

## Safety Evaluation Studies of *Citrullus Colocynthis* for diabetes in Rats

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### Abstract

An experiment conducted in the department of Pharmacology and Toxicology, Nagpur Veterinary College, Nagpur reported *Citrullus colocynthis* to possess antidiabetic effect in rats at the rate of 50 mg/kg b.w and 100mg/kg b.w. So it was decided to also evaluate the safety of *Citrullus colocynthis* in rats at its antidiabetic dose. The experiment was conducted for 28 days. 18 wistar rats were divided into three groups containing six rats in each group. Group T<sub>1</sub> was maintained as normal control, whereas groups T<sub>2</sub> and T<sub>3</sub> received aqueous extract of *Citrullus colocynthis* @ 50 and 100 mg/kg body weight. Haematological and Biochemical estimations were done at the end of experiment i.e. on 29<sup>th</sup> day by using standard kits. Rats were then sacrificed and histopathological examinations were done. The results obtained showed that *Citrullus colocynthis* is safe at its antidiabetic dose and is safe for use as an antidiabetic remedy.

**Keywords:** Diabetes, Safety Evaluation, Metabolic disease, Herbal drug.

### Introduction

Diabetes is the most important metabolic disease which can affect nearly every organ system in the body. Number of people are suffering of diabetes, as insulin is either not available or is unaffordable by them. Many herbs and herbal products claim to possess the hypoglycemic effect. Ayurveda has been the first to give an elaborative description of diabetes, its clinical features and the patterns and its management by herbal or herbomineral drugs. Plant drugs are frequently considered to be less toxic and free from side effects than synthetic ones. The World Health Organization has also recommended the evaluation of the effectiveness of plants in conditions where safe modern drugs are beyond the reach of general people (Upadhyay and Pandey, 1984). The plant *Citrullus colocynthis* claims to possess hypoglycemic property as reviewed from various literatures (Abdel-Hassana et al., 2000, Fatma et al., (2004)). This plant also possess some toxic effects as reviewed from literature (Elawad et al., (1984),

Table-1. Experimental design is as follows:

Group	No. of Animals	Treatment
T1	6	Control
T2	6	Aqueous extract @50 mg/kg b.wt.
T3	6	Aqueous extract @100 mg/kg b.wt.

Adam et al.,(2001)). An experiment was conducted in the department of Pharmacology and Toxicology, Nagpur Veterinary College, Nagpur to study the antidiabetic effect of *Citrullus colocynthis* in rats at the rate of 50 mg/kg b.w and 100mg/kg b.w. So it was decided to study the safety evaluation of *Citrullus colocynthis* in rats at its antidiabetic dose.

### Materials and Methods

The present study was carried out in the Department of Pharmacology & Toxicology, Nagpur Veterinary College, Nagpur. The experimental protocol was approved by Institutional Animal Ethical Committee (IAEC) as per the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Social Justice and Empowerment, Government of India. The present research work was conducted on 18 rats of albino wistar strain, which were procured from the recognized Laboratory Animal Breeding Center. Rats weighing around 150-200 gms were used for the present study. All the animals were kept under standard

Table - 2. Mean Levels of Haematological and Serum biochemical parameters observed in different groups.

