants compounds, and these molecules protect the human cell from the free redicals which lead to cell damage, and they also protect the body from various biotic stress i.e ageing, physiological diseases, neurological diseases, cancer, and so on. The generation of reactive oxygen species (ROS) is one of the earliest responses of plant cells under abiotic stresses (**Leeetal., 2012**). In plants, ROS are formed as byproducts of aerobic energy metabolism and the plants being exposed to various biotic and abioticstresses (**Seloteet al., 2006**). Under normal conditions, the production of ROS in cells is maintained at low levels by antioxidant enzymes.

Material and Methodology

All experiments were conduct in the research laboratory of the department of Biochemistry from MohammadAliJauhar University, Rampur India. This study was Perform with soybean seeds *("Glycine max. (L.) Merril").* Seeds of soybean ("*Glycine max. (L.) Merril")* were sterilized with 1% $Hgcl_2$ for 10 min, then washed several times with distilled water and germinated for 3DAS in the dark on the floating plastic net. After germination, young seedlings were transferred to pot contain 3 kg soil with 1/4 strength modified Hoagland nutrient solution Series of pots was fill with an equal amount of 3 kg soil with 1/4 strength, and then25th of February in 2016 the equal number of sterilized seeds transver into the pots and 27th of February in 2016 to added Hoagland nutrient solution, and added a different pesticides concentrations, i.e. (100ppm, 200ppm, and 400ppm) of pesticides in the soil and mixed thoroughly. Samples were randomly collect at 32 (DAS) and determined the effect of three levels of pesticides on growth parameters (Plant length and leaf area). The plant length was measured from the soil level to the tip of the shoot, and the plant root length was measured from nodal initiation of the shoot to the tip of longest root. Enzymatic antioxidants such as Guaiacolperoxidase (GPOD)was measure according to **(Hammerschmidtr *et al.*, 1982)**. Non-Enzymatic antioxidants i.e the estimation of total phenol content was done in the soybean leaf by spectrophotometer using the method of the given by**(Bray et al., 1954).**Non- Protein thiol (NPT) also a non- enzymatic antioxidants. NPT was measured with Ellman's reagent **(Ellman 1959)**.

Statistical Analysis

All the statistical analysis was perform using computing. The data represented the average of the three replicates have been analyzed statistically and represented in figures. All parameters was determined using ANOVA.

Results and Discussions

Growth Parameters (Plant length)

Effect of Pesticides (Triazole) on shoot length

Our experiments showed that the plant shoot were take for measured on 32 DAP. total height of the plant increased at 100ppm with age in control. Triazole concentration (200ppm, and 400ppm) reduced the plant height (Shoot length) of soybean *("Glycine max. (L.) Merril")***(Fig.a).**Similar results were reported in Triazole treatments reduced stem elongation, and plant height in *Plectran thus for skholii* **(Lakshmanan et al.,2007),**and *Catharanthusroseus***(Jaleel et al., 2008a)**.

Effect of Pesticides (Triazole) on Root lenght

In our study also observed that the total root length of the soybean plant *("Glycine max. (L.) Merril")* was increased with Triazole at (400ppm) with the age of control and decrease at (200ppm, and 100ppm) treated plants **(Fig.b)**. Our results based on, an increase in root length was reported in paclobutrazol and triadimefon treated in *Catharanthusroseus* **(Jaleel et al., 2006b).**Paclobutrazolgreater the root length, and increase the lateral roots in tomato plants**(Berova et al., 20003).**

Effect of Pesticides on Leaf Area

The total leaf area of the plant decreased with the age in all the treatments. The more decrease at (400ppm), and than pesticides concentration (200ppm, and 100ppm) at 32 DAS were reducing total leaf area when compared to control in Soybean plant *("Glycine max. (L.) Merril")* **(Fig.c).**Our results based on the leaf area is decreased in *Pyrecantha species* under Uniconazole treatment **(Norcini et al., 1989).**On the other hand, a decreased leaf area was observed in the triazole treated *Beta vulgaris* **(Velayutham et al., 2003),** and also based on this results in Paclobutrazole treatment resulted in reduction of total leaf area in *Barassicanapus* **(Child et al., 1993).**

Enzymatic ROS scavenger

Effect of Pesticides (Triazole) on GuaiacolPeroxidase (GPOD)

Our experiment observed that in leaves of soybean ("*Glycine max. (L.) Merril*") the activity of Guaicolperoxidase (GPOD) was measure at (100ppm, 200ppm, and 400ppm) were enhance as compare to control **(Fig.d).**Similarly the result performed atan increase in Guaiacolperoxidase (GPOD) activity under the influence of the aromatic herbicide 1,10-phenantroline in the leaves of some species of plants **(Herman et al., 1998).**

Non-Enzymatic ROS scavenger

Effect of Pesticides (Triazole) on Total Phenol Content

In present study, the increased total phenolic content with the different concentration of pesticides at (100ppmm, 200ppm, and 400ppm) when compare to control**(Fig.e).**Our result based on, Increased phenol content was previously report in *Coleus plant* under hexaconazole treatments **(Lakshmanan et al., 2007).**According to **(Robbins2003),** after fermentation total phenoliccontent increased in soybean with findings reported by other investigator.

