



Effect of *Hibiscus rosasinensis* on the liver of Swiss albino mice: a histo-morphological investigation

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Abstract

Nature has been a source of medicinal agents for the thousands of years and a large number of drugs have been isolated from natural sources. Over 50% of all modern drugs are originated from natural sources. *Hibiscus rosasinensis* is also a very renowned flower having a vast use as a medicinal plant. Several studies have shown that the flower, leaf of this plant has a wide range of medicinal uses such as contraception, anti-nociceptive, anti-inflammatory, anti-allergic, anti-tumor, anti-diarrheic and anti-convulsent. But whether this plant affects the liver or not is still not investigated with proper care. For the sake of this purpose a research was conducted on the Swiss albino mice in the Bioresearch Laboratory, Department of Anatomy and Histology, Bangladesh Agricultural University, Mymensingh-2202. Twenty (20) mice (Avg. weight of 27-28 gm and avg. age of 6-7 weeks) were purchased from ICDDR,B, Mahakhali, Dhaka and divided into two groups (control, C and Treated, T) each having 10 mice. During the experimental period, the control group was supplied with the normal mice pellet and plane water whereas, the powder of the *Hibiscus rosasinensis* @ 500 mg/ml with drinking water and the normal mice pellet was provided to the treated group. After the end of the experimental tenure of one month the mice were sacrificed ethically and sample (liver) was collected for the gross and histological analysis. Both in the gross and histology the histomorphology of the liver was similar without having any alteration from the normal. No remarkable changes of the gross and histological architecture were found. So it can be said that the extract of *Hibiscus rosasinensis* has no baleful effects on the histomorphology of the liver in Swiss Albino mice.

Key words: *Hibiscus rosasinensis*, baleful effect, liver, histomorphology, Swiss albino mice

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Introduction

There has been an increasing demand for the health promoting food products by the consumers all over the world. It is eternal that nature makes our lives possible at every aspect as it is the chief depot of all the primary resources for human medicines (Jena *et al.*, 2012). People are becoming more dependent on the herbal medicines rather than the synthetic or chemical drugs as the herbs are usually free from any side effect/baleful effects (Das *et al.*, 2010).

Hibiscus rosasinensis Linn. (Malvaceae) is a glabrous shrub widely cultivated in the tropics. Throughout the tropics this plant is found commonly and it is planted as a house plant throughout the world (Kumar and Singh, 2012). It is well accepted that the leaves and flowers of this plant have many medicinal uses which has made this plant a precious one (Upadhyay and Upadhyay, 2011). This plant is traditionally used as the herbal medicine and also highly used by the follower of

the Hindu religion for their worship (Kumar and Singh, 2012). *Hibiscus rosasinensis* flower showed antispermatogenic, androgenic, anti-implantation, antihypercholesterolemic, antitumor, anticonvulsant, antihypertensive, antioxidant, anti-ammonemic and antihypertension activities (Mishra *et al.*, 2009, Murthy *et al.*, 1997, Hirunpanich *et al.*, 2006, Essa and Subramanian 2007, Herrera *et al.*, 2004, Mathu *et al.*, 1990, Chang *et al.*, 2006). Leaves and flower also possess hyperglycemic activity (Pekanwar *et al.*, 2013). Though this is a very available plant especially in this Indian subcontinent so the people can use the plant easily at free of cost. But all most all the plants have toxic effects on the body and it shows when the dose is not maintained properly (Tomar *et al.*, 2010). There are many medicinal plants like the *Abrus precatorius*, *Ricinus communis* and so on which are highly potential as a source of medicinal uses. But all these are highly toxic if the dose is not maintained properly. But does *Hibiscus rosasinensis* make any baleful effect on the histomorphology of the liver is not known properly yet. The present research was conducted to find out the effects of the flower of the *Hibiscus rosasinensis* on the liver, whether it affects the normal architecture or not.

