Antioxidant enzymatic action of *Avena sativa* on young cigarette smokers

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Abstract

Cigarette smoking was a highly addictive pervasive personal habit, with strong appeal among teenagers and young adults. One of the strategies of current interest was the inclusion of dietary strategies for the detoxification of cigarette. Supplementation of *Avena sativa* in young smokers were effective in protection against cigarette induced toxicity.

Key words: Detoxification, Antioxidants, *Avena sativa*, SOD, catalase.

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Introduction

Smoking refers to the inhalation and exhalation of fumes from burning tobacco in cigars, cigarettes and pipes. Historically, smoking as a practice, was followed by natives of the Western Hemisphere, in religious rituals and for medicinal purposes. Smoking is associated with lower antioxidants concentrations (Lehotsky *et al.*, 1999), such as Superoxide dismutase, Catalase and Glutathione peroxidase; macro molecules like albumin, ascorbic acid, alpha- tocopherol, uric acid and bilirubin and increased chronic diseases (Duthie *et al.*, 1993). In developing areas 90% of lung cancer deaths are caused by smoking (Peto *et al.*, 2006). Cigarette smoke contains over 60 carcinogens (Hecht, 2003). Antioxidants are molecule capable of slowing or preventing the oxidation of other molecules. Boyne *et al.* 1982 studied about the alterations of enzymatic antioxidant system in oral cancer patients who have the habit of tobacco smoking. One of the best choices of antioxidant property in edible food was *Avena sativa* commonly known as oats. Oats are a rich source of soluble fibre, well- balanced proteins, several vitamins, and minerals essential for human health (Peterson, *et al.*, 2002). Additionally oats are a source of several natural antioxidants (Miller *et al.*, 2000).

The present research focuses on the edible food which can naturally prevent the most hazardous effect of cigarette smoking and thereby bringing out the effectiveness of detoxification.

Materials and Methods

The present research was carried out to study the effect of preventing the risk of cancer in cigarette smokers by administering oats (20mg/kg). The study was carried out in a group of 6 subjects aged from 20-40 years, who had no acute or chronic diseases who had not used any medication for atleast two months before blood sampling.

The subject was divided into 3 groups. Group I: Young non smoking healthy volunteers [n=3]. Group II: Young smoking volunteers [n=3].Group III: Young smoking...
volunteers supplemented with oats [n=3]. All cases were selected from places in and around Thuckalay, Kanyakumari district. Blood samples were drawn from the antecubital vein, serum was separated and antioxidant enzymes were analyzed. The enzymatic antioxidants namely Superoxide dismutase, Catalase, Glutathione peroxidase and non-enzymatic antioxidants like Vitamin C and Reduced glutathione was estimated.

**Results And Discussion**

Supplementation of *Avena sativa* on cigarette smokers were shown to have significant increase in the level of antioxidants (Fig 1).

![Fig. 1: Effect Of *Avena Sativa* On Superoxide Dismutase Activity](image1)

Administration of *Avena sativa* to group III smokers significantly increased the activity of SOD when compared to the group II of young smokers. SOD has been recognized to play an important role in the defense mechanism of the body against harmful effects of Oxygen free radical in the biological system (Verma, 2001).

![Fig. 2: Effect Of *Avena Sativa* On Catalase Activity](image2)

Belge et al. (2003) indicated that rise in GSH-Px activity might be a response to the need for further enzymatic capacity to deal with the enhanced production of H₂O₂. The concentration of non-enzymatic antioxidants namely Vitamin C in volunteers treated with *Avena sativa* recorded a significant elevation compared to young smokers (Fig. 4). According to the antioxidant theory when the concentration of antioxidant vitamins decreases, lipid peroxidation increase

![Fig. 3: Effect Of *Avena Sativa* On Glutathione Peroxidase Activity](image3)

The concentration of non enzymatic antioxidants namely Vitamin C in volunteers treated with *Avena sativa* recorded a significant elevation compared to young smokers (Fig. 4). According to the antioxidant theory when the concentration of antioxidant vitamins decreases, lipid peroxidation increase in plasma and tissue leading to damage of cell membranes.

![Fig. 4: Effect Of *Avena Sativa* On Vitamin C Activity](image4)

The reduced glutathione activity in young smokers fed with oats showed a meagre variation when compared to young smokers (Fig. 5). The significant increase in the levels of GSH causes increased degradation of lipid peroxidation products.
In conclusion, the results of the present study have indicated the adverse effects of cigarette in young smoking volunteers. Supplementation of *Avena sativa* in young smokers were effective in protecting against cigarette induced toxicity. The protective role of nutritional foods might be due to their rich content of antioxidants.

**References**


