Study the anti-oxidant property of *Tris*-(4-phenoxyphenyl) amine

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Abstract: The present paper demonstrated the antioxidant activity of ***Tris*-(4-phenoxyphenyl) amine** versus the alcohol induced oxidative damage in albino wistar rats. In the study, the alcohol 30% exposed rats were found to be more prone to peroxidative risk as they are calculated by species of thiobarbituric acid. It was observed that, after the rats induction with 30% alcohol, concentration of lipid peroxidation has been obtained expressively ($P \leq 0.001$) high in a liver and serum, beside with concomitant substantial ($P<0.001$) reduced in enzymatic and non-enzymatic antioxidants as well as ceruloplasmin in serum along with liver, only 30% alcohol was treated.

Keywords: Antioxidants, oxidative damage, thio-barbituric acid.

Introduction: Antioxidants are the compounds which inhibits the oxidation. Any chemical reaction producing the free radicals, thereby leads to chain reaction which might harm the organism cells and is termed as oxidation. Thiols or ascorbic acids (Vit. C) terminates these chain reactions and acts as antioxidants. For balancing the oxidative stress, animals and plants maintains complex system of the overlapping antioxidants, like glutathione and enzyme such as superoxide mutase and catalase, produced internally, or the dietry antioxidant Vitamin E and Vitamin C. The antioxidants are commonly having two different groups of substrates in use: the industrial chemicals products for oxidation prevention, as well as the natural compounds present in the tissues as well as food. The industrial oxidants have varied utilization: performing as the preservatives in the cosmetics along with foods as well as in fuels as a oxidation-inhibitors. (1)The antioxidant dietry supplement has not demonstrated any improvement in human health, or to be active in preventing the disease. (2)

Examples of Bioactive Anti-oxidant compounds:

Anti –oxidants are classified as hydrophilic (soluble in water) and hydrophobic (insoluble in water. The hydrophilic antioxidant reacts with the oxidants present in blood plasma along with cell cytosol, whereas the cell membrane is prevented by hydrophobic antioxidants. (3) All these compounds can be produced in a body as well as could be found from food and other food products. (4) There are present different oxidants in the body fluids and tissues, example glutathione or ubiquinone which is mostly present in the cell, whereas few other like uric acid is uniformly distributed (below table). In some organisms antioxidants are found as well as these compounds could be significant in the pathogens along with virulence factors. (5) Interaction among the antioxidants is such a complicated issue, having most of an antioxidant compounds as well as antioxidant enzyme system with interdependent along with synergistic effect on each other (6, 7). The mode of action of the antioxidant depends on the functioning of the all members of an antioxidant system. (4) The amount of protection delivered through any antioxidant can also be governed by its reactivity to the ROS (Reactive Oxygen Species) being deliberated, the antioxidant as well as concentration status having its interacting. (4)

Many of the compounds exhibits antioxidant defence by the chelating transition metals as well as inhibit them from catalyzing the production of free radical in a cell. There is extensive evidence to implicate free radicals in the recent research and development of many of the degeneration diseases (8). The free radicals need to be implicated in causation of ailments like nephrotoxicity, liver cirrhosis, and diabetes, etc.(9) The free radicals intermediated Lipid peroxidation calculated to become a main mechanism of cellular damage as well as cellular membrane devastation.(10) Just about the most extensively examined instance will be the lipid peroxidation activated by hepatotoxin alcohol model. Generally there seems in order to be rising evidence about alcoholic toxicity might be connected with free radical related injury as well as raised oxidative stress. (11) Production of oxygen metabolites including O_2^- (superoxide), H_2O_2 (hydrogen peroxide) as well as OH^- (hydroxyl radical) is thought to be essential in the

pathogenesis of alcohol liver injury.(12) To deal with the oxidants, cells have many antioxidant enzymes like GPx, GSH, CAT, and SOD.

Recently, antioxidative activities of N-oxides of tertiary amines have been carried out.(13) Antioxidative kaempferol impacts as well as their equimolar mixture having phenyltin compounds has been also studied.(14,15) Souza and Giovani (16) demonstrated that the complicated flavonoids has high impact as compared to free flavonoids. Further, it has been argued that the high antioxidant complexes' activity is because of only adding superoxide dismutating centers.(17) Boadi *et al*., (18) have shown that the complexed flavonoid provide more protection as compared to single treatment as well as can also be recognized to raised scavenging chelating abilities of a combined treatments as compared to single treatment.

Experimental:

Synthesis of Tris-(4-phenoxyphenyl) amine (20):

K_2CO_3 (1 gm), 18-crown-6-ether (1.5 gm), phenol (0.6 ml, 6mmol), and Tris-(4-bromo-phenyl)-amine (1 gm, 2mmol) (19) were dissipated in 10ml of acetone as well as for 60hrs at 50°C as shown in Fig 6.34 it is allowed to reflux. TLC monitors the progress of reaction in hexane: ethyl acetate (70:30%). Furthermore, 100ml distilled water is used for quenching the reaction as well as chloroform (4x50ml) is used for extracting the organic compound. Next, organic layer was collected as well as sodium sulphate is used for its drying. Rotavapo is used to remove the solvent as well as column chromatography (Hexane: Ethyl acetate, 80:20) is used for purifying the compound. The resultant product is having a 129°C melting point and is of pale yellow color.

Anti-oxidant Study:

Optimum dose selection of Tris-(4-phenoxyphenyl) amine

Rats have been categorized into 5 groups of ten animals and given orally 20-100 mg/kgbwt/day Tris-(4-phenoxyphenyl) amine with olive oil for 30 consecutive days. After 26 hours of last dose delivery, the animals had been studied for mortality, behavioural toxicity or morbidity and then autopsied for examine the oxidative stress and hepatotoxicity. The optimum dose (20 mg) was obtained and used for the further experimentation of liver protection through antioxidant activity against alcohol induced oxidative damage for several antioxidant markers.

Discussion

Results obtained from biochemical parameters showed that an administration of 30% alcohol to rats caused major peroxidative damage ($P \leq 0.001$) as showed by enzymatic and non-enzymatic antioxidants and lipid peroxidation by serum along with liver contents.. The Rats treated with 30% alcohol, showed a major ($P<0.001$) altitude of lipid peroxidation in contents of liver as well as serum. In contrast, treatment with Tris-(4-phenoxyphenyl) amine (20 mg/kg) indicated no significant effect on 30% alcohol-induced rise of LPO in liver and serum contents. The hepatic antioxidants' activities like CAT, SOD, GR, GST and GPx were decreased considerably ($P \leq 0.001$) up to 30% alcohol administration to the rats (Group II) if equated with group I. These decreased hepatic antioxidant markers were having no effect as shown in Group III and IV.

The activities of GSH, Vit. C, Vit. E, β-carotene as well as Ceruloplasmin in serum had been reduced in rats treated with 30% alcohol in Group II . Simultaneous treatment with Tris-(4-phenoxyphenyl) amine, afforded no effect against 30% alcohol-induced decrease in the levels of serum antioxidants in the Group III and silymarin treated Group IV

Conclusion

In conclusion it can be said that the biochemical variations witnessed in hepatic damage appears to be mostly because of mechanism of oxy-radical-mediated, which involves lipid peroxidation having given conditions of decreased levels of antioxidant which scavenge superoxide, lipid peroxides and hydrogen peroxide. The obtained results suggests that the Tris-(4-phenoxyphenyl) amine is not effective in for their antioxidant properties.

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