ejpmr, 2017,4(9), 601-604

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

TO EVALUATE THE HEPATOPROTECTIVE ACTIVITY OF ETHANOLIC LEAF EXTRACT OF MORINGA OLEIFERA PLANT IN ALBINO WISTAR RATS.

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Article Received on 07/07/2017 **Article Revised on 27/07/2017** **Article Accepted on 17/08/2017**

ABSTRACT

Introduction: Moringa Oleifera is widely found in Asian subcontinent and it has been used as an hepato-protective in Indian folklore medicine. In this study we compared the hepato- protective effects of Moringa Oleifera ethanolic extracts with other standard drug in Albino Wistar Rats. **Methods**: 30 Albino Wistar rats were divided into 5 groups of six each and administered placebo (saline), Liv-52 (standard) and 3 groups of Moringa Oleifera using 100mg/Kg, 200mg/Kg and 400mg/kg doses. **Results**: Rats treated with ethanolic Leaf extract of Moringa Oleifera (100/200/400 mg/kg, orally once daily) for 21days, the SGOT values (261.66±11.75 IU/L, 248.66±5.16 IU/L, 219±14.74 IU/L) were significantly lower (P<0.05), (P<0.05), (P<0.01) when compared to SGOT levels in control rats (277.00 ±7.45 IU/dl). Rats treated with ethanolic Leaf extract of Moringa Oleifera (100/200/400 mg/kg, orally once daily) for 21days, the SGPT values (72.33±4.96, 64.66±2.73, 56.33±2.33 IU/dl) were significantly lower (P<0.05), (P<0.05), (P<0.01) when compared to SGPT levels in control rats (99.33±2.65 IU/dl). **Conclusion**: Ethanolic extracts of Moringa Oleifera leaves exhibits significant hepatoprotective activity in a dose dependent manner.

KEYWORDS: Hepatoprotective, Moringa Oleifera, SGOT, SGPT.

INTRODUCTION

The multiple uses and potential of Moringa Oleifera plant has attracted the attention of farmers and researchers in past historical eras. Ayurvedic traditional medicine says that Moringa Oleifera can prevent 300 diseases and its leaves have been used in folklore both for preventive and curative purposes.[1] In many developing countries, a large proportion of the population relies on traditional practitioners and their knowledge of medicinal plants in order to meet health care needs. Although modern medicines may exist side-by-side with such traditional practice, herbal medicines have often maintained their popularity for historical and cultural reasons. Such products have become more widely available commercially, especially in developed countries. Use of herbal medicines in developed countries has expanded sharply in the latter half of the twentieth century. In India, herbal drugs are an integral part of The Indian System of Medicine (Ayurveda) which is an ancient and mainstream system.[2]

Moringa is one such species which has not been explored fully despite the enormous reports having potentials such as: cardiac and circulatory stimulants, antitumor, antipyretic, antiepileptic,[3] anti-inflammatory, diuretic, antispasmodic,[4] antiulcer[5], antihypertensive, cholesterol lowering,[6] antioxidant, antidiabetic, antitumor, hepato-protective, antibacterial and antifungal activities.[7] These are also being used for treatment of different ailments in the indigenous system of medicine.[8] The leaves are used in folklore medicine as hepatoprotective. Some previous reports indicate that ethanolic extract of the leaves possesses significant hepatoprotective activities. Therefore the present study is aimed to evaluate the hepatoprotective activity of Ethanolic leaf extract of Moringa Oleifera plant by measuring serum transaminases i.e. serum Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase (SGPT) levels in Albino Wistar Rats.

MATERIALS AND METHODS

Plant Material and Extraction

Fresh leaves of Moringa Oleifera of were collected from periphery of Aurangabad city and its identity was confirmed by Department of Botany, Maulana Azad College Aurangabad. Leaves were dried in the shade inside the room for two days and later made into powder. 90% ethanol was used to extract the powder using the method of soxhlation for 18 hrs. Whitman filter paper No. 1 was used to filter the extract and concentrated to yield a semi solid mass of 48 gm (yield 9.2% w/w) and was refrigerated at 4°C and for later use .

Chemicals: Carbon tetrachloride, procured from Sigma Chemical Company, Merck Olive Oil from Sasso, Italia. Liv 52, standard drug was obtained from Himalaya Drug Company, India. All the reagents used were of analytical grade. SGOT and SGPT levels were estimated using commerial kits from Erba Diagnostics, Germany.

Animals

Animals were procured from central animal house of M.G.M. Medical College and Hospital Aurangabad. Male Albino Wistar rats (100-200 g) were used. The animals had free access to standard pellets as basal diet and water. Animals were acclimatized for laboratory conditions for 7 days before the experiments. The experimental study protocol was approved by the Institutional Animal Ethics Committee (IAEC) of MGM Medical College and Hospital, Aurangabad constituted as per the guidelines laid by the committee for the purpose of control and supervision of experiments on Animals (CPCSEA).

