



# Ameliorative Efficacy of Leaf Extract of *Moringa oleifera* on Protein Profile Aluminium- Induced in Albino Rats

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## ABSTRACT

Aluminium is a broadly distributed element with a well-known toxicity. The present work was designed to study the protective effect of the *Moringa oleifera* leaf extract on aluminium induced changes in protein profile in male albino rats. A total sixty healthy male albino rats equal weight and size were grouped into three groups of 20 rats each. Group 1: Control normal food and distilled water. Group 2: aluminium 200 mg /kg b. w. Group 3: 300 mg / kg b. w of leaf extract of *M. oleifera* along with same dose of Al for total 60 days. Blood samples were collected at 45 and 60 days for analysis of protein profile Albumin, A/ G ratio and Total protein. The outcome of current study revealed a significant decrease in the activities of Albumin , A/G ratio and TP after Al subjection compared to control group. There was a significant increase in Group 3 in all days. The finding demonstrated ameliorative potentials of aqueous leaf extract of *Moringa oleifera* against damages induced by Al in a dose and time selected manner.

**Keywords:** Aluminium, Albino rat, Biochemical, *Moringa oleifera*, Protein profile

## INTRODUCTION

Aluminium (Al) is the third most copious component on the Earth's crust. Population are unprotected to Al from several environmental causes and mediations, e.g., dialysis ingestion of antacids, using Al cookware and packing containers etc. Al can also be borne in some foods, dust, including drinking water and other sources (Tripathi et al 2009). Aluminium is broadly exploited in the manufacture of industrial apparatus and humans are consequently revealed to elevated dosage of the metal by boring, mineral extraction, reuse of metal and coupling procedure (Boran et al. 2013). Al are broadly used to decline the dyspeptic sign. Hence, the utilization of large quantity of Al compounds, period of pregnancy could convey a prospective possibility of Al accretion and infectious (Colomina et al 2005). It was create that one of the chief biological structure selected by Al subjection that is kidney (Saragzi et al 2006). The liver is a critical organ which includes most of the accumulated metals and where toxic effected may be predicted (Kurutasetal2009). Al gathered higher with in the liver than in the muscles tissues, heart, brain or lung (Greger and Sutherland 1997).

The use of plants escorted by therapeutic properties possess achieve the popular awareness later considerable studies verified that they carry bioactive combination that advantageous to human beings. Plants accompanied by remedial properties disport a crucial role in different civilization, almost all seriously in Asian medicine (Luo et al 2019). Already numerous are examine secure as it appear least absolutely not difficulty caused by its biological source (Dragos et al 2017). The most ordinary origin of vital compounds in plants is leaves (Tugme and Nyakoojo 2019).

A specimen of that kind plant is *Moringa oleifera*, locally known in the India as “shajna”. Beside among actuality comfortable accessible, their leaves are famous and efficiently appreciate with respect to superior origin of nourishing and restorative utility (Abdul et al 2014). Bioactive constituents play a remarkable lead in the effectiveness of this plant leaves as a form of medicaments (Diaz – de et al 2017). *Moringa oleifera* a extremely appraise plant of socio-occupational significance receivable to its diverse nutritional, pharmaceuticals (Fuglie 2000). Its commercial utilization has embellish of enormous importance in the community (Foldl, 2001). *Moringa oleifera* is extensively used in classical and verdant medicine, and has earned universality demand extremely people has initiated perceptive the pharmacological significance in present day drug and synthesize remedy. Around entire parts of the plant is helpful in classical medicine method (Rathi et al. 2006). *M. oleifera*, also known as the miracle tree. Leaves of *M. oleifera* are a good source of vitamins, minerals, iron, ca, K+, Cu and phytochemicals with determined powerful antioxidant properties (Sabale et al. 2008; Siddhuraju et al 2003). Researchers have shown that, the leaves of *M. oleifera* contain vitamins and iron in significant amounts and hence help to improve Fe and Hb status in rats (Dhar and Gupta 1982). This antioxidant activity of *M. oleifera* leaves extract is because of the presence of several bioactive compounds like chlorogenic acid, rutin, quercetin glucoside and kaempferol. Furthermore, the leaves extract of *M. oleifera* shown to have antioxidant action in vivo (Ashok and Pari 2003).

There is an important require to begin a correlation among leaf extract and antioxidant activities. Due to there are such spread studies obtainable, in progress work is compulsory. This awareness void encouraged us to prefer the present study focus to find out beneficial effects of *M. oleifera* leaf extract against Al-induced in albino rat.

## **MATERIALS AND METHOD**

### **Experimental animals**

Sixty male albino rats were used for the investigation. The animals were obtained from the Animal House, School of Life sciences, Khandari campus, Dr. B.R Ambedkar University, Agra. The animals were housed in cages under standard laboratory condition (25° C) twelve hour light & twelve hour dark cycle. They were fed commercial rat pellet and distilled water *ad libitum*.

### **Chemicals**

Aluminium was obtained from Thomas Baker Pvt. Ltd. Mumbai -400002 India. All other chemicals used were analytical grade.

