REVIEW ARTICLE

Moringa oleifera Lam: Pharmacologically efficient herb

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This literature review's objective was to provide cutting-edge investigative data so that scientists may soon find a novel pharmacological entity from the medicinal plant *Moringa oleifera* Lam. (*Moringaceae*). The plant provides an uncommon and enriched combination of zeatin, beta-sitosterol, kaempferol and quercetin. *Moringa oleifera* Lam is highly noteworthy for its medicinal value in addition to its great nutritional content. In the indigenous medical system, several parts of this plant-including leaves, roots, seeds, bark, fruit, flowers and immature pods-have antiulcer, antipyretic, antitumor, antispasmodic, antihypertensive, diuretic, anti-inflammatory, antioxidant, antidiabetic, cholesterol-lowering, hepatoprotective, antibacterial and antifungal properties. They also act as cardiac and circulatory stimulants. This review gives the scientific information regarding the pharmacological potentials of *Moringa oleifera* Lam. (*Moringaceae*).

Keywords: Moringa; Drumstick; Pharmacology; Nutrition

INTRODUCTION

The highly prized plant *Moringa oleifera* Lam. (*Moringaceae*) is found in many tropical and subtropical nations. It has a high nutritional content and an impressive range of therapeutic uses. In addition to being a good source of minerals, protein, beta-carotene, amino acids and different phenolics, different plant parts make up a contour of essential vitamins.

While the plant's young buds and leaves are consumed as vegetables and can be washed on shrines to relieve headaches, the bark and roots are said to have anti-scorbutic properties and can be applied topically as a counterirritant. The juice of a leaf and honey mixture is used to cure eye conditions. Additionally, known for its high nutritional content, the plant is used in traditional medicine to treat a variety of pain and inflammation-related conditions. The seeds of *Moringa oleifera* are used as a tonic, purgative, anti-inflammatory, ophthalmic preparation and for a variety of venereal infections. While the aqueous extract of *Moringa oleifera* roots demonstrated an antifertility profile, the ethanolic extract of *Moringa oleifera* leaves demonstrated analgesic activity [1-5]. The plant demonstrated a broad range of pharmacological actions, including hepatoprotective, diuretic, hypolipidemic, antibacterial activities, antifungal, antipyretic, antispasmodic, antiulcer and antitumor. This review is to recapitulate the pharmacologic activity of various *Moringa oleifera* plant parts.

LITERATURE REVIEW

Pharmacological properties of *Moringa oleifera*

Antifungal and antibacterial activity: The antibacterial action of *M. oleifera* distillate is demonstrated by a marked decrease in bacterial growth. *E. coli* is found to exhibit the strongest antibacterial activity, followed by *K. pneumoniae, B. subtilis, P. aeruginosa* and *S. aureus*. When compared to the standard and control, the fungal extract significantly inhibits the growth of the colony in the plates. Additional suppression of *A. niger* is demonstrated, along with inhibition of *A. terreus, A. nidulans* and *A. oryzae*. *M. oleifera* 15's antibacterial and antifungal properties [6].

Oxidant radical scavenging activity: Moringa shows cell reinforcement property attributable to the presence of mixtures like phenolic, phytochemical screening affirmed its presence in hyydroalcoholic separate. In this worship, units of Moringa contain huge bioactive mixtures including thiocarbamates, glucosinolates, isothiocyanates and flavonoids. These mixtures diminish ROS, recover film bound cell reinforcements and chelating metal particles. Drumsticks shows presence of β-carotene, as a significant part from the plant and *M. oleifera* likewise shows presence of L-ascorbic acid and a which in deed help as a clarification for their method of activity as a cell reinforcement capacity. *M. oleifera* remove shows chemo preventive strength the premise of attributed to the synergistic activity of the concentrate and acceptance of cell reinforcement catalysts and compounds of stage II (GSTs) which may be worried in the anticarcinogenic action [7].

