

Effect of Nigella Sativa on Platelets in Organophosphorus Induced Toxicity in Albino Rats

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ABSTRACT

Objective: To evaluate the effect of Nigella Sativa on Platelets functions in Organophosphate induced toxicity in Rats.

Study Design: Experimental Study

Place and Duration of Study: This study was conducted at the Al Tibri Medical College Isra University Karachi Campus from January 2015 to July 2015.

Materials and Methods: Thirty albino rats were selected through random sampling and divided into three groups. Group A was the control group, Group B the group that was induced with Chlorpyrifos, whereas Group C was the interventional group in which the Chlorpyrifos and Nigella Sativa was given. At the end of the experiment, the rats were sacrificed and blood samples were collected via cardiac puncture, after which Platelet count was assessed. Data was analyzed using SPSS. To compare the mean values one-way ANOVA, followed by Post Hoc Tukey's test was done.

Results: The mean platelet count of the groups were $185 \times 10^3/m^3$ for Group A, $95 \times 10^3/m^3$ for Group B, and $115 \times 10^3/m^3$ for Group C. Significant difference was seen in the mean platelets count between Group A and B (P-value ≤ 0.01), and Group B and C (P-value ≤ 0.01). No significant difference was seen between Group A and C.

Conclusion: Nigella Sativa had a protective effect on Platelet count and hence function when Albino rats were subjected to Organophosphorus Poisoning.

Key Words: Nigella Sativa, Platelets, Organophosphorus Induced Toxicity, Albino Rats

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INTRODUCTION

Nigella sativa L is one of the most effective herbal plants that are derived from their seeds. It is well placed under the classification of edible plants with basic composition of fatty acids (polyphenols and tocopherols) along with major content of water-soluble vitamins and adequate quantity of minerals that are essential for maintenance of healthy environment of the body.¹ Their anti-inflammatory and antimicrobial activity are main functional part of the seeds. The seeds and oil both having essential components that can establish the antioxidant status of the body.² Kalongi is the common name of these seeds, and they are the part of daily cuisine on our society especially in

Asian Countries. This plant belongs to the family of Ranunculaceae, and specie Sativa. Multiple studies establish the evidence regarding various benefits of the seeds.³⁻⁴ Organophosphate is one of the poisons that creates oxidative stress in the body. They can over stimulate the cholinergic system and generates the oxidative stress, and alter the pathophysiology.⁵ In developing countries the ratio of poisoning increases due to its excessive use, and lack of awareness regarding potential use of that product. Common site or exposure is its industrial usage as pesticides.⁶ Most affected site is South Africa according to the report of epidemiology.⁷ According to some case reports the thrombotic complication may occur due to acute poisoning.⁸ Acute poisoning also alter the blood indices.⁹ The poisoning also reports the deformation of the erythrocytes membrane due to inflammation, and also change the size and morphology of erythrocytes.¹⁰ The basic purpose of this study is to evaluate the effect of black seeds in treating organophosphate poison and their influence on platelet count.

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MATERIALS AND METHODS

The experimental study was designed at Al Tibri Medical College Isra University Karachi Campus from January 2015 to July 2015. After taken an ethical

approval from the concerned authority, total 30 numbers of rats were randomly selected from the animal house. The animals were divided into three groups on the basis of treatment plan, and each group having 10 numbers of rats with weight of 150-250 gms. Group A (Control) given normal saline and normal diet with 12 hours light and dark cycle. Group B (toxic) group given orally with Chlorpyrifos daily for 6 weeks (The dose was given 4.2 mg/kg b.w. - 1/20th L D₅₀). Group c (treated) group Chlorpyrifos with *Nigella sativa* for 6 weeks. (The dose was given 4.2mg/kg b.w. - 1/20 LD₅₀ + 500mg/kg b.w. The *Nigella* seeds extract were washed under tap water. The seeds were placed and spread properly on cotton cloth. The room temperature was maintained between 35°C - 40°C in day time and 25°C - 30°C at night. This procedure was done continuously for 6 weeks, till the seed were completely dried. After dryness the seeds were converted into powder by using grinder. The desired compound was concentrated in the distillation flask, and made the ethanol based extract. Each animal was anaesthetized by giving deep ether anesthesia then dissected through midline abdominal incision. Thoracic cage was retracted. The heart was exposed, and blood samples were collected via cardiac puncture from each rat with the help of syringe. Blood was collected in heparinized tubes for the assessment of blood parameter. The data was analyzed through SPSS. To compare the Mean values one way of ANOVA was applied followed by post hoc Tukey's test, and the p value was considered significant at <0.05.