### **Experimental Protocol:**

A total of sixty rats were randomly divided into control and experimental group as follows:-

1. Group1 : served as control
2. Group 2: Aluminium treated
3. Group 3: Aluminium followed by the treatment of 200mg/kg & *Moringa oleifera* leaf extract 300 mg / kg b. w

### Collection of leaf & Preparation of extract

Fresh leaf of *Moringa oleifera* were collected from local area at Agra region in Uttar Pradesh for this study. Leaf of this plant authenticated at Department of Botany, School of Life sciences, Dr. B.R Ambedkar University Agra, India. Thereafter, the leaves were rinsed in clean tap water, air dried at room temperature for a period 2 weeks. Leaves were ground using a grinder to make in powder. The pulverized material was mixed into distilled water, the solution was left to stand for some period after that filtered by muslin cloth. The extract produce was used in this study.

### Blood Collection

After 45 and 60 days rats in all groups were subjected to light anesthesia, blood was collected through cardiac puncture in vials for various biochemical analysis. The samples were tested for Total protein, Albumin and A/G ratio. Test sample analysis were determined by standard methods, Total protein was analyzed by (Lowery et al. 1951), Albumin analysis by methods of (Doumas and Biggs 1972) and A/G ratio calculated according to process by serum T. Protein and Albumin (*Vide supra*).

### Statistical Analysis

All statistical analysis were performed using statistical software. Values are expressed a mean  $\pm$  standard error of the mean (SE m). Data were analyzed using Student 't' test.

## RESULTS AND DISCUSSION

In this study, rats were subjected to aluminium and treated with *Moringa oleifera* fresh leaf aqueous extract. Biochemical analysis was performed after the 45<sup>th</sup> and 60<sup>th</sup> day of experiment. The values of several biochemical parameters including Total protein, Albumin and A/G ratio were assessed in control and treated groups. In treated groups showed a significant decrease ( $P>0.05$ ) in Total protein, A/G ratio and Albumin in aluminium included group as compared to the control group as shown in Table 1.

**Table I:** Beneficial effects of *Moringa oleifera* leaf extract in liver parameters (Total Protein, Albumin and A/G ratio) of albino rat after aluminum intoxication.

S.No.	Parameters	No. of Albino rat	Period (days)	Control Group		Treated-I (Al)		Treated-II (Al+M. oleifera)	
				Mean	$\pm$ S.Em.	Mean	$\pm$ S.Em.	Mean	$\pm$ S.Em.
1.	Total	10	45	7.94	0.24	5.76	0.23****	9.01	0.13***
	Proteins (g/dl)	10	60	8.23	0.13	5.61	0.33****	8.82	0.11***
2.	Albumin	10	45	4.24	0.21	2.30	0.25****	5.03	0.15***
	(g/dl)	10	60	4.42	0.22	2.37	0.23****	5.13	0.21***
3.	A/G Ratio	10	45	3.73	0.16	1.78	0.19****	4.20	0.15***
	(g/dl)	10	60	3.82	0.43	1.55	0.10****	5.24	0.11***

S. Em. = Standard Error of Mean,

\*\*\*\* = Very Highly Significant ( $p < 0.001$ ), \*\*\* = Highly Significant ( $p < 0.01$ ), \*\* = Significant ( $p < 0.05$ ), \* = non-significant ( $p > 0.5$ )

The present study was conducted to determine the alteration in Total protein, Albumin and A/G ratio among Al treated experimental rats and to evaluate the ameliorative effect of *Moringa oleifera* aqueous leaf extract against the toxic effect of Al on these biochemical parameters. As the previous studies aluminium significantly decrease total protein, also albumin when compared to control, this was in agreement with (Imam et al. 2006). Harun ciftci et al (2022) reported the significant decrease of total protein and albumin in Al subjected group. Shrivastava (2013) also observed significant reduction in total protein. In controversial Al administration significantly increased the total protein and albumin level (Kalaiselvi et al (2015). In another studies Osama et al (2014) revealed that decrease level in total protein and albumin and significant elevation in the A/G ratio animals administered with aluminium compared to control one. Al – Hashem (2009) published that the decline in T. Protein and albumin concentration in Al given animals. Similar result was reported by (Ekakitie et al 2022) in their study, Al induced significant reduce in concentration of albumin and T. Protein relative to control set.

Albumin is the majority copious protein in plasma of human, representing 55-65% of the total protein. Amount at which albumin is consolidate in the liver be conditional on protein accrual, which is modulated by the plasma albumin degree. Nearly all the albumin strain by the kidney renal glomeruli is assimilation at proximal tubule cells where lysosomal enzymes decay the albumin into shard that are arrive back to the circulation. The transmission. The noticed reduce in albumin in aluminium treated rats might be because of alteration in protein synthesis and metabolism in the liver. (Chinoy and Memon 2001)

Al – Eisa et al (2017) outcome show that decrease in the level of T. Protein and albumin in Al group. Also Tripathi et al (2009) noted that significant reduction in the sera total protein and albumin in albino rats (*Rattus norvegicus*) given dose of Al.

In this present study investigation revealed that *M. oleifera* affects the protein profile produce toxic effect by aluminium. This plant have potential to cure the liver toxicity caused by this metal. Azzaz et al (2020) suggested that *M. oleifera* has hepatoprotective and free radical scavengers due to presence of phenolic and flavonoids components.

## CONCLUSION

From this investigation, it could be concluded that the *Moringa oleifera* leaf extract is beneficial in the medicinal field and in our daily life against the potent toxic effect caused by aluminium indices ameliorates by this plant. This investigation will help the society to aware about the Al toxicity and how to reduce & protects with *M. oleifera* herbal plant.

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