Moringa oleifera fluid concentrate showed major areas of strength for an extinguishing impact on free revolutionary of 2, 2-Diphenyl-2-Picryl Hydrazyl (DPPH), superoxide and nitric oxide extremist, alongside lipid per oxidation restraint. *Moringa oleifera* concentrate of the leaf shows a free extreme extinguishing impact comparable to with that of the reference norms of cell reinforcements. The *Moringa oleifera* delicate and mature leaves extricates shown guard in opposition to free revolutionary's oxidative harm, safeguard to major biomolecules against oxidative harm and manage the cost of huge protection against oxidative harm. *Moringa oleifera* leaf hydro-alcoholic concentrates (1000 mg/kg portion) and case (organic product) fluid concentrate (750 mg/kg portion) of *Moringa oleifera* shows presence of flavonoids, tannin and phenolic. The poly phenolic phytochemical presence in the plant might be contributing their ethano-restorative use. Accordingly, it tends to be resolved that *Moringa oleifera* removes shows significant cancer prevention agent action and the presence of kaempferol in *Moringa oleifera* leaves showed the cell reinforcement action which was accounted for [8].

Gastric ulcer defensive activity: Das et al., conscious the plausible antiulcer impacts of *M. oleifera* watery concentrates of in two creature models of ulcers. The watery leaves separate was assessed for antiulcer action at the 200 mg and p.o 400 mg/kg portion level of in gastric ulcer by ibuprofen and pyloric ligation models. The harshness of gastric ulceration prompted in two models was assessed on the boundary of ulcer record.

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Assessed creature models displayed in charge gathering of creatures humble to serious ulcers; in that the limit was by pylorus ligation strategy. The concentrate of *M. oleifera* and standard medication utilized famotidine fundamentally ($p<0.001$) shows decrease in the ulcer record when related to positive benchmark group in together ulcer models. *M. oleifera* was shown equivalent antiulcer impact through that of the typical medications in pylorus ligation and ibuprofen actuated ulcer techniques. Famotidine and concentrate of *M. oleifera* altogether ($p<0.05$) lessened the aggregate and free acridity of gastric juice. It is correspondingly intense when connected with famotidine [9].

It was correspondingly viewed that as the *M. oleifera* leaf fluid concentrate of was uncovered to protect rodents from indomethacin prompted gastric ulcer in a ward on portion. Vasoconstriction and protein accelerating impact tannins with potentially will be profitable being developed ulcer avoidance. Astringent impact of tannins has accelerated micro proteins on the ulcer site where it is shaping an impermeable defensive pellicle over the organ to deflect poisonous substance and battle against the proteolytic chemical. It has detailed presence of flavonoids which suggestion some insurance against ulcer advancement by further developing microcirculation and expanding slender obstruction which diminishes the cells less harmful to encouraging variables.

DISCUSSION

In indomethacin-prompted ulcers leaf concentrate of the plant was shown defensive impact on gastric mucosa ward of portion. *M. oleifera* (tannins and flavonoids) leaf remove phytoconstituents decreases the propagation and inception of ulceration might be responsible for the experiential impacts. An antiulcerogenic capability of leaf separate propose it's utilized as a customary medication [10].

Local anaesthetic and analgesic activity: At the point when ethyl acetic acid derivation, petrol ether, n-butanol diethyl ether part of alcoholic *M. oleifera* extricate completed by tail submersion strategy and hotplate shown pain relieving movement. Intense pain relieving action showed *M. oleifera* seeds different parts of ethanolic separate which is comparable to at 25 mg/kg of body weight of ibuprofen. From this examination, it very well may be settled that the *M. oleifera* Lam seed have perceptible pain relieving action and is similarly powerful to standard medication (Ibuprofen) which lays out the utilization of *M. oleifera* seeds as ordinary pain relieving. *M. oleifera* methanol remove when affirmed in guinea and frog models for the assessment of nearby sedative action and it was seen that the plant (root bark) has shaped in the two creatures, critical neighborhood sedative action.

Anti-inflammatory and antinociceptive activity: Ndiaye et al., assessed a water concentrate of roots for the calming action in rodents surmised weight somewhere in the range of 160 g and 120 g. *M. oleifera* treatment at 750 mg/kg portion altogether subdued the oedema advancement at 1, 3 and 5 hours (decrease by 51.1%, 53.5% and 44.6% separately). If *M. oleifera* portion increment upto 1000 mg/kg didn't upgrades the restraint impact on advancement of oedema at 3 and 1 hours, while this portion potentiated the oedema at 5 hours [11].