Methods

30 Male Albino Wistar Rats were divided into five groups of six rats each. A suspension of carbon tetrachloride in olive oil (1:1) in the dose of 1ml/kg intraperitoneal was given for induction hepatic damage. First group served as control received normal saline 10 ml orally for ten days. Second group received Liv-52 in the dose of 0.216 ml/kg/day orally for ten days. Third group rats were given 100 mg/kg body weight of Moringa Oleifera ethanolic extract for ten days. Fourth group rats were given 200 mg/kg body weight of Moringa Oleifera ethanolic extract for ten days. Fifth group rats were given 400 mg/kg body weight of Moringa Oleifera ethanolic extract for ten days. The rats were kept overnight fasting after 21 days and blood samples were collected by retro orbital puncture under ether anaesthesia and the serum was used for the estimation of hepatic biochemical markers like SGOT, SGPT.

RESULTS

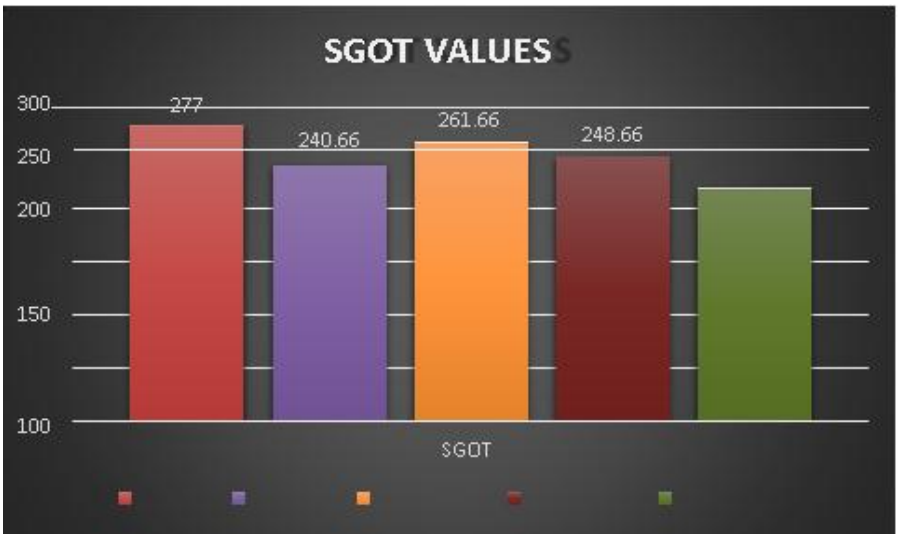
Table: Effect of Extract of Moringa Oleifera (MO) leaf extract on SGOT, SGPT levels.

Sr. No.	Groups	SGOT	SGPT
1	Control	277±7.45	92.33 ± 2.65
2	standard	240.66±16.23**	53.33± 4.50**
3	MO 100 mg	261.66 ± 11.75*	72.33 ± 4.96*
4	MO 200 mg	248.66 ± 5.16*	64.66 ± 2.73*
5	MO 400 mg	219 ± 14.74**	56.33± 2.33**

* p<0.01 – significant, **P<0.001 - Highly significant, ns – not significant.

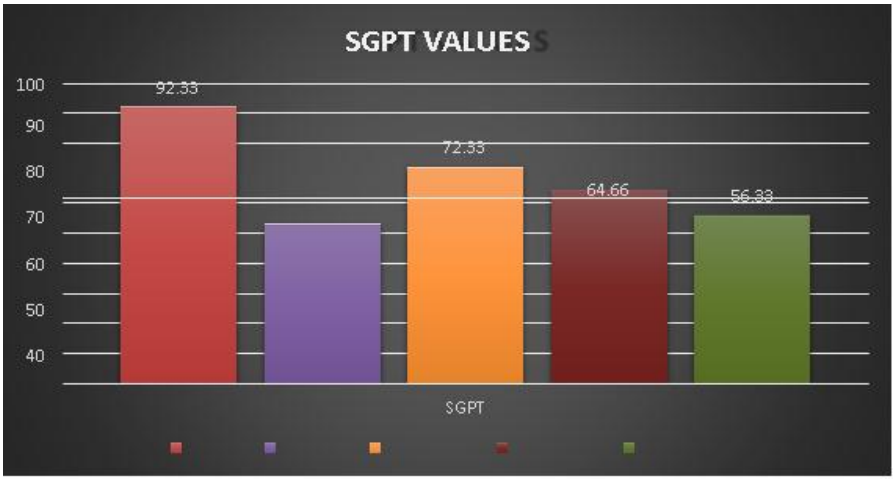
Effect on serum Glutamate Oxaloacetate Transaminase (SGOT) levels

