



ANTIOXIDANT EFFECT OF WHEAT GRASS (*TRITIMUM AESTIVUM* LINN) IN ALBINO RATS INDUCED WITH MYOCARDIAL INFARCTION.

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ABSTRACT

Context: Oxidative stress is an imbalance between free radicals and antioxidants in your body.. Whole grain like wheat (*Triticum aestivum* Linn.) may have cardioprotective effect by decreasing the oxidative stress..

Aims: This study was carried out to find out the cardio-protective potential of *Triticum aestivum* Linn by observing its antioxidant effect on Isoproterenol induced myocardial infarction in rats.

Settings and Design: This was a longitudinal study done on thirty healthy albino rats

Methods and Material: Thirty albino rats were grouped into five groups of six rats in each, and housed in separate cages group-wise. All groups except control received Isoproterenol. In addition to Isoproterenol, two groups were given wheat grass at different dosage and one group received Carvedilol. malondialdehyde, SOD (superoxide dismutase), and reduced GSH were estimated.

Statistical analysis used: ANOVA test and post hoc Dunnett test using SPSS version 16, unpaired t test Results: wheat grass treated rats showed significant decrease in Malondialdehyde, and significant increase in Superoxide dismutase and reduced GSH

Conclusions: *Triticum aestivum* may prevented the ISO induced cardiotoxicity by its antioxidant action...

KEYWORDS : *Triticum Aestivum* Linn, Oxidative Stress

TEXTINTRODUCTION:

Oxidative stress is an imbalance between free radicals and antioxidants in your body. Free radicals are oxygen-containing molecules with an uneven number of electrons. The fine balance between ROS and antioxidants is disturbed when excessive amounts of free radicals are produced or antioxidant capacity is decreased. This disturbance is known as oxidative stress and it plays an important role in cardiac pathophysiology. Under conditions of oxidative stress, Reactive oxygen species attack biomolecules that are in close proximity. Mitochondrial and nuclear DNA damage, protein cross-linking and lipid peroxidation occurs, resulting in mutations, protein denaturation and loss of enzyme and membrane pump function. Thus antioxidant may play important role in prevention of heart disease. (1,2)

Whole grain like wheat (*Triticum aestivum* Linn.) finds a place in the recommended DASH diet and is an important component of human diet, particularly in developing countries. Epidemiological studies reveal that consumption of whole grain and its products are protective against chronic diseases such as cardiovascular diseases, diabetes and cancer. Wheat when harvested as young green shoots germinated over a period of 6-10 days is generally called 'wheat grass' and it is known as 'functional food' during which vitamins, minerals and phenolic compounds such as flavonoids are synthesized in wheat sprouts reaching maximum antioxidant potential.(4) Herbal products are highly acceptable and used 70 to 80% of the world population for their primary health care, especially in developing countries, due to their easy access, lesser side effects and low cost. It is also known to possess antioxidant as proven in several studies. (5,6) This property might protect the heart and preventing the most important cardiovascular complication. This study will definitely help and add knowledge in scientific exploration of cardio-protective potential of this promising herb in animal models. With this study, we had tried to find out the antioxidant potential of *Triticum aestivum* Linn. by observing its effect on Isoproterenol induced myocardial infarction in rats.

SUBJECTS AND METHODS:

This was a longitudinal study done on thirty healthy albino rats weighing between 100-200gms. Prior to the dietary manipulation, all rats were fed standard rat chow, containing 60% vegetable starch, 11% fat and 29% protein, water ad libitum and maintained on 12 hours light/dark cycle. Simultaneously rats were acclimatized to the procedure of blood pressure measurement daily for one week.

DRUGS & CHEMICALS:

The drugs selected for the study were obtained in pure powder form from the following sources.

- 1- *Triticum aestivum* powder –Girmes wheat grass, Pune
- 2- Carvedilol – Alkem Company, Mumbai, Maharashtra, 400013
- 3- Isoproterenol (ISO) – Get well Pharmaceuticals, New Delhi

Myocardial Infarction was induced in rats by intraperitoneal injection of Isoproterenol hydrochloride at a dose of 20mg/100g body weight, dissolved in normal saline for 2 consecutive days.

Thirty albino rats were grouped into five groups of six rats in each, and housed in separate cages group-wise, as follows.

Group 1 (Control) : Rats were administered Normal saline 0.5ml orally for 15 day followed by Normal saline 5ml s.c. on 14th& 15th day, at an interval of 24 hr.

Group 2 (ISO) : Rats were administered Normal saline 0.5 ml orally once daily for 15 days followed by ISO 20mg/100g body weight subcutaneously on the 14th& 15th day, at an interval of 24 hr.

Group 3 (TR low dose + ISO) : Rats were pretreated with *Triticum aestivum* low dose 200mg/kg orally for a period of 15 days followed by subcutaneous injection of Isoproterenol 20mg/100g body weight on 14th& 15th day at an interval of 24 hr. Group 4 (TR high dose + ISO): Rats were pretreated with *Triticum aestivum* high dose 250mg/kg orally for a period of 15

days followed by subcutaneous injection of Isoproterenol 20mg/100g body weight on 14th & 15th day at an interval of 24 hr.

