REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 23, No. 4 (2022)
http://www.veterinaria.org
Article Received: 20 August 2022; Revised: 28 October 2022; Accepted: 05 November 2022

Hematological, Biochemical, And Histological Measures in Wistar Male Rats used to Assess Asafetida's Toxicity

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ABSTRACT

Traditional uses of asafetida in folk medicine include the alleviation of a wide range of symptoms. A proper assessment of its toxicity in the animal system is necessary to back up its usage in conventional medicine. Asafetida was tested for its toxicity in Wistar albino rats in order to draw conclusions about its safety for human consumption. Tools and Techniques: Animals were given oral doses of different mg/kg of body weight to test for acute toxicity. Asafetida was given to animals at several dosages of mg/kg body weight) during the course of a 6-week chronic trial. Asafetida's effects on renal,haematological, and histological indicators and hepatic measures were assessed at the study's conclusion. There was no fatality seen in the acute toxicity trial for asafetida up to 72 hours after dosing. Within 24 hours, no noticeable neurological or behavioural abnormalities were seen. In the long-term trial, asafetida consumption altered haematological markers including platelets, RBC, WBC, andHCT. The enzymes lactate dehydrogenase (LDH) and aspartate aminotransferase (AST)were both considerably elevated in the treated animals. At no point throughout the research did asafetida treatment cause a change in plasma urea or creatinine levels. Hepatotoxicity was found by histopathology analysis, although significant kidney pathological alterations were not. We conclude that asafetida is safe for short-term use, but that long-term use may have unfavourable effects on hepatocytes and haematological parameters.

Keywords: *liver, Asafetida, kidney, toxicity, hematology*

INTRODUCTION

By making cuts in the roots and stem of Ferula asafoetida L. and other species, asafetida, an oleo-gum-resin, is extracted. The resin is an essential pharmacological and industrial ingredient that is used in traditional medicine to treat a variety of conditions, including bronchitis, asthma,stomach discomfort, indigestion, intestinal parasitesand whooping cough [2, 3]. Nepalese people use 50–200 mg of asafetida twice a week for its medicinal uses. According to Ayurveda, asafetida is an effective treatment for acidity, hysteria, gastric diseases, irritation, stomach discomfort, and helmintic conditions. This resin gum contains anticancer, antifungal, antimicrobial, and cytotoxic properties, according to recent research. In addition, it has antispasmodic, anticonvulsant, and antinociceptive properties. [5,6,7,8, 9, 10] Although there are a variety of research on the pharmacological characteristics of asafetida, we are unaware of any extensive toxicological studies conducted on animal models. Methemoglobinemia after the injection of the herbal compound to a male child has been reported in just one instance. Additionally, it is advised that it is not to be taken whilecarrying baby since it may raise the chance of preterm childbirth delivery. [11]

Asafetida's toxicity has been examined mostly on protozoan and parasitic flora and fauna, indicating that it is antiparasite activities [12,11,13], antifungal[14], and antibacterial[15].

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Kumar and Singh discovered to facilitate several Ferula asafoetida root exudates had anti-mollusc killing effect against the snail. As shown by Bagheri et al., asafetida has a cytotoxic impact on brine shrimp. [16] Several ancient research shown to facilitate plant extract has a gentle exchange-effective effect on chromatids in mouse spermatocytes[18] andclastergenicity. [19] The purpose of this research is to investigate the harmful consequence of the sample on blood measuresliverand renal variables, and the histology of the liver and kidney in Wistar male rats.

MATERIALS AND METHODS

Animals

Wistar Male rats measuring 150–180g; 6–8 weeks old were produced and kept at 21degree celcius in 12 h:12h light: darkness. Rats were kept in cages with free foodstuff and water. Delhi University of Medical Science accepted the research.

Clinical toxicology

Rats were evaluated for toxicity after receiving varying dosages of asafetida. Normal activity and no death were recorded during the period.

Biochemistry

Chronic renal and liver parameters. Control and asafetida-treated animals had similar urea and creatinine levels. LDH and AST incremented in asafetida-injected mice contrast to controls ($P > 0.05$).

Asafetida'sconsequence on rat kidney and liver biochemistry

Hematology

After 6 weeks, asafetida reduced WBC, RBC, platelets, and HCT %. HCT % in asafetida 25 group didn't change.

Liver histopathology

Liver slices from control rats exhibited hepatic structural design and hepato-cytesthrough significant portal,nucleus, and central vein, regions. Some hepatocytes of extract-treated animals revealed negligible degeneration. Increasing extract dosages (50,100, and 200 mg/kg) increased hepatocyte size and nucleus prominence measure against to the control. Kupffercells and sinusoids that weredilated were observedthrough increasing dosages used. Normal as well as transparent liver lobule formations exist.

1. Different experimental groups' liver histology. (a) The control group's lobules and hepatocytes had no histological alterations. (a) Some hepatic cells degenerate...

Kidney histopathology

The control group's renal tubular and glomerulus histology was normal. Sections of kidneys from 25, 50, 100, and 200 mg/kg extract groups exhibited negative alterations

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ofpathologysave renal tubular necrosis. In certain extract groups, inflammatory cells infiltrated blood channels and interstitial regions. In the 200 mg/kg extract group, some glomeruli were slightly enlarged and tubular degeneration was minimal.

DISCUSSION

Herbal medications play a vital part in healthcare programmes across the globe since they are natural. Mild and rare side effects do occur. Asafetida is a culinary spice and traditional medicine in several cultures. Although there are no experimental evidence on asafetida's toxicity, Iranian tradition emphasises that excessive doses might cause lip swelling, digestive symptoms such gas and diarrhoea, pain, and headache. [3] Asafetida is nontoxic and safe at certain dosage levels when given orally to rats. Clarke & Clarke [22] say any chemical or medication with an oral LD50 above 1,000 mg/kg is low-toxic. Asafetida is secure to 1,000 mg/kg body weight for mortality. In this investigation, acute asafetida poisoning increased Hormone levels in rats which were injectedmeasured against controls. Many enzymes in serum aren't from serum. Some enzymes leak into blood upon tissue injury. [21] Serum enzyme measurements provide information on the impact and type of diseased tissue damage. Increased blood LDH and AST activity may suggest liver injury by leaking enzymes from tissues into the serum due to increased cell membrane permeability. [22,21] LDH and AST are susceptible markers of liver injury as well as may quantify liver damage. [21] In this investigation, asafetida did not affect urea or creatinine levels. Destruction of glomeruli reduces GFR and raises blood urea and creatinine, causing chronic renal failure. [27] Asafetida is not nephrotoxic based on urea and creatinine levels [28]. RBC, WBC, and platelet counts decreased in our work. Asafetida affects RBC, WBC, and platelet levels mildly. As these are made from coreof the bone, extract's dullness on this limb is clear, certifying its medicinal function. Histopathological examinations showed asafetida therapy caused minimal hepatocyte degeneration. Sections of kidneys from 25-50-100-200 mg/kg extract groups exhibited no pathological alterations in the medulla and cortex, as mild kidneydamage. These alterations were dose-dependent, and histological evidence matched biochemical data.

CONCLUSION

Chronic ingestion of this extract had reversal efficacyofhepatocytes and blood measures. The research recommends using minimal asafetida dosages.

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