Essentially repressed advancement of oedema 1, 3 and 5 hours (49.1%, 82.1% and 46.9% individually) when treated with indomethacin. These discoveries demonstrate that an at portion of 750 mg/kg *M. oleifera* watery root remove diminishes the oedema initiated *via* carrageenan to the same degree as the strong mitigating drug indomethacin. In addition, these outcomes convey further sign that the *M. oleifera* roots contain calming esteem that might be advantageous in the intense provocative therapy. Based on bio-examine coordinated cleansing and seclusion of the ethyl acetic acid derivation concentrate of *M. oleifera* natural products created five recognized phenolic glycosides and three new phenolic glycosides; 4-((2'- O-acetyl-alpha-l-rhamnosyloxy) benzyl) isothiocyanate (1), 4-((3'- O-acetyl-alpha-l-rhamnosyloxy)benzyl) isothiocyanate (2) and S-methyl-N-(4-((alpha-l-rhamnosyloxy) benzyl)) thiocarbamate (3), together (4-8) [12]. Examination of secluded *M. oleifera* intensifies uncovered calming activity in macrophage crude 264.7 cell line set off by lipopolysaccharide (LPS)-mouse of 4-((2'-O-acetyl-alpha-l-rhamnosyloxy)benzyl) Isothiocyanate (1) was isolated which impacted intense NO-inhibitory action with an IC (50) worth of 1.67 microM, trailed by 2 (IC (50)=2.66 miniature M), 4 (IC (50)=2.71 microM) and 5 (IC (50)=14.4 microM), correspondingly. The NO-inhibitory action of *M. oleifera* organic products is ascribed to these secluded parts 1, 2, 4 and 5.

In the rodent model of asthma, *M. oleifera* may likewise have a few restorative characteristics that work against synthetically set off insusceptible intervened incendiary responses [13]. Sulaiman et al., examined the antinociceptive and calming properties of a watery concentrate of *M. oleifera* leaves in research facility creatures, using the squirming, hot-plate and formalin tests for antinociception and the carrageenan-actuated paw oedema test for calming exercises. In every one of the tests utilized, the concentrate (10, 30 and 100 mg/kg) showed significant (P 0.05) antinociceptive adequacy, which was portion subordinate. In a portion subordinate way, the concentrate likewise showed significant (P 0.05) calming activity. At long last, *M. oleifera* leaves have hostile to nociceptive and mitigating properties that are both unexpectedly halfway narcotic intervened and non-narcotic interceded. The customary advantages of *M. oleifera* in the treatment of illnesses, especially those associated with irritation and torment were additionally affirmed in this study.

Cardiac protective activity: Nandave et al., researched the cardioprotective benefits of a lyophilized hydroalcoholic concentrate of *M. oleifera* in an Isoproterenol (ISP)-prompted myocardial localized necrosis mouse. Persistent treatment with *M. oleifera* weakened ISP-prompted hemodynamic changes (HR, (+) LV dP/dt, (-) LV dP/dt and LVEDP). Persistent *M. oleifera* treatment brought about a significant valuable change of biochemical compounds (superoxide dismutase, catalase, glutathione peroxidase, lactate dehydrogenase and creatine kinase-MB) when contrasted with the ISP control bunch, however no huge impact on decreased glutathione. Moringa treatment altogether diminished lipid peroxidation in heart tissue [14]. In addition, *M. oleifera* additionally restricted the destructive ultrastructural and histopathological anxieties set off by ISP. In light of the after effects of the current exploration, it tends to be resolved that concentrate of *M. oleifera* holds critical cardioprotective impact, which might be credited to its antiperoxidative, myocardial additive properties and cancer prevention agent action.

Wound healing activity: *M. oleifera* leaves fluid concentrate was analyzed for wound recuperating action. The concentrate at a 300 mg/kg portion of body weight was inspected utilizing resutured extraction, entry point and dead space twisted models in rodents. The prohealing exercises appear to be attributable to expanded collagen testimony notwithstanding better development and arrangement. From the review results found, it could be settled that the watery concentrate of *M. oleifera* has significant injury mending property [15].

Spasmolytic and hypotensive activities: Bioassay directed fractionation of *M. oleifera* leaves ethanolic remove showing hypotensive action coordinated to the separation of two nitrile glycosides, niazirinin and niazirin and three mustard oil glycosides, niaziminin A, 4-((4'-O-acetyl-alpha-L-rhamnosyloxy) benzyl) isothiocyanate and niaziminin B. The thiocarbamate and isothiocyanate 4 glycosides niaziminin B and an introduced hypotensive action however nitrile glycosides 2 and 1 were start to be sluggish in such manner. Besides, the spasmolytic movement of the plant's constituents gives a logical premise to the plant's conventional use in motility problems of gastrointestinal.

