



Neuropharmacological, Analgesic, Antidiarrheal and Antimicrobial Activities of Methanolic Extract of *Ziziphus mauritiana* Leaves (Rhamnaceae)

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ABSTRACT

The purpose of this study was to gauge the neuropharmacological, analgesic, antidiarrheal and antimicrobial activity of methanolic crude extract of *Ziziphus mauritiana* leaves in mice model. After collection of leaves it was washed, sun dried and made coarse powder. It was soaked in methanol for several days and extracted at room temperature. Dried methanolic extract was partitioned into pet ether, carbon tetrachloride, chloroform and aqueous soluble fractions. Among all the fractions, methanolic extract at a dose of 200 and 400 mg/kg body weight revealed 27.6 and 29.6 minutes of onset of sleeping; 79 and 89.8 minutes of total sleeping time where control group showed 15.8 minutes of onset of sleeping and 118.6 minutes of total sleeping time. Besides crude extract at a dose of 400 mg/kg weight significantly inhibited the pain sensation at 48.55%, 57.77% and 61.44% after 30, 60 and 90 minutes with reference to standard morphine, revealed antidiarrheal activity by reducing 52.02% of diarrhea comparing with standard drug loperamide (50 mg/kg body wt) having 67.24% of reduction of diarrhea and crude extract and its different fractions inhibited the bacterial growth starting from 6.5 to 18.8 mm against gram positive bacteria, 6.2 to 17.9 mm against gram negative bacteria and seven .4 to 14.7 mm against fungi compared with standard ciprofloxacin.

Folk medicinal practices are very common in Bangladesh. Besides herbal medicine practice is also increasing day by day due to fewer side effects. Bangladesh is a good source for medicinal plants which is providing a reliable source of medicinally important secondary metabolites. Based on different traditional uses, one of the plant species of Rhamnaceae family was undertaken to evaluate different biological properties in laboratory. *Ziziphus mauritiana*, also referred to as Kul or Boroi in Bangladesh, Chinese Apple, Jujube, Indian plum and

Masau may be a tropical fruit tree species belonging to the family Rhamnaceae.

It is a common plant in our country. Extensive investigation showed that this species revealed important biological activities such as antioxidant activity, antimicrobial activity, anti-inflammatory activity, anxiolytic property, antidiabetic activity. Leaves of *Ziziphus mauritiana* were collected from Gazipur district, Dhaka, Bangladesh in February, 2013. This plant was identified by botanists of the Botany Department of Dhaka University. The reference sample for the plant was DUSH, Accession Number 4257 and calls no 01. Swiss albino mice of either sex, aged 4-5 weeks were the experimental animal and were obtained from the Animal Resource Branch of the International Centre for Diarrheal Diseases and Research, Bangladesh (ICDDR, B). Institution of Animal Ethical Committee which was maintained by Faculty of Biological Science, University of Dhaka gave approval for this project to collect and utilize Swiss albino mice as experimental animal. The approval reference number was Ref-DU/BD/IACE-A143. They were kept in standard environmental condition and fed ICDDR, B formulated rodent food and water. Experimental animals were collected, handled and kept by following standard protocol based on the ethical committee of our university. In order to administer the crude extract at doses of 200 and 400 mg/kg body weight of mice, 50 and 100 mg of the dried extract were measured respectively and were triturated unidirectional way by the addition of small amount of suspending agents Tween-80. After proper mixing of extract and suspending agent, normal saline was slowly added and made 2.5 ml. Water for injection was added with morphine to dilute it so that 0.3 ml of the diluted solution will have 10 mg/kg body weight of morphine.

Neuropharmacological activity The methanolic crude extracts of *Z. mauritiana* leaves potentiate the phenobarbitone induced sleeping time in a dose dependent manner. Methanolic extract at a dose of 200 and 400 mg/kg body weight revealed 27.6 and 29.6 minutes of onset of sleeping; 79 and 89.8 minutes of

total sleeping time where control group showed 15.8 minutes of onset of sleeping and 118.6 minutes of total sleeping time.

Methanolic crude extract of *Z. mauritiana* leaves induced the sleeping time i.e. hypnotic effect induced by the phenobarbitone sodium in a dose dependent manner which suggests a profile of sedative activity. Crude extract probably possesses benzodiazepines and related compounds that bind to the receptors in the CNS to stimulate the sedative effect recorded here. This experimental findings from the study showed that the crude extract of *Z. mauritiana* leaves have moderate sedative activity in mice which suggests its central depressant activity. Analgesic activity of crude methanolic leaves extract of

Z. mauritiana was evaluated by following radiant heat tail-flick method. The crude extract effectively elongates the reaction time in a dose dependent manner. Methanolic crude extract at a dose of 400 mg/kg body weight significantly inhibited the pain sensation at 48.55%, 57.77% and 61.44% after 30, 60 and 90 minutes later in comparable standard morphine at a dose of 10 mg/kg body wt.

It could be concluded that crude extract of *Z. mauritiana* leaves possesses important metabolites that would probably inhibit the formation of prostaglandins.

Keywords: *Ziziphus mauritiana*, Neuropharmacological activity, Analgesic activity, Antidiarrheal activity and Antimicrobial activity

