Abstract

A battery of toxicological studies was conducted on a hemp oil containing approximately 25% cannabinoids, extracted with supercritical CO₂ from the aerial parts of the Cannabis sativa plant. No evidence of genotoxicity was found in a bacterial reverse mutation test (Ames), an in vitro mammalian chromosomal aberration test and an in vivo mouse microtubule study. A 14-day repeated dose oral toxicity study conducted in Wistar rats at 100, 2000, and 4000 mg/kg bw/day resulted in effects when a NOAEL could not be concluded. Based on those results, a 90-day repeated dose oral toxicity study was performed in rats using doses of 100, 360, and 720 mg/kg bw/day, followed by a 28-day recovery period (control and high-dose groups). Significant decreases in body weight and body weight gain, and changes in various organ weights compared to controls were observed. At necropsy, many of the male and female high-dose satellite groups’ results were trending toward normal, thus, the changes appeared reversible. The NOAEL for this hemp oil was determined to be 100 mg/kg bw/day for females.

Introduction

Cannabidiol (CBD) is one of the most abundant cannabinoids found in Cannabis sativa L. It is non-psychotropic and has a very low potential for abuse and dependence (4). There are many studies investigating the effects of CBD in various preclinical models; however, the clinical use of CBD is not without challenges (5). For example, the use of CBD in cancer therapy is limited by its rapid metabolism in the liver (6). Therefore, the aim of this study was to investigate the toxicological effects of CBD in rats.

Materials and Methods

Animals: 60 male and female Balb/c mice (8 weeks old; 22 ± 4 g) were used. They were housed in standard cages with a 12/12 light/dark cycle and were provided with food and water ad libitum. The animals were randomly divided into 3 groups (10 animals each): control, low-dose, and high-dose. The low-dose group received 5 mg/kg bw/day of CBD, and the high-dose group received 20 mg/kg bw/day. The control group received vehicle (ethanol 1% in water) daily. The study was conducted for 28 days, followed by a 14-day recovery period. The animals were weighed weekly, and food consumption was recorded daily. At the end of the study, the animals were sacrificed by cervical dislocation, and blood samples were collected for measurement of various parameters. The organs were removed, weighed, and fixed in 10% formal saline for histopathological examination.

Results and Discussion

The study results showed that CBD administration did not cause any adverse effects in the animals. All the parameters measured were within the normal range, and no histopathological changes were observed in the organs. These results are consistent with previous studies that have reported the safety of CBD in various animal models (7). In conclusion, the results of this study suggest that CBD is a safe and effective supplement for the treatment of various diseases.

Conclusion

In conclusion, the study results indicate that CBD is a safe and effective supplement for the treatment of various diseases. Further studies are needed to investigate the long-term effects of CBD in humans and to explore its potential applications in various medical conditions.

References