Materials and Methods

Twenty (20) experimental animal, Swiss albino mice (at the age of 6-7 weeks and avg. weight 27-28 gm) were collected from ICDDR,B, Mahakhali, Dhaka and divided into two (2) groups such as Control (C) and Treated (T) groups, each having ten (10) mice. Prior the treatment of the mice they were reared for 2 weeks for being accustomed with the environment. During that period both the control and treated group were supplied with the normal feed and water. After that the treatment period started. During the treatment period, the control group was fed with the normal mice pellet and water whether the treated group was given powder of *Hibiscus rosasinensis* flower along with water @ 500 mg/ ml, but normal mice pellet was also provided. The experimental tenure was for 30 days and during the period all the management practices were uniform

for both the control and treated groups. After the end of the experimental tenure the mice (both the control and treated groups) were sacrificed ethically and the sample (liver) was collected, processed, stained and observed under the microscope for investigating the architectural deviation from the normal in both gross and histology.

Results and Discussion

It was observed in the gross study that the color of the liver was dark red, shape and size was normal in the mice of the control group (Figure 1). Whereas the liver of the treated mice was also as normal as of the control one. It showed the similar type of color, size and shape as the control one. There was no alterations in the liver after the treatment with the extract of the *Hibiscus rosasinensis* in the treated group (Figure 1). So it has the evidence that the extract of *Hibiscus rosasinensis* does not affect the gross morphology of the liver.

Regarding the histological architecture of the liver of the control group, it showed the normal feature having hexagonal shaped cells (hepatocytes) which were arranged as a cord along with the sinusoids present in between the cords of the hexagonal hepatocytes and the central vein was at the center of the hepatic cord. Section of hepatic vein was also found in the control liver (Figure 2 and Figure 3).

In the treated group the architectural feature of the liver showed the same views as the control one, nothing deviated from the control liver, where the hepatocytes were in the hexagonal shape and having the cord like arrangement. At the center of the hepatic cords the central vein was located and the sinusoids were in between the two hepatic cord (Figure 2 and Figure 3).

There is a growing concern about the hepatotoxicity of herbal remedies (Larry, 1997). The herbal hepatotoxicity has been recognized for many years which was identified by Chitturi *et al.*, (2000), Dehghani and Panjehshahin (2006), Jain *et al.*, (2013) and many others. In the researches of the aforesaid researchers they observed that the herbal plants can cause hepatocytic necrosis as well as hemorrhages in

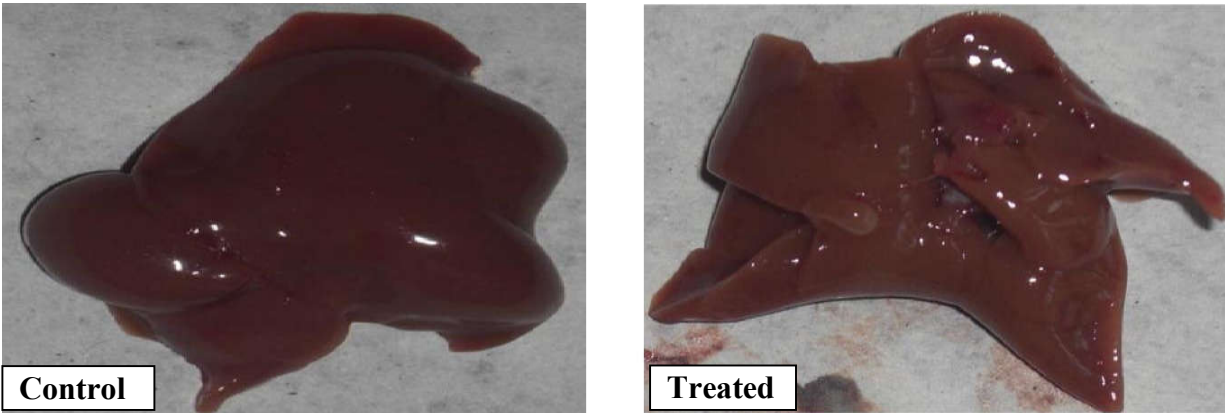


Figure 1. Gross anatomy of liver showing control, C (Left) and treated, T liver (Right) without having any morphological changes

