
Summary and Conclusion

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Indigenous plants have been the traditional source of raw materials for the manufacture of medicines. The diverse culture of our country is a rich source of traditional medicines. The trend of using natural products has increased and the active plant extracts are frequently screened for new drug discoveries.

Free radicals may attack life important molecules such as DNA and membrane lipids and play a role in the pathology of numerous chronic diseases. Growing evidence has shown that an inverse correlation between intake of dietary antioxidants and the risk of chronic diseases such as coronary heart diseases, cancer and several other age-associated health problems.

In recent times, focus on plant research has increased all over the world and a large body of evidence has been collected to show the immense potential of medicinal plants used in traditional systems. Various medicinal plants have been studied using modern scientific approaches and the results have revealed the potential of medicinal plants in the area of pharmacology.

Increasing evidence indicates that *Triticum aestivum* (wheat) and wheat-based food products contain significant levels of natural antioxidants, which may provide health benefits to consumers in addition to general nutrients and energy. So the present study was formulated to understand the antioxidant properties of *Triticum aestivum*. Earlier studies in our laboratory have shown that the leaves of 4th day plant of wheat possess the maximum antioxidant capacity than 8th and 12th day.

The conservation of molecular and physiological systems shared between humans and flies has allowed the use of *Drosophila melanogaster* system for the study. Moreover, it is relatively easy to culture, has a conveniently short life span, consists of mostly post mitotic tissues (except for the reproduction system and a small part of the gut), have fully sequenced genome and well-characterized genetics.

The study thus focused on the evaluation of enzymic and non-enzymic antioxidants status in the *Drosophila* subjected to oxidative stress induced by H₂O₂/CCl₄ at two different concentrations in the presence and the absence of the *Triticum aestivum* leaf extracts.

The activities of the enzymic antioxidants, superoxide dismutase, catalase and peroxidase were analyzed. These enzymic activities were found to decrease by CCl₄/H₂O₂ administration in the male and female flies. A great depletion in the enzymic activity was found in the female flies exposed to H₂O₂. The result, also show that the depletion is severe as the concentration of the oxidants increased.

Co-administration of the aqueous extract of *Triticum aestivum* leaves significantly increased the activities of these enzymic antioxidants. The reversal in the activity of SOD to near normal range was obtained in the male and female flies subjected to stress induced by lower dose of CCl₄. Though there was a marked increase in the activity of this enzyme, in the other groups exposed to high dose of CCl₄ and H₂O₂ (low and high dose) reversion was not obtained. A similar trend was obtained in the case of catalase and peroxidase, but the control level was reached only in the male flies subjected to oxidative stress induced by the lower dose of CCl₄.

Co-administration of leaf extract increased the activity of catalase and peroxidase in all the other groups.

The level of non-enzymic antioxidants, vitamins C, E and reduced glutathione were also analyzed. There was significant decrease in the level of these non-enzymic antioxidants in the flies subjected to oxidative stress induced by H₂O₂/CCl₄ at both the concentrations. The extent of decrease in the levels was related to the concentration of the oxidant used. The higher the concentration, the more severe was the depletion in the levels of vitamins C, E and reduced glutathione. The higher dose of H₂O₂ caused the antioxidant level to decrease to a very low level in the female flies.

When the aqueous extract of *Triticum aestivum* was co-treated with both the oxidants, there was significant increase in the levels of non-enzymic antioxidants. These non-enzymic antioxidants were increased to near normal levels in the male flies exposed to the lower dose of CCl₄. There was marked increase in the levels of vitamins C, E and reduced glutathione in male flies exposed to the higher dose of CCl₄ but the reversal was not possible by the co-treatment of leaf extract. A similar trend was observed in the male and female flies exposed to the lower and higher doses of H₂O₂. In addition, the males were found to respond better than the females.

Thus, the present study has confirmed the antioxidant potential of the *Triticum aestivum* leaf extracts under conditions of oxidative stress in *Drosophila melanogaster*. This observation strongly suggests that the *Triticum aestivum* leaves can be used in medicinal preparations to combat the disorders caused by oxidative stress.

This study, also have proved that *Drosophila melanogaster* can be effectively used as *in vivo* model system to assess the effects of oxidative stress and their modulation by plant extracts and their components. This study thus validates the use of the fruitfly in studies assessing the oxidant-antioxidant stress.

SUGGESTIONS FOR FURTHER STUDIES

- ✓ Further studies are required to understand the mechanism of the leaf extracts in protecting biomolecules. The active components can be isolated and purified and their effect can be studied further against oxidative stress.
- ✓ The end points of oxidative damage to biomolecules (like lipid peroxidation and DNA damage) can be followed in conditions of oxidative stress in the presence and the absence of *Triticum aestivum* leaf extract.
- ✓ The *Drosophila* tissues can be cultured and the effect of leaf extract can be studied in this system.