

Restoring Effects of *Murraya koenigii* Leaves Chloroform Extract (MKCE) on Altered Body Weight in Lead-intoxicated Mice

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Abstract:

Background: Exposure to lead induces a broad range of physiological, biochemical and behavioural dysfunctions in the body. Although a very few scientific evidences have been reported the defensive effect of plant extracts on the lead induced changes in body weight.

Aim and Objectives: The study was aimed at evaluating the role of *Murraya koenigii* leaves against the harmful effects of lead on the body weight in mice.

Material and Methods: *Murraya koenigii* leaves were shade dried and its chloroform extract was prepared by maceration method. Male albino Swiss mice were divided into three groups. Group I was served as normal control group, Group II was injected intraperitoneally lead acetate only daily at once time and Group III concurrently received *Murraya koenigii* Chloroform Extract (MKCE) orally and injection of lead acetate intraperitoneally for consecutive 7 days. Body weight of all mice was taken daily; recorded and percentage of change in body weight was calculated.

Results: Significant decrease in body weight of mice was observed in lead intoxicated animals. MKCE-treated mice group have shown the recovery of body weight to some extent.

Conclusion: MKCE has shown significant protective role against lead intoxication by restoring body weight in mice.

Keywords: Lead acetate, male albino Swiss mice, *Murraya koenigii*

INTRODUCTION:

Exposure to lead induces a wide range of physiological, biochemical and behavioural dysfunctions in the body. It is one of current interesting studies of different sequestering agents to chelate heavy metals for minimizing toxicities and safe for use.

Kadhipatta has botanical name as *Murraya koenigii* belonging to family Rutaceae [1] which is commonly known curry leaves. It contains several bioactive compounds like euchrestine B, bismurrayafoline E, mahanine, mahanimbicine, mahanimbine [1] and essential oil [2] which contribute antioxidative, hypoglycaemic, anti-trichomonal and hepatoprotective effects [3, 4]. Till date, on reviewing literature and to our knowledge, there is lack of scientific evidences reported on the effects of *Murraya koenigii* leaves on lead induced damage in body weight of mice. So this study was aimed for evaluating the role of *Murraya koenigii* leaves chloroform extract against the toxic effects of lead on the body weight in mice.

MATERIAL AND METHODS:

Authentication and Preparation of *Murraya koenigii* Leaves Chloroform Extract (MKCE):

Fresh leaves of *Murraya koenigii* was purchased from the local market areas of Malkapur-Karad and authenticated by botanist. Fresh leaves was thoroughly washed under tap water and shade dried, powdered by using a mechanical grinder. Maceration method was used to prepare

Chloroform extract of *Murraya koenigii* leaves. About sufficient quantity of shade dried leaves of *Murraya koenigii* was extracted in the conical flask by using chloroform. The extraction process will be continued for 6-7 times till the appearance of colourless solvent in the flask. The collected extract was dried out by evaporating chloroform at room temperature to obtain 3% of yield from the crude extract; stored in suitable container for future use and labeled as *Murraya koenigii* Chloroform Extract (MKCE).

Experimental Animals:

Eighteen male Swiss albino mice were randomly divided into three groups of each weighing between 25-30 g were used in the study. Animals were obtained from the Animal House, KIMS, Karad, India. Mice were maintained under standard husbandry conditions temperature $22 \pm 2^\circ\text{C}$, humidity 45-55%, light: dark cycle in twelve hours for an acclimatization period of 15 days.

The experiments were compiled with the guidelines for animal experimentation of laboratory and Institutional Animal Ethical Committee, KIMS, Karad approved for the study.

Acute Oral Toxicity and Dosage Fixation:

According to earlier report, the LD₅₀ value for the aqueous extract of leaves of *Murraya koenigii* was found to be 150mg/kg i. p. in rats [4]. The dosage of lead acetate (15

mg/kg i. p) and MKCE (50 mg/kg p. o) were chosen in accordance to previous studies of Ghosh *et al* (2013) [4] and Ghosh *et al* (2012) [5].

Animal Groups:

Group-I (Normal): Normal diet and water only *ad libitum*

Group-II (Pb treated): Lead acetate (15 mg/kg i. p) at once daily

Group-III (Pb + MKCE treated): MKCE (50 mg/kg p. o) + lead acetate (15 mg/kg i. p) at once daily

Body Weight:

The body weight of all mice recorded during the experimental procedure and percent change in body weight of mice were calculated in according to the given formula [9]:

$$\text{Change in body weight (\%)} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

RESULTS:

The present study describes the effects of MKCE against lead induced altered body weight in mice. Table 1 is tabulated for the changes in the body weight of mice and it is observed that the gradual decrease in body weight day by day. Group III has retained some extent of body weight in mice compared to Group II and shown some improvement. It may be linked to the protective effect of MKCE orally administrated to Group III.

Table 1: Effects of MKCE on Body Weight in Lead-intoxicated Mice

Groups	I	II	III
Initial weight (g) of mice	47.25 ± 2.51	45.16 ± 2.33	46.10 ± 1.07
Final weight (g) of mice	39.57 ± 2.89	43.33 ± 2.05	43.66 ± 1.11
Percent change in body weight (%)	16.25	4.05	5.29

Values are expressed in Mean ± SEM. Number of animals =6

DISCUSSION:

Effect on Body Weight:

The present study is resulted body weight loss in mice however; it may be contradictory matter in a few studies like weight gain after lead exposure shown by Sharma *et al* (2011) [6] and Gajawat *et al.* (2006) [7]. It may be related to dysfunction in the glucocorticoid hormones leading to alteration of body weight increase or decrease [6]. Study has been reported by Sharma *et al.* (2012) stated that lead exposure may cause to interfere with calcium absorption in the body in turn to body weight loss [8]. A few studies by Rajesh *et al.* (2015) [9], Ibrahim *et al.* (2012) [10], Edrees *et al.* (2013) [11], Sun *et al.* (2005) [12] and Das *et al.* (2015) [13] have supported to our study with respect to significant body weight loss. Lynda *et al.* (2011) [14] regarding body weight in rats suggested that acute lead exposure affects on body weight however the body weight gain due to adaptation in chronic lead exposure. Our study

has suggested that different animal species like rats and mice have different physiological system and have different adaptation to gain weight. It depends on the duration of lead exposure. On supplementation of antioxidant plant extract may help to recover the body weight. Overall studies have suggested the toxic effect of lead is almost body weight loss yet its exact mechanism is not known and not fully understood. It is needed to study the change of body weight by gain/loss due to acute/chronic lead exposure in further investigations.

CONCLUSION:

MKCE has shown protective role against lead intoxication by restoring body weight in mice.

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