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Hepatoprotection by the aqueous root extract of *Vetiveria zizanioides* (Sevendera) against paracetamol induced hepatotoxicity: A comparative study with N-acetyl cysteine

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The hepatoprotective and antioxidative effects of an aqueous root extract of *Vetiveria zizanioides* was investigated against paracetamol induced hepatocellular damage in mice.

Paracetamol (Acetaminophen), at the single dose of 300 mg/kg (in saline, oral, after 16 h fast) produced liver damage in ICR mice as manifested by the significant rise ($P< 0.001$, student's t-Test) in serum enzyme levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP) and a reduction ($P<0.001$) in the liver reduced glutathione level (GSH) compared with respective control values. As expected, a marked improvement in all parameters ($P<0.001$) was observed in N-acetyl cysteine (500 mg/kg, oral) treated mice. Pre-treatment of mice with the root extract of *Vetiveria* (0.9 g/kg) orally for seven days significantly ($P<0.01$) reduced the serum enzyme levels of ALT, AST and ALP by 53.43%, 60.57% and 38.07% respectively and increased the liver GSH level by 408.39% significantly ($P<0.001$). Histopathological studies provided supportive evidence for the biochemical analysis. Slides observed by two independent observers who were unaware of the treatment given indicated that the liver tissues of mice treated with paracetamol alone showed confluent necrosis with valuolation, ballooning degeneration and massive congestion in the surviving hepatocytes and that the extent of damage was significantly reduced in *Vetiveria* treated mice.
Paracetamol hepatotoxicty is largely due to the biotransformation of the drug into a highly reactive metabolite (NAPQI, N-acetyl-para-amino-benzoquinone imine) by the cytochrome P_{450} system. Since the paracetamol toxicity is enhanced by factors that cause GSH depletion, enhanced NAPQI formation, or a reduction in the antioxidative capacity of the liver, it could be suggested that the partial hepatoprotection afforded by *Vetiveria zizanioides* may be ascribed to its opposing action on one or more of these factors. The results of this preliminary study indicate that *Vetiveria zizanioides* has an antihepatotoxic and antioxidative effect against paracetamol induced hepatotoxicity in mice.

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