Acute Toxicity Study for *Cissus Quadrangularis* whole Plant Powder

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Summary

The aim of the present work is to carry out acute toxicity study of *Cissus quadrangularis* as an important rambling shrub usually found climbing over bushes. The whole plant powder of this plant is used for acute toxicity study. *Cissus quadrangularis* is found in Western Ghats with thick fleshy, glabrous, ridged and quadrangular stem. This plant is used commonly for indigestion, applied as a poultice over bone fractures and swellings, gastrointestinal disorders [1]. The exposure of the whole plant powder in the form of aqueous slurry on Swiss mice was carried out and the exposure route was oral single administration with water. The observations of changes in body weight, food and water intake as well as cage side observations were reported. The whole plant powder was found to be nontoxic.

Keywords: *Cissus quadrangularis,* plant powder, bone-healing, shrub, climber

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Introduction

Toxicity is the fundamental science of poisions. The organization for Economic and Development (OECD) mentioned acute toxicity as the advance effect occurring within a short time of oral administration of a simple dose of a substance or a multiple doses given within 24 hours (1,2) Phychochemical interactions of poisions lead to injury or death with living tissues (3). Toxicology is like science and an art like medicine. It includes observational data gathering & data utilization to predict outcome of exposure in human and animals (2). The ancient humans categorized some plants as harmful and some as safe (2).

All organisms are exposed constantly and unavoidably to foreign chemicals or xenobiotics, which include both man–made chemicals such as drugs industrial chemicals pesticides, pollutants pyrolysis products in cooked foods, alkaloids secondary plant metabolites, and toxins produced by moulds, plants and animals. Poisions are any agent capable of producing a deleterious response in a biological system, seriously injuring function or producing death (3). Toxicologists usually divide that exposure of animals into four categories which are acute, subacute, subchronic and chronic (4-7).

Experimental

Three dose groups are considered for the toxicity study of *Cissus quadrangularis* whole plant powder. The study protocol is given in following table 1 (8-11).

Table 1: Study Protocol

Name of the study	Acute toxicity study
Test material	*Cissus quadrangularis* plant powder slurry
Animal model	Albino Swiss Mice
Animals procured from	Raj Biotech (INDIA) Ltd., Pune
Sex	Male and Female
Weight range of animals	Between 35 to 55 g
No. of dose groups	Three groups
Animals per group	3 males and 3 females
Route of administration	Intragastric administration with the help of gavage No. 16
Dose volume	2.0 ml per animal
Vehicle for administration	Distilled water
No. of administrations	Single
Concentration of dose	200, 400, and 600 mg/Kg body weight
Study duration	Acclimatization for 14 days, one day drug administration and 14 days observation period including holidays
Parameters observed	Cage side observations, daily food and water intake, daily body weight and daily mortality record etc

Animal Maintenance

The animals were housed in polyurethane cages. The cages were provided with rice husk bedding and were cleaned daily. The animals were provided with drinking water ad libitum and were fed on commercially available Mice feed supplied by AMRUT FEED. The specifications of the feed are listed below in table **2.**

Table 2

Name	Percentage
Crude Protein	20 - 21 % minimum
Ether Extractive	04 - 05 % minimum
Crude Fiber	04 % maximum
Ash	08 % maximum
Calcium	1.2%
Phosphorus	0.6 % minimum
NFE	54 %
ME Kcal/Kg	3600
Pallet Size	12 mm

The feed was enriched with stabilized vitamins such as Vit. A and D_3, Vit. B_{12}, Thiamine, Riboflavin, Folic acid and supplemented with all minerals and microelements. Measured quantities of water and feed were supplied daily in each cage. The consumption of water and food was estimated from the amount of water remaining in feeding bottles and from the amount of feed remaining in the feed hopper.

Cage Side Observations

Assessment of the behavior of animals was carried out by general observations of each animal on a daily basis from the stage of dosing to the end of the study. Any changes or abnormalities recorded could be an indication of toxicity. The test animals at all dose levels showed no significant changes in behavior before and after the administration of an oral dose of whole plant powder as slurry following table **3** shows the dosage regime. Table **4** shows the general cage side observations for the parameters studied. Table **5** shows the mortality record.