In group 1[control] rats had serum SGOT level of (277.00±7.45 IU/L) when measured on day 21. In group 2[standard] rats had serum SGOT level of (240.66±16.25 IU/L). In group 3[Moringa Oleifera 100 mg/kg] rats had serum SGOT level of (261.66±11.75 IU/L). In group 4 [Moringa Oleifera 200 mg/kg] rats had serum SGOT level of (248.66 ±5.16 IU/L). In group 5[Moringa Oleifera 400 mg/kg] rats had serum SGOT level of (219±14.74 IU/L). There was significantly higher difference in SGOT Levels in standard group (P<0.05) when compared to serum SGOT levels in control rats (277.00 ± 7.45 IU/dl). Rats treated with ethanolic Leaf extract of Moringa Oleifera (100/200/400 mg/kg, orally once daily) for 21days had the following SGOT values (261.66±11.75 IU/L, 248.66±5.16 IU/L, 219±14.74 IU/L). This was significantly lower (P<0.05), (P<0.05), (P<0.01) when compared to SGOT levels in control rats (277.00 ±7.45 IU/dl).



Effect on Serum Glutamate Pyruvate Transaminase (SGPT) levels

In group 1[control] rats had serum SGPT level of (99.33±2.65 IU/L) when measured on day 21. In group 2[standard] rats had serum SGPT level of (53.33±4.50 IU/L). In group 3[Moringa Oleifera 100 mg/kg] rats had serum SGPT level of (72.33±4.96 IU/L). In group 4 [Moringa Oleifera 200 mg/kg] rats had serum SGPT level of (64.66 ±2.73 IU/L). In group 5[Moringa Oleifera 400 mg/kg] rats had serum SGPT level of (56.33 ±2.33 IU/L). There was significantly higher difference in SGPT Levels in standard group ($P<0.05$) when compared to serum SGPT levels in control rats (99.33 ± 2.65 IU/dl). In rats treated with ethanolic Leaf extract of Moringa Oleifera (100/200/400 mg/kg, orally once daily) for 21days had the following SGPT values (72.33±4.96, 64.66±2.73, 56.33±2.33 IU/dl). This was significantly lower ($P<0.05$), ($P<0.05$), ($P<0.01$) when compared to SGPT levels in control rats (99.33±2.65 IU/dl).



DISCUSSION AND CONCLUSION

It is generally accepted in the scientific world that the hepatotoxicity induced by Carbon tetrachloride (CCl_4) is due to the formation of the active metabolite, trichloromethyl free radical (CCl_3). This then readily interacts with molecular oxygen to form the trichloromethyl peroxy radical (CCl_3OO). Both radicals are capable of binding to proteins and other macromolecules with simultaneous attack on poly-unsaturated fatty acids to produce lipid peroxidation leading to hepatotoxicity.[9]

Lipid peroxidation of hepatic cell membrane is one of the principle causes of hepatic injury induced by CCl_4 or other hepatotoxicants. The efficacy of any liver curative drug depends on its capacity of either reducing the harmful effect or restoring the normal hepatic physiology that has been made anxious by CCl_4 and/or other hepatotoxicants.[10] In our present study, the measurement of marker enzymes like SGOT and SGPT is a convenient method to monitor oxidative cell damage. Inhibition of elevated enzymes has been observed in Moringa Oleifera extract and Liv 52 treated groups probably due to its through re-establishment of biomembranes of hepatic parenchymal cells.[11]

Oral treatment with Moringa Oleifera extract in doses of 100, 200, 400 mg and Liv 52 attenuated these increased enzyme activities produced by CCl_4 and a subsequent recovery towards normalization of these enzymes strongly suggests the possibility of Moringa Oleifera extract being able to affect the hepatocytes so as to cause accelerated regeneration of parenchymal cells and lysosomes, thus protecting against lysosomal integrity and cell membrane fragility and therefore decreasing the leakage of marker enzymes into the circulation. A study done by A.A. Hamza et al evaluated the effect of Moringa Oleifera seed extract on liver fibrosis. Liver fibrosis was induced by the oral administration of 20% carbon tetrachloride (CCl_4). Simultaneously, Moringa Oleifera seed extract (1g/kg) was orally administered daily. The administration of Moringa seed extract decreased the CCl_4-induced elevation of serum aminotransferase activities and globulin level which is in correlation with our study.[12]

The plant can therefore offer a potential benefit in the management of various hepatic disorders. However, further research is needed to explore the active ingredients contributing to its activities and elucidate the exact mechanism of action of this plant.

ACKNOWLEDGEMENT

We are very thankful to Dr Deepak Bhosle, Head of the department of Pharmacology, MGM Medical College Aurangabad and all teaching staff for their kind help during this research.

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