Faizi et al., additionally investigated the hypotensive action of the *M. oleifera* whole units and parts their off, mash, specifically, seed and coat watery and ethanolic removes. The units and the seeds ethanolic remove was comparable at the portion of 30 mg/kg. It was found that the cases ethanolic extricate ethyl acetic acid derivation stage was start to be the strongest part at a similar portion. Its bioassay-directed fractionation yielded isothiocyanate and thiocarbamate glycosides, which were correspondingly the hypotensive action of the units, as seen in Moringa leaves. O-(2'-hydroxy-3'-(2"-heptenyloxy)) and O-(2'-hydroxy-3'-(2"-heptenyloxy)) are two new mixtures. The current investigations additionally separated-propyl undecanoate (1) and O-ethyl-4-((alpha-L-rhamnosyloxy)-benzyl) carbamate (2), as well as the known substances methyl p-hydroxybenzoate (3) and beta-sitosterol. The hypotensive action of the last two mixtures, as well as p-hydroxybenzaldehyde, was promising.

Anti-helmentic, antiathero-sclerotic activities and hypolipidemic: It was found strong anthelmentic action shown by the plant and impelled loss of motion inside 6-15 min while death is practically equivalent to with that of piperazine citrate as death of worms in a 64 min.

Chumark et al., inspected the antiatherosclerotic and hypolipidaemic exercises leaf concentrate of *M. oleifera*. They see in hares benefited from diet hyper cholesterol-at twelve weeks of treatment the fluid concentrate of the plant altogether (P<0.05) brought down the cholesterol levels and decreased the atherosclerotic plaque arrangement to around half and 86%, separately and these impacts were at degrees practically identical to those of simvastatin [16-20].

Simvastatin at a portion of p.o. 4 mg/kg and *M. oleifera* methanolic concentrate of at a portion of 150, 300 and 600 mg/kg, p.o. alongside hyperlipidemic diet were figured out how to Pale skinned person Wistar rodents for 30 days to identify hypolipidemic impact. It was assessed that *M. oleifera* decreasing the serum triacylglyceride, cholesterol, LDL, VLDL and atherogenic record and simvastatin however HDL level was increased as likened to the comparing high took care of cholesterol diet bunch (control). *M. oleifera* was correspondingly start to flood the crap of cholesterol. Subsequently, it tends to be settled that *M. oleifera* has a hypolipidemic impact [21-23].

Antiurolithiatic activity: The result *M. oleifera* root-wood alcoholic and watery concentrate directed orally in male Wistar pale skinned person rodents, on calcium oxalate urolithiasis was planned. Ethylene glycol supporting caused hyperoxaluria and expanded calcium and phosphate discharge in the kidneys. Supplementation with *M. oleifera* root-wood fluid and alcoholic concentrates essentially decreased urinary oxalate levels, showing an administrative impact on endogenous oxalate union. The expanded affidavit of stone laying out constituents in the kidneys of calculogenic rodents was additionally genuinely brought down by preventive and healing treatment utilizing alcoholic and fluid concentrates. In this way, the outcomes show that the root-wood of *M. oleifera* is blessed with antiurolithiatic movement [24-30].

Other activities: The powder of Moringa was likewise mistreated as enemies of helps specialist. Immunostimulatory impact is one of the explanation of hostile to HIV movement. It is correspondingly perceived that polysaccharide separated from the hot watery concentrate of *M. oleifera* mature units showed significant macrophage action through the arrival of nitric oxide on mouse monocyte cell line. Afterward, it wandered that the immunostimulatory movement is because of event of its part in *Moringa oleifera* methanolic separate. It was likewise tracked down that both low portion (25 mg/kg, p.o.) as well as high portion (750 mg/kg, p.o.) of *M. oleifera* energizes safe framework by acting through humoral and cell resistance in investigational models of invulnerability in creatures. However, low portion was start to be generally employable than the high portion. This could due to the presence of poison for instance isothiocyanate and glycoside cyanides that might pose pressure at high focus and subsequently dropping the cell reinforcement capability of *Moringa oleifera* [31-38].

