ABSTRACT

Title: Study of aromatic grasses and the antigenotoxic properties of their essential oils

Essential oils extracted from the aromatic grasses belonging to the genera *Cymbopogon* and *Vetiveria* or *Chrysopogon* (Family- Poaceae) are of enormous commercial value. At present, the greatest use of these essential oils and their major components is in food as flavoring and preservative agents. We therefore deemed important to evaluate the safety of these compounds. The genotoxicity and antioxidant properties of the essential oils namely palmarosa, citronella, lemongrass and vetiver acetate were investigated in *in vitro* and *in vivo* experiments. Cytotoxicity and genotoxicity studies revealed that the essential oils lead to reduction in cell viability, increased DNA damage and augmented the levels of reactive oxygen species (ROS) only at higher concentrations. These concentrations are much higher than in use.

The antigenotoxic properties of the essential oils were tested against methyl methanesulphonate (MMS) and hydrogen peroxide (H$_2$O$_2$) in human lymphocyte cells. At low concentrations, the essential oils could reduce the genotoxicity of MMS and H$_2$O$_2$. The essential oils show inhibition of lipid peroxidation and increased DPPH free radical scavenging activity. In addition, Swiss albino mice were primed with the essential oils to study their effect on cisplatin-induced nephrotoxicity, genotoxicity and myelosuppression. The results show that the essential oils confer protective activity against cisplatin-induced toxicities in kidney and in bone marrow cells. Priming animals with the essential oils prior to cisplatin administration could prevent necrosis of renal epithelial cells and restore them to an improved condition. Oxidative stress in kidney resulting from cisplatin treatment was ameliorated by essential oils. An increased level of reduced glutathione content (GSH) and activity of the antioxidant enzyme Glutathione-S-transferase with decrease in protein oxidation and lipid peroxidation were observed. The essential oils could reduce cisplatin-induced DNA strand breaks and chromosome aberrations in bone marrow cells. The total WBC, RBC and platelet count, hemoglobin content and hematocrit values increased in animals primed with the essential oils.

In conclusion, based on the results of the present study the four essential oils can be considered safe at low concentration for human consumptions.