Effect of Pesticides (Triazole) on Non-Protein Thiol (NPT)

Pesticides showed enhancement in the level of Non-protein Thiolwith the increasing concentration of the pesticides at 100ppm, 200ppm, and 400ppm in the leaves of soybean ("*Glycine max. (L.) Merrill*") as compare to control**(Fig.f).**Based on the results of this study that protein, and thiol content was found to increase including heavy metals, and radionuclides have been demonstrated by many workers **(Gleba et al., 1999).**

Conclusion

Our results have shown that the potential for developing a healthy food supplement, or dietary adjunct, with soybean. Germination has resulted to an increment of antioxidant activities, and total phenolic content in soybean which reflected the enhanced of the nutritional level of the legumes. On the other hand, the study of antioxidants in fruits is important for several reasons. Fruits are a significant part of our daily diet and logical strategy to increase antioxidant intake and decrease oxidative stress. Adding antioxidants to the human diet could reduce diseases such as cancer.

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Seeds of Soybean

Germination of Soybean

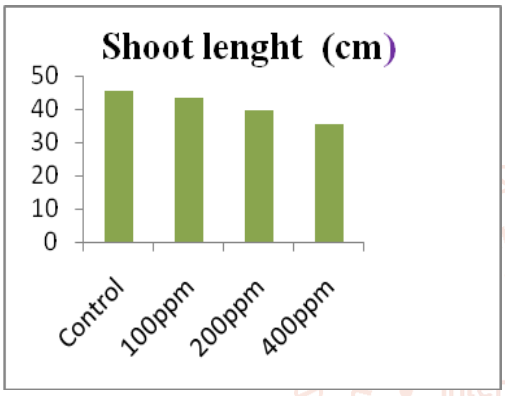


Fig.a

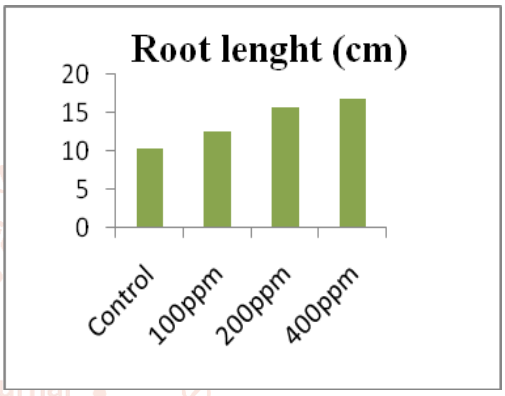


Fig.b

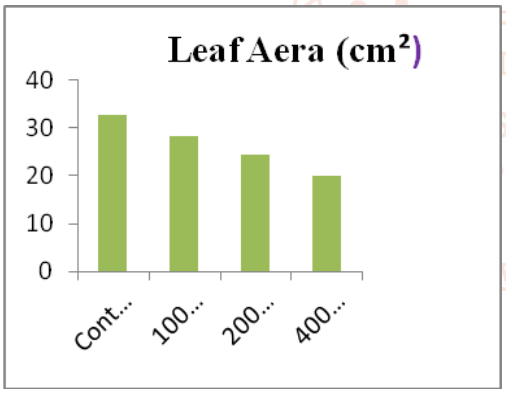


Fig.c

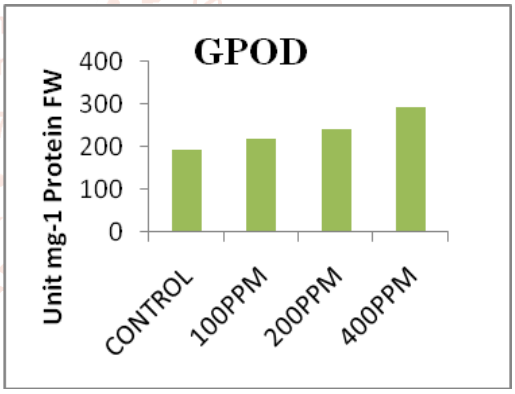


Fig.d

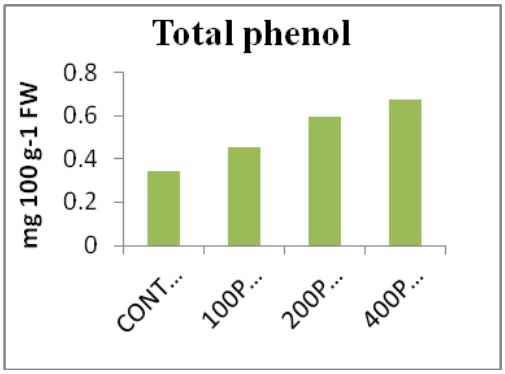


Fig.e

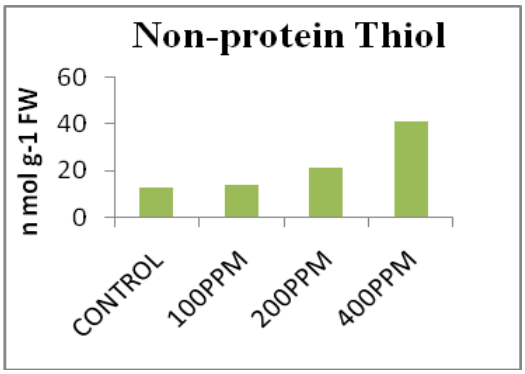
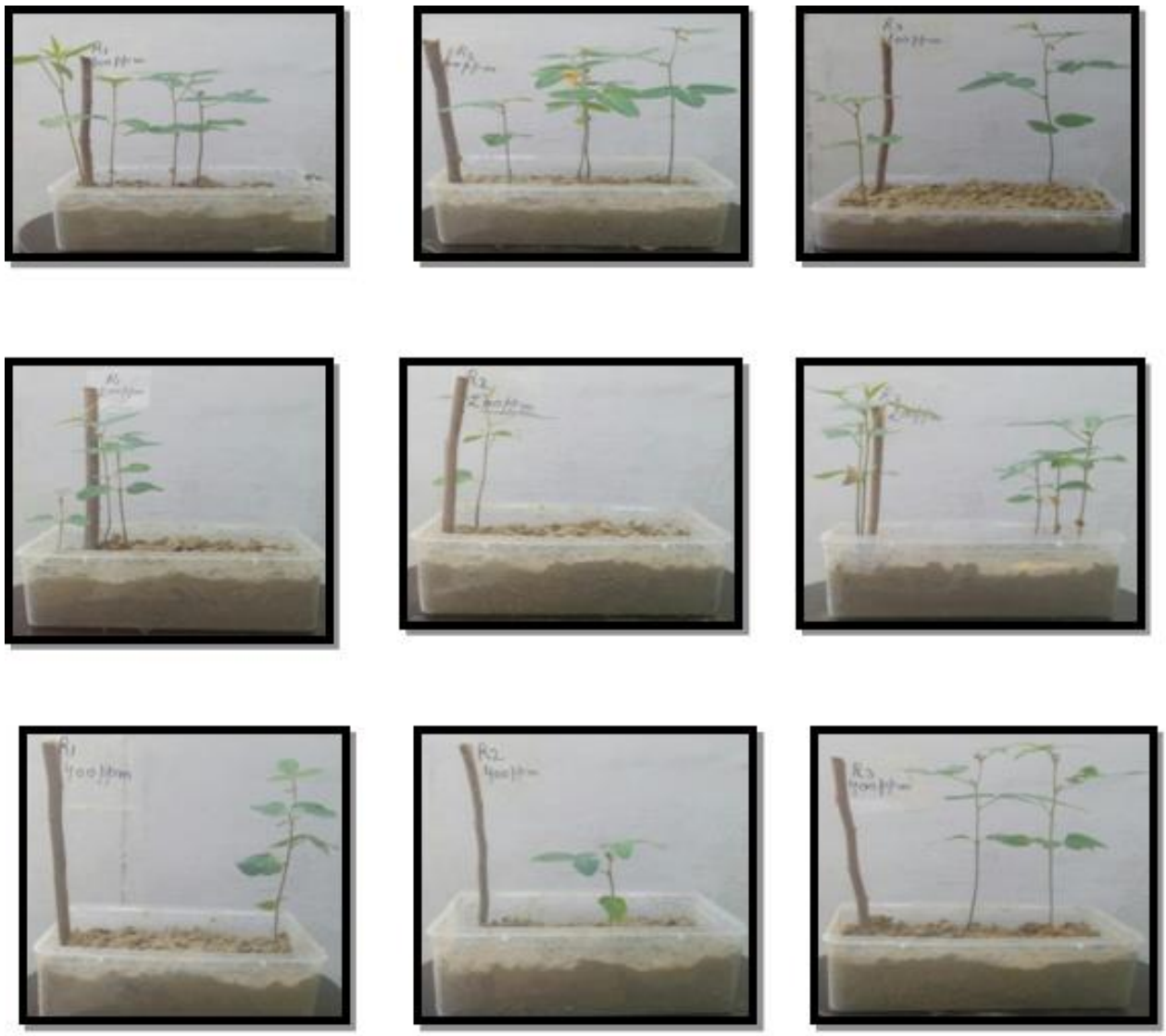


Fig.f

Effect of Pesticides (Triazole) on (fig,a) Shoot length, (fig.b) Root length, (fig.c) Leaf Area, (fig.d) Guaiacolperoxidase (GPOD), (fig.e)Total phenol content, and (fig.f) Non-protein thiol (NPT) inSoybean*("Glycine max. (L.) Merril").*



Plant growth under pesticides concentrations

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