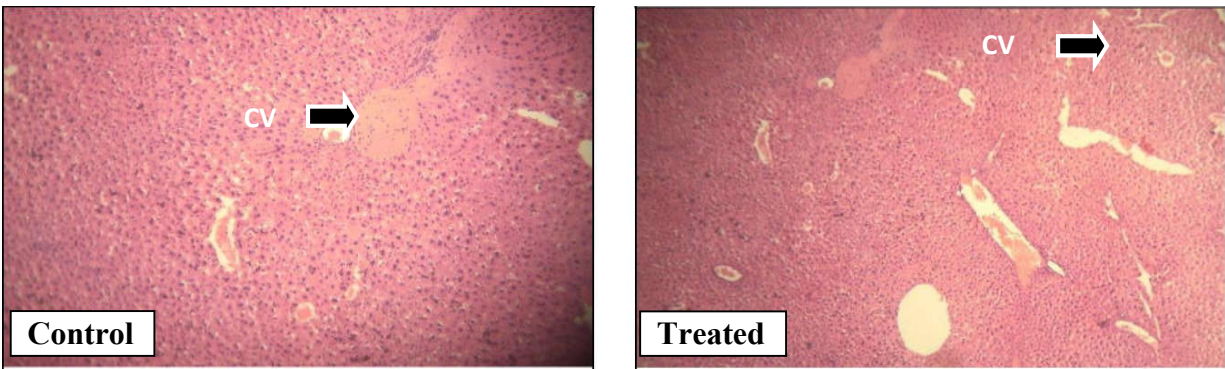


Figure 2. Normal histology of the liver with hepatocytes (H), sinusoids (S) and central vein (CV) H&E 4X in the control group, C (Left) and treated group, T (Right)

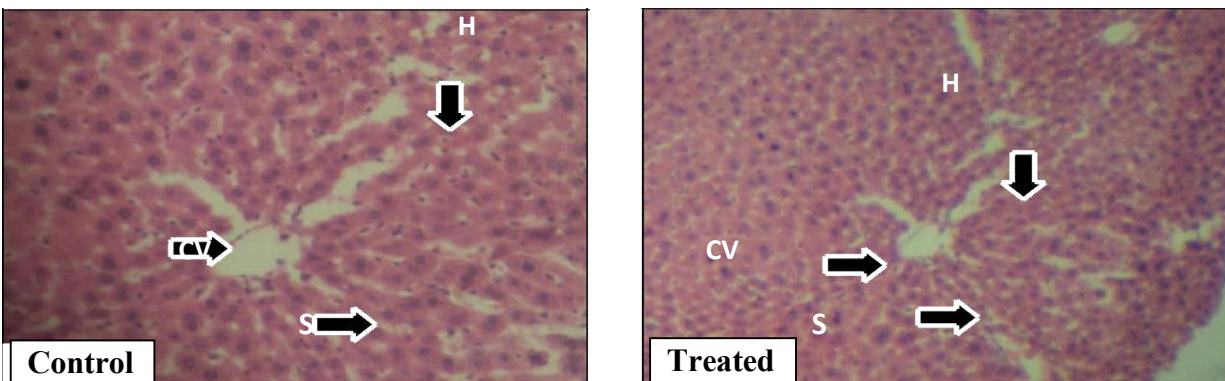


Figure 3. Normal histology of the liver with hepatocytes (H), sinusoids (S) and central vein (CV) H&E 10X in the control group, C (Left) and treated group, T (Right)

the lobules and congestion in the central vein along with fibrosis or cirrhosis in liver parenchyma. But those researchers conducted their researches with *Citrullus colocynthis* and used the albino rat for their experiments. As per the study done by Adedapo *et al.*, (2007) the histological examination revealed foci of lymphocytic infiltration at the portal areas of the liver, but their research was done with the extract of *Abrus precatorius* and the experimental animal was rat.

But there are also some herbal agents which do not make any hepatotoxic effects. In the present research we used the flower of the *Hibiscus rosasinensis* and the experimental animal was Swiss Albino mice. But we didn't find any such type of hepatotoxic effects on the liver of the mice of the treated group. The liver was same as the control one.

Though Dose is a vital factor in this matter. Dehghani and Panjehshahin, (2006) revealed that the effects of the extract on the liver is dose dependent. If the dose is maintained properly during the treatment then it would not make such type of harmful or toxic effects. So the extract of *Hibiscus rosasinensis* does not make any baleful effects on the liver of the Swiss Albino mice

Conclusion

The use of *Hibiscus rosasinensis* is safe as a medicinal plant as it does not have any harmful effects on the histomorphology of liver in both the gross and histology. It does not affect the normal architecture of the liver in the gross and histology. So the further research on the dose determination, phytochemical investigation and standardization should be continued for promoting this plant extract as a patent one.

Conflict of interest

The authors declare that they have no competing interest.

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