Table 3: Doses Regime

Sr. No.	Sex	Dose mg/Kg Body Wt.	No. of animals used	Total Vol. administered in cm3
1	Male	200	03	2.00
2	Female	200	03	2.00
3	Male	400	03	2.00
4	Female	400	03	2.00
5	Male	600	03	2.00
6	Female	600	03	2.00

Table 4: Cage Side Observations for all animals

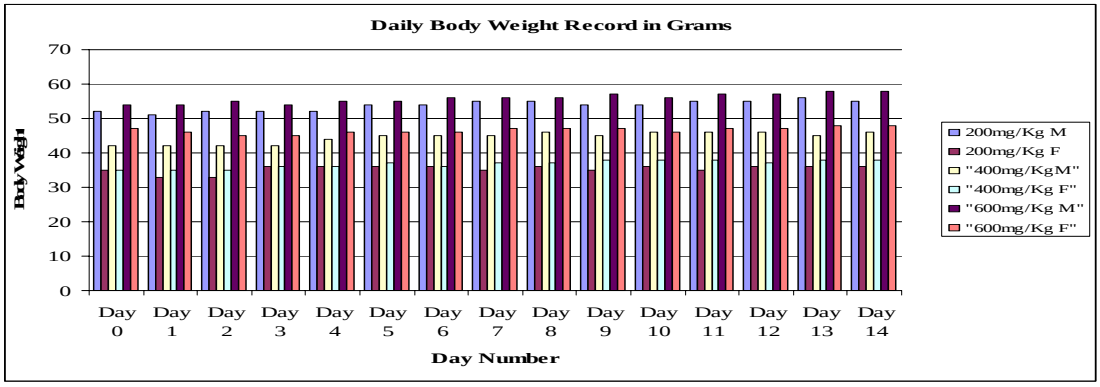
Sr. No.	Parameters	Cage Side Observations
1	Condition of the fur	Normal
2	Skin	Normal
3	Subcutaneous swellings	Nil
4	Abdominal distension	Nil
5	Eyes -dullness	Nil
6	Eyes - opacities	Nil
7	Pupil diameter	Normal
8	Ptosis	Nil
9	Colour & consistency of the faeces	Normal
10	Wetness or soiling of the perineum	Nil
11	Condition of teeth	Normal
12	Breathing abnormalities	Nil
13	Gait	Normal

Table 5: Mortality Record

Group	**3**	**3**	**5**	**5**	**7**	**7**
Sex	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Hr. 1	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 2	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 3	Nil	Nil	Nil	Nil	Nil	Nil
Hr. 4	Nil	Nil	Nil	Nil	Nil	Nil
Day 1	Nil	Nil	Nil	Nil	Nil	Nil
Day 2	Nil	Nil	Nil	Nil	Nil	Nil
Day 3	Nil	Nil	Nil	Nil	Nil	Nil
Day 4	Nil	Nil	Nil	Nil	Nil	Nil
Day 5	Nil	Nil	Nil	Nil	Nil	Nil
Day 6	Nil	Nil	Nil	Nil	Nil	Nil
Day 7	Nil	Nil	Nil	Nil	Nil	Nil
Day 8	Nil	Nil	Nil	Nil	Nil	Nil
Day 9	Nil	Nil	Nil	Nil	Nil	Nil
Day 10	Nil	Nil	Nil	Nil	Nil	Nil
Day 11	Nil	Nil	Nil	Nil	Nil	Nil
Day 12	Nil	Nil	Nil	Nil	Nil	Nil
Day 13	Nil	Nil	Nil	Nil	Nil	Nil
Day 14	Nil	Nil	Nil	Nil	Nil	Nil
Mortality	**0/3**	**0/3**	**0/3**	**0/3**	**0/3**	**0/3**

Body Weight Changes

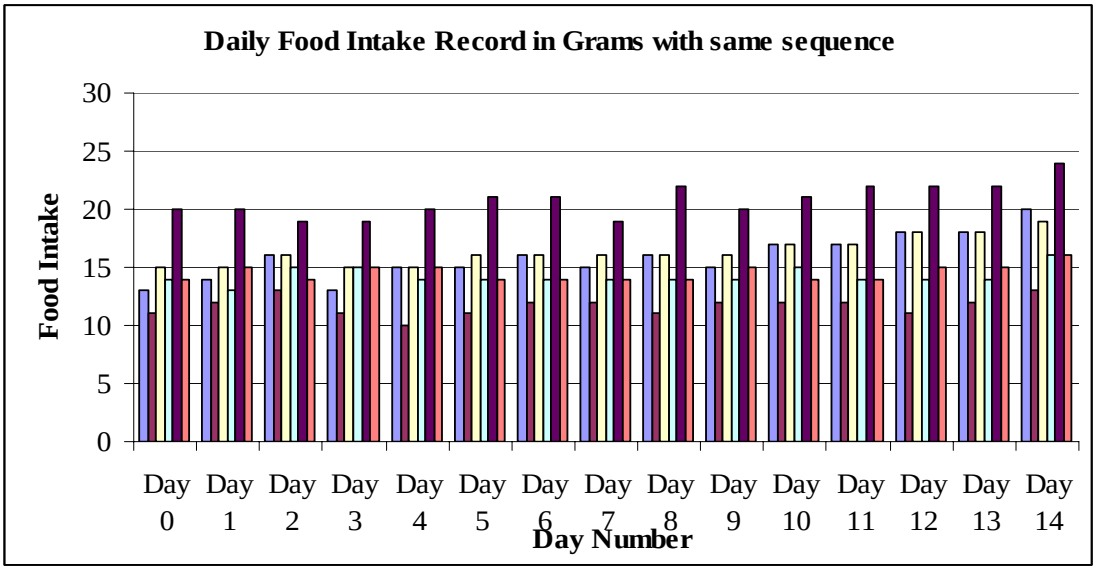
Body weight is an important factor to monitor the health of an animal. Loss in body weight is frequently the first indicator of the onset of an adverse effect. A dose, which causes 10 % or more reduction in the body weight, is considered to be a toxic dose [12, 13]. It is considered to be the dose, which produces minimum toxic effect, irrespective of whether or not it is accompanied by any other changes. All the animals from treated groups did not show any significant decrease in body weights for all the 14 days as compared with the 0 day values. The variation in body weight changes of males and females and the data is given in Graph 1**.**



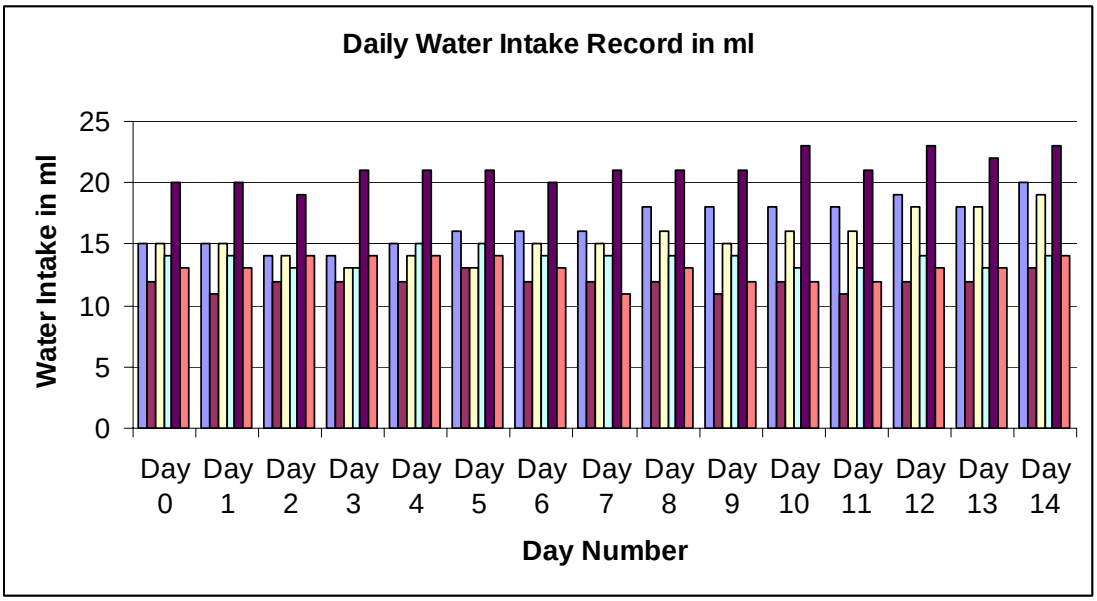
Graph 1: (All the values expressed as mean of three animals in each group)

Food and Water Consumption

There was no significant change in food and water intake of the test animals at all dose levels. The data for food and water consumption is given in Graph 2 and **3** respectively.



Graph 2: (All the values expressed as mean of three animals in each group)



Graph 3: (All the values expressed as mean of three animals in each group)

Mortality

Mortality is the main criteria in assessing the acute toxicity (LD_{50}) of any drug. There was no mortality recorded even at the highest dose level i.e. 600 mg / Kg. body weight.

Conclusion

From the results of this study, it is observed that there is no change in body weight, food and water consumption by the animals from all dose groups (200 mg/Kg body weight to 400 mg/Kg body weight), There was no mortality recorded even at the highest dose level i.e. 600 mg/ Kg body weight, which proves that the plant powder of all plants have no significant toxic effect in mice.

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