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Acute Oral Toxicity Study of Extract of Spathodea Campanulata Bark in Wistar Rats

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ABSTRACT:

The herbal drug spathodea campanulata has already proved its efficacy in diabetic and malarial parasitic condition but still more therapeutic potential can be utilize from its different parts. The present study was designed to study acute oral toxicity study of herbal extract of spathodea campanulata bark as per the OECD 425 guideline. As for any herbal drug must exhibit its safety and efficacy data in animals so the safety study is the initial requirement for the current work. The herbal extracts of spathodea campanulata bark single oral dose (2000mg/kg) supplemented to all laboratory screened rats selected for the study. The various assessment parameters like general appearance, behavior, body weight, mortality were studied. No changes in general appearance & mortality was observed. The spathodea campanulata bark extract was found to be safe at dose of 2000mg/kg. For efficacy and long term safety prospective further studies are suggested to perform in future.

KEYWORDS: acute oral toxicity study, spathodea campanulata bark, mortality, OECD guideline.

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INTRODUCTION:

Herbal drug are the main focus in current ailments especially if the condition is life threatening disease or disorder. Even the herbal concept is very much fruitful option in areas where the costly options for management are not affordable. As it is already mentioned various literature that presence of chemical in herbal drugs exhibit numerous pharmacological activity. But to prove the constituents efficacy and safety there are certain standards which the herbal drugs need to compensate. *Spathodea campanulata* has lots of medicinal uses like extracts of bark, flowers and bark used to treat malarial parasitic condition, acquired immune deficiency syndrome, diabetes mellitus, edema, constipation, dysentery, ulcers and gastrointestinal disorders, skin diseases and wounds, fever, liver complaints and as antidote. Even the wood is used for carving, however considered less important for other purposes. The seeds are often eaten in many parts of South Africa. The flower buds contain a reddish sap, and are used as water pistols by children.[1, 2]

Alternative system of medicine like ayurveda, siddha and Unani are comprehensively practiced in the prevention, diagnosis and treatment of various life threatening or incurable diseases and disorders.[3.4] Even though the extensive use of plants for treatment of several ailments there is minute information known about their toxicity and safety point of view The evaluation of the toxic action of the plant parts extracts or poly-herbal or herbo-mineral formulations is important in order to regard as safe before

used as management options.[5,8] A prime stage in ensuring the safety of drugs is to conduct toxicity tests in suitable animal models and as per organization for economic co-operation and development (OECD) guidelines.[6,8] The acute oral toxicity test aims at establishing the therapeutic index, for example defined as the ratio LD50: ED50. [7,8]

METHODOLOGY:

The species for the proposed study that spathodea campanulata bark were collected from tribal forest area of valsad district in the month of february 2014 and it was authentified by Dr.Sachin Narkhede, head of department, department of Pharmacognosy, Smt. BNB. Swaminarayan Pharmacy College, Salvav.

Processing of plant samples:

The spathodea campanulata bark were properly washed in tap water & then rinsed with distilled water. The spathodea campanulata barks are kept for drying in an oven at a temperature of 34-40°C for three days. The dried bark extract of plant are pulverized, by using a sterile electric blender, to obtain a powered form of root. The powdered form of these plants is stored in airtight glass containers, protected from hours of daylight until required for analysis.

Preparation of extracts of *spathodea campanulata bark:*

The residue was successively extracted with petroleum ether, ethanol, and aqueous using hot percolation method (three days). The extract obtained was filtered, concentrated and dried in a hot air oven.[9-10] The extractive value was calculated for each extracts.

Acute oral toxicity study:

Healthy young adult wistar rats, weighing 150-180 g at the start of the experiment, were procured from animal house of the institute. The current study was approved by the Institutional Animal Ethics Committee of SMTBNBSPC. The experiment and all the practiced were followed as per the guideline mention in organization for economic co-operation and development (OECD). Female rats were selected because they are usually slightly more sensitive.[11] The experimental animals were randomly selected & kept in their cages for five days prior to dosing to allow for acclimatization to the laboratory conditions. The animals were housed individually in clean white cages. The room temperature and humidity were maintained at 25°C (± 30°C) and 45-55% respectively with a light-dark cycle of 12 hour. Sanitary husk bedding was provided to the animals. The animals were fed with available standard pellet chow and unlimited supply of filtered drinking water. Animals were observed continuously during the first 30 minutes after dosing and observed periodically for the next twenty four hours and then daily thereafter, for fourteen days. All observations were thoroughly recorded with separate records being maintained for each experimental animal. Observations included changes in skin, eyes, mucous membranes and behavioral pattern. Attention was given for observations of tremors, salivation, convulsions, lethargy, diarrhea, sleep and mortality. Changes in assessment parameters were compared with that of control animals. Body weight**s** of animals were recorded before the administration of drug on 1st day of the study and thereafter on the 7th and 14th day of the experiment. Changes in the weight of individual animals were calculated and also compared with that of the control.

Statistical Analysis:

Generally the changes in body weights were expressed as mean ± Standard Deviation and their statistical significance was calculated using t-test. LD50 value was determined by using Acute Oral Toxicity (OECD Guideline 425).

RESULTS AND DISCUSSION:

The behavioral patterns of animals were observed first 4 hour, followed by 14 day after the administration. No major changes were observed in observational parameters used for assessment of toxicity. Skin, eyes, behavioral pattern and sleep pattern parameters of the treated animals were found to be normal. No somatic changes were observed in any animal. No mortality was observed in any animal. All treated animals lived up to 14 days after the administration of Poly-herbal formulation.

Table 1: % yield of extracts of *spathodea campanulata* bark

Sr no	Type of extract	% yield
1	Ethanol	9.56
2	Aqueous	17.7
3	Pet.ether	3.3

Body Weight Statistical Analysis

There were no significant changes in body weight. However, all animals exhibited a normal increment in body weight without drastic difference between both control and treated groups. The results were mention in table below.

Table 2: Result of changes in body weight of study animals at end of study

Group	Treatment	Body weight in gm		T value	Observation
		Bf (m+ SD)	Af(m+ SD)		
Control	Gum acacia	156.35±2.15	164±3.77	3.54	No significant
Test	2,000 mg/kg of pet. Ether extract of root	176.00 ± 2.55	178.63 ± 4.26	3.203	No significant
	2,000 mg/kg of Aqueous extract of root	172.34±2.26	175±2.35	3.704	No significant
	2,000 mg/kg of ethanol extract of root	164.22±3.14	167.33±1.43	3.16	No significant

(Bf=before, Af=after, m= mean, SD= standard deviation)

CONCLUSION:

The current results demonstrate that different bark extracts of *spathodea campanulata* does not cause any toxicity in animal selected for study. No death or signs of toxicity were observed in rats treated by extracts at dose 2000 mg/kg thus proving its safety in use. Hence, *spathodea campanulata* can be used as a safe herbal option for multiple therapeutic options no doubt its efficacy and therapeutic potential need to be established in future studies. The current study recommended future sub acute and chronic toxicity study to prove the bark extract of herbal drug safe in long term use.

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