CONCLUSION

Moringa oleifera Lam., a one of the old restorative plant, is developed broadly species have a place with family *Moringaceae*. Stem, blossoms, leaves, bark, seeds roots and so on have been applied in different human ailments. Different pharmacological activity announced incorporate antiurolithiatic movement, sedative antifungal, analgesic, anti-incendiary, antiulcer, cancer prevention agent and against bacterial, injury recuperating action, hypotensive and cardioprotective and so on. This survey notices a portion of the pharmacological movement of *Moringa oleifera* which can be utilized to explore further to confine dynamic mixtures as a wellspring of novel home grown medication.

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REFERENCES

1. Anwar F, Latif S, Ashraf M, et al. *Moringa oleifera:* A food plant with multiple medicinal uses. Phytother Res. 2007;21(1):17-25.
2. Ezeamuzie IC, Ambakederemo AW, Shode FO, et al. Antiinflammatory effects of *Moringa oleifera* root extract. Int J Pharmacog. 1996;34(3):207-212.
3. Rathi BS, Bodhankar SL, Baheti AM. Evaluation of aqueous leaves extract of *Moringa oleifera* Linn for wound healing in albino rats. Indian J Exp Biol. 2006;4:898-901.
4. Sulaiman MR, Zakaria ZA, Bujarimin AS, et al. Evaluation of *Moringa oleifera* aqueous extract for antinociceptive and anti-inflammatory activities in animal models Pharmaceut Biol. 2008;46(12):838-845.
5. Sutar NG, Bonde CG, Patil VV, et al. Analgesic activity of seeds of *Moringa oleifera* Lam. Int J Green Pharm. 2008;2(2).
6. Shukla S, Mathur R, Prakash AO. Antifertility profile of the aqueous extract of *Moringa oleifera roots*. J Ethnopharmacol. 1988;22(1):51-62.
7. Guevara AP, Vargas C, Sakurai H, et al. An antitumor promoter from *Moringa oleifera* Lam. Mutat Res Genet Toxicol Environ Mutagen. 1999;440(2):181-188.
8. Cáceres A, Saravia A, Rizzo S, et al. Pharmacologie properties of *Moringa oleifera*. 2: Screening for antispasmodic, antiinflammatory and diuretic activity. J Ethnopharmacol. 1992;36(3):233-237.
9. Devaraj VC, Asad M, Prasad S. Effect of leaves and fruits of *Moringa oleifera* on gastric and duodenal ulcers. Pharmaceu Biol. 2007;45(4): 332-338.
10. Faizi S, Siddiqui BS, Saleem R, et al. Hypotensive constituents from the pods of *Moringa oleifera*. Planta Med. 1998;64(03):225-228.
11. Mehta K, Balaraman R, Amin AH, et al. Effect of fruits of *Moringa oleifera* on the lipid profile of normal and hypercholesterolaemic rabbits. J Ethnopharmacol. 2003;86(2-3):191-195.
12. Pari L, Kumar NA. Hepatoprotective activity of *Moringa oleifera* on antitubercular drug-induced liver damage in rats. J Med Food. 2002;5(3):171-177.
13. Nwosu MO, Okafor JI. Preliminary studies of the antifungal activities of some medicinal plants against Basidiobolus and some other pathogenic fungi. Mycoses. 1995;38(5-6):191-195.
14. Nikkon F. *In vitro* antimicrobial activity of the compound isolated from chloroform extract of *Moringa oleifera* Lam. Pak J Biol Sci. 2003; 6(22):1888-1890.
15. Kekuda TP, Mallikarjun N, Swathi D, et al. Antibacterial and antifungal efficacy of steam distillate of *Moringa oleifera* Lam. J Pharm Sci. 2010;2(1):34.
16. Bharali R, Tabassum J, Azad MR. Chemomodulatory effect of *Moringa oleifera*, Lam, on hepatic carcinogen metabolising enzymes, antioxidant parameters and skin papillomagenesis in mice. Asian Pac J Cancer Prev. 2003;4(2):131-140.
17. Ashok Kumar N, Pari L. Antioxidant action of *Moringa oleifera* Lam. (drumstick) against antitubercular drugs induced lipid peroxidation in rats. J Med Food. 2003;6(3):255-259.
18. Paliwal R, Sharma V, Pracheta P, et al. Anti-nephrotoxic effect of administration of *Moringa oleifera* Lam in amelioration of DMBA-induced renal carcinogenesis in Swiss albino mice. Biol Med. 2011;3(2):27-35.
19. Sreelatha S, Padma PR. Antioxidant activity and total phenolic content of *Moringa oleifera* leaves in two stages of maturity. