Summary & Conclusion
5. SUMMARY AND CONCLUSION

The organophosphate insecticide, dimecron when introduced into the fertilized hen's egg at a certain dose before incubation to see the action of the pesticide in developing chick embryo, shows a characteristic and interesting feature which has been studied and discussed in details. Further, the toxicity develops due to the introduction of the pesticide is recovered by the use of ameliorating agents like Vit C and Vit E, those help in ameliorating the toxicity symptoms. The present study shows that the chick embryo tolerates the dose to some extent. For the specified dose the mortality rate increased with the increased time of exposure and the percentage of formation of abnormal embryo gradually decreases suggesting a condition of lethality to the abnormal due to treatment. It is interesting to note that when the mortality rate in the treated embryo is very high in comparison to control, the difference in the rate of abnormality comes down. The loss of neuromuscular control and inhibition of cholinesterase activity is the cause of lethality for pesticide exposed embryos.

On the other hand the gross weight of the whole body becomes reduced due to the water loss from the cell as well as intercellular space. Reduction of the growth of the body concurrently may affects the length and breadth of the whole body and the result is the formation of abnormal embryos. It can be concluded that the usual process of differentiation in formation of the organ systems and other structures those are externally visible in embryos may be hampered due the introduction of the pesticide.

The hematological parameters in the present study shows an unexpected effect treated with dimecron in the developing chick embryo. The present blood picture justifies that dimecron has some relation with the changing pattern of the blood parameters. The changes are related with the reduction in the number of erythrocytes, hemoglobin level, PCV, MCH and MCHC. The present study also encounter an increase in MCV suggesting an intensified compensating activity of hematopoiteic system in response to the hemolytic action of the pesticide. The fall of erythrocyte count and hemoglobin level with a simultaneous tendency to fall of hematocrit value may be related with intensive decrease of reticulocyte count during the period. The
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decrease rate of reticulocyte may have some correlation with the fall of MCH and MCHC.

The present study of total leukocyte count can be attributed to the effect of dimecron as a chemical stressor. A considerable increase in number of both lymphocyte and neutrophil is observed during different period of epigenesist due to pesticide intoxication. The number of eosinophil is also on increasing side. The mobilizing activity of reticuloendothelial can be attributed to the change towards an increasing side in the number of monocyte. Simultaneous decrease in the number of basophil indicates that pesticide causes a general granulocytolysis. Collectively leukocyte data suggests an inhibiting activity in lymphocytopoeisis in developing chick embryo due to the action of the pesticide.

It is well known that morphogenetic process is nothing but a chain of reactions in each step and each step of morphogenesis is controlled and determined by some biochemical trigger. Thus a quantitative study of proteins from different organs viz. liver, kidney and brain has been made in the present study. A significant reduction in the quantity of the protein of all the organs is observed. Further the study witnessed the activity of DNA and RNA that undergoes a decline in its quantity by the action of the pesticide. The results of the study can be attributed to the strong toxic effect of the pesticide.

It may further be noted that the activity of enzymes in terms of both acid and alkaline phosphatases, there is increase of acid phosphatase but decrease in alkaline phosphatase measured in the liver as well as in kidney. The rise in acid phosphatase activity indicates a possible in vivo labilization of lysosomal membranes with the release of acid phosphatases. The decrease in alkaline phosphatase is due to the strong toxic effect of the pesticide accompanying the decrease in total protein as mentioned earlier. The present study also includes acetylcholinesterase activity of brain which has been inhibited by the action of Dimecron. The over stimulation of cholinergic neuron initiates a process leading to structural brain damage of the organism, causing inhibition of the enzyme.

Present study of transaminase activity is very interesting as it shows both activities increased and that might have some correlation with the cellular damage and
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or stress condition. The LDH activity is also increased due to pesticide action which may be related with increase in lipid peroxidation that causes increase in LDH leakage.

With the enzyme activity so far discussed the oxidative stress parameters as lipid peroxidation, GSH and activities of antioxidant enzymes like catalase and glutathione peroxidase are also recorded. The lipid peroxidation level has been increased with whereas the GSH level is decreased in the present experiment conducted on chick embryos treated with dimecron insecticides. In the present study, it has also been reported that the activity of catalase is decreased due to the pesticidal action. The decreased activity of GPx is a factor that plays a role in minimizing the level of GSH resulted in disturbing in redox status i.e. GSH/GSSG ratio. Involvement of the glutathione metabolism in the toxicity of dimecron is also worth mentioned.

The two vitamins those are used in the present study for amelioration of pesticide toxicity act as biological antioxidants. Vit C, that is considered as a well known antioxidant in biological system, has a power of reducing a variety of oxidative compounds especially free radicals. When ascorbate scavenge free radicals, the resultant dehydroascorbate is reduced to ascorbate to be used repeatedly. Further, Vit E also acts as a primary radical scavenger in biological membranes. These are continuously regenerated at the expense of ascorbate and GSH oxidation. The results so far reported here clearly show that intoxication with dimecron caused a disturbance in oxidative and antioxidative balance in the study.

The ameliorative agents have protective role in either increasing or minimizing the effects in all the parameters studied. Thus it is concluded that the ameliorating agents increases the tolerance against oxidative stress and decreases the toxicity generated by dimecron pesticide in developing chick embryos.