RESULTS

Figure 1 shows the Mean Platelets values among the different therapeutic groups
 Table 1.1 shows the comparison of Mean with level of significance among different therapeutic groups.

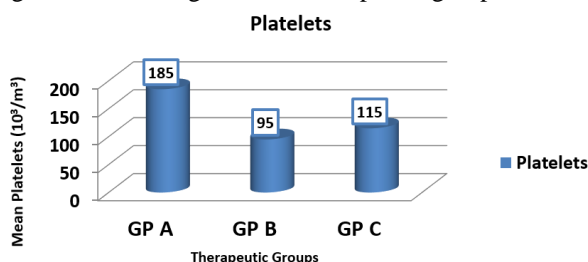


Figure No.1: The Mean Platelet count among the different Therapeutic groups

Table No.1: Comparison of Mean platelet values among the therapeutic groups

GP B vs A	GP B vs C	GP A vs C
≤0.001	≤0.001	0.005

DISCUSSION

Organophosphate compounds are commonly used as agricultural insecticide. However, its use has been directly proportional to global morbidity and mortality, with a greater predilection in developing countries¹¹. With Organophosphate accounting for three million cases annually, it is important to control its use and find treatment modalities that might reverse its life threatening effects. Organophosphate inhibit the enzyme acetylcholine esterase (AChE) which in turn results in accumulation of acetylcholine, overexciting acetylcholine receptors and the parasympathetic pathway¹². Organophosphate poisoning in the acute setting has a potentially of inducing thrombotic abnormalities¹³. Cohort studies have shown to increase prothrombotic diathesis in patients with organophosphate intoxication¹⁴. Many studies have gone onto show that Organophosphorus poisoning effects the platelets by inducing thrombotic events such as Deep vein thrombosis and pulmonary thromboembolism¹⁵⁻¹⁶. *Nigella Sativa* is hailed as a miracle herb, due to its miraculous therapeutic properties such as antihypertensive, liver tonics, diuretic, digestive, anti-bacterial, and analgesic¹⁷. *Nigella Sativa* was studied to see if it had any effect on the platelet levels in Organophosphorus pesticides. The interventional group C proved to show positive result when given *Nigella Sativa*, preventing significant reduction in the platelet levels. Although the platelet count wasn't as high or greater than Group A, the control group, it still managed to produce appreciable results showing off the miraculous properties of this herb. In another study, *Nigella Sativa*'s preventive features were studied when rats were exposed to Diazinon, an organophosphate insecticide similar to the one in our study. The study showed that administration of *Nigella Sativa* attenuated the hematological changes that are caused by Diazinon¹⁸. *Nigella Sativa* also had a protective role in reproductive and hormonal alterations when induced by Chlorpyrifos, the same agent we used in our study¹⁹. This shows that not only does *Nigella Sativa* has a protective role on the hematological parameters of the body, which is also proven from our study, but cab exhibit protective efforts on other organs as well. We only went onto evaluate the platelets in our study, future studies can be done on other hematological parameters such as Red Blood Cell Count, Hematocrit, Mean Corpuscular Volume, Hemoglobin, Mean Corpuscular Hemoglobin Concentration, and White Blood cells as done in various studies²⁰. However, uniqueness of our study is that Platelet count has not been studied often and knowing the fact that Organophosphate compounds can cause thrombotic events, more research needs to be done here.

CONCLUSION

Our study can concluded that *Nigella Sativa* prevented a decline in platelet count in Organophosphorus induced poisoning, thereby exhibiting a protective effect on the platelets.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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