Group 5 (carvedilol + ISO): Rats were pretreated with carvedilol 5mg/kg orally for a period of 15 days followed by subcutaneous injection of Isoproterenol 20mg/100g body weight on 14th and 15th day at an interval of 24hr.

| Group | Drug | Dose | Duration | Induction of MI |
|-------|---------------------------|----------|-------------|---|
| 1 | Distilled Water | 0.5 ml | For 15 days | No treatment |
| 2 | Distilled Water | 0.5 ml | | Isoproterenol 20mg/100gbwt. SC Inj on 14th& 15th day. |
| 3 | Triticum aestivum Extract | 200mg/kg | | |
| 4 | Triticum aestivum Extract | 250mg/kg | | |
| 5 | Carvedilol | 5mg/kg | | |
| | | | | |

BIOCHEMICAL STUDIES :

The cardiac tissue was homogenised and biochemical parameters like malondialdehyde, SOD (superoxide dismutase), and reduce GSH were estimated. This was done using standard method. (7)

Table 1: Effect of *Triticum aestivum* Linn. on various Antiox idant parameters .

| Parameters (mmHg) | Group1 CONTROL (Distilled Water) | Group2 CONTROL ISO 20mg/100gbwt | Group3 WG200mg/kg +ISO 20mg/100gbwt | Group4 WG250mg/kg +ISO 20mg/100gbwt | Group5 Carvedilol 5mg/kg+ ISO 20mg/100gbwt |
|----------------------|----------------------------------|---------------------------------|-------------------------------------|-------------------------------------|--|
| Malondialdehyde ± SE | 89.14 ± 6.29 | 307.207*** ±5.04 | 130.99* ±6.16 | 110.25*** ±2.87 | 84.79 ±4.44 |
| SOD ± SE | 10.65 ±1.01 | 6.88 ±0.56 | 9.9* ±1.11 | 10.98 ±1.15 | 10.4 ±0.71 |
| GSH ± SE | 2.45 ± 0.34 | 1.32*** 0.17 | 1.798* ±0.17 | 2.6*** ±0.17 | 1.988*** ± |

*. P<0.05, **. P<0.01, ***. P<0.001

DISCUSSION:

This study was carried out to find out to the antioxidant potential of *Triticum aestivum* Linn. by observing its effect on Isoproterenol induced myocardial infarction in rats. Thus the cardio-protective potential of *Triticum aestivum* Linn. by observing its effect on Isoproterenol induced myocardial infarction in rats was studied.

Wheat grass refers to the young grass of wheat (*Triticum aestivum*) germinated for a period of 6 to 10 days. It contains vitamin C and E, β carotene, ferulic acid, vanilic acid and phenols, especially flavonoids. Wheat grass juice is found to have healing properties in various degenerative diseases and is known to benefit blood cells, bones, glands, kidney and other parts of the body. (8,9,10) Since little or no work has been done on antioxidant effects of wheat grass, the present study was designed to analyse its role on Isoproterenol induced myocardial insufficiency.

In the cardioprotective study, first myocardial-infarction was induced with a β-adrenergic agonist Isoproterenol, which caused severe stress in the myocardium causing coagulative necrosis (i.e. infarct like) of heart muscle. Cardiac markers are biomarkers measured to evaluate the heart function. They are creatine phosphokinase, Lactate dehydrogenase, aspartate aminotransferase etc.

The present study showed development of oxidative cardiac injury induced by ISO by the myocardial cell damage, the alteration in oxidative stress markers and the significant decrease in SOD as well as the levels of reduced GSH in the heart tissue. Cardioprotection was confirmed by the decrease level of serum markers of heart damage and elevated levels of GSH, SOD. (10,11)

To conclude, the present result suggests that *Triticum aestivum* may prevented the ISO induced cardiotoxicity by its

Statistical Analysis--The comparison were done using ANOVA test and post hoc Dunnett test using SPSS version 16, unpaired t test and p<0.05 was considered as statistically significant.

RESULTS:

Effect of *Triticum aestivum* linn. on various antioxidant parameters is shown in Isoproterenol induced myocardial infarction in albino rats. (Table 1) Malonaldehyde levels are increased in Isoproterenol treated group and it is not increased significantly in treatment group and carvedilol treated group. Triticum treated group has significantly reduced amount of malonaldehyde as compared to Isoproterenol treated groups. Superoxide dismutase levels are decreased in Isoproterenol treated group and it is not increased significantly in treatment group and carvedilol treated group. Triticum treated group has significantly increased amount of superoxide dismutase as compared to Isoproterenol treated groups.

Thus wheat grass treated rats showed significant decrease in Malondialdehyde, and significant increase in Superoxide dismutase and reduced GSH.

antioxidant action.. Wheatgrass extract can be a good alternative or primary therapy in treating cardiovascular diseases myocardial infarction in future.

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