Sr. No.	Parameters	T1 (Normal Control)	T2 (Aq. Ext 50mg/kg b.w)	T3 (Aq. Ext 100mg/kg b.w)
1	Haemoglobin (gm %)	13.00±0.9a	14.17±1.08 a	14.33±1.12 a
2	Packed Cell Volume (%)	42.50±2.87 b	43.50±0.77 b	43.17±1.01 b
3	Body weight gain (gms)	15.00 ±1.83 c	15.83± 2.01 c	13.33± 4.02 c
4	Feed consumption (gms)	12 ± 0.057 d	12.5 ± 0.057 d	13 ± 0.052 d
5	SGOT (IU/L)	70.50±3.34 e	71.17±0.88 e	74.17±1.14 e
6	SGPT (IU/L)	47.50±4.7 f	48.50±1.03 f	50.00±1.16 f
7	Alkaline Phosphatase (IU/L)	30.83±0.95 g	31.17±0.88 g	31.33±0.67 g
8	LDH (IU/L)	401.67±3.18 h	405.83±3.01 h	400 ± 1.83 h
9	Creatinine (mg/dl)	0.48±0.02 i	0.48±0.01 i	0.49±0.01 i
10	Urea (mg/dl)	37.5±1.52 j	38.5±0.72 j	38.33±0.56 j
11	Total Proteins (g/dl)	6.53±0.16 k	6.5±0.12 k	6.43±0.14 k
12	Albumin (g/dl)	5.20± 0.18 l	5.08 ± 0.10 l	4.96 ± 0.13 l
13	Globulin (g/dl)	1.33±0.03 m	1.41±0.05 m	1.46±0.04 m

Mean ±S.E with common superscript did not differ significantly

managerial conditions as per the norms of CPCSEA. The animals were given balanced pelleted feed, procured from Godrej Agrovet Ltd. Aqueous extract of *Citrullus colocynthis* was prepared and was used as herbal medicine. The experiment was conducted for 28 days by administering aqueous extract at its antidiabetic dose.

Body weight gain and feed consumption by rats were recorded during the experimental period. Haematological and Biochemical estimations were done at the end of experiment i.e. on 29th day by using standard kits. At the end of experiment all the rats were sacrificed and organs like liver, kidney and small intestine were collected for histopathological study. All the data were statistically analysed by completely randomized design for all the parameters used in the safety evaluation study. The fruits of *Citrullus colocynthis* were procured from the Pune region and were identified from University Department of Botany, Nagpur University, Nagpur. The plant material was dried at room temperature and powdered. The powder was stored in glass bottle in a cool and dry place away from direct sunlight and used for preparation of aqueous extract. The aqueous extract was prepared by the method described by Rosenthaler (1930). Safety evaluation parameters have been studied with reference to its toxicological properties.

#### Results and Discussion

The mean haemoglobin level and the mean PCV level in groups T1, T2 and T3 are shown in the table above and these values were found differing nonsignificantly when compared with the control group. The mean body weight gain level in groups T1,

T2 and T3, were found to be differing nonsignificantly. The mean feed consumption in groups T1, T2 and T3, were differing nonsignificantly when compared with normal. The mean levels of the serum biochemical parameters are presented and all the other parameters are showed in the table. Non significant difference were observed in all the groups when compared with control. The value of the Total Proteins also showed non significant difference when compared with the control. Grossly liver, kidney and small intestine were apparently normal. There were no noticeable changes in histological sections of liver, kidney and small intestine.

Bakhiet and Adam (1995) studied toxicity of *Citrullus colocynthis* in chicks. *Citrullus colocynthis* seed was fed at 2% and 10% of the basal diet to 7-day old Bovans-type chicks for 6 weeks. Diwan *et al.* (2000) reported effect of saponins extract of *Citrullus colocynthis* on mortality and histopathologic changes in mice. AL-Qarawi and Adam (2000) studied the effect of combination of *Capsicum frutescens* and *Citrullus colocynthis* on growth, haematological and pathophysiological parameters in rats. The toxicity of diet containing 10% of *Capsicum frutescens* or 10% of *Citrullus colocynthis* fruits or their 1:1 mixture (5% + 5%) to rats treated for 6 weeks was evaluated.

Farzaneh and Mohammad (2006) studied the toxic effect of alcoholic extract of *Citrullus colocynthis* on rat liver @ 50, 100, 200 and 400 mg/kg body weight. They reported that toxic effects were null at 50 and 100 mg/kg body weight and less intense @ 200 and 400 mg/kg body weight.

The present experiment lead us to the conclusion *Citrullus colocynthis* at its antidiabetic dose is safe for use and does not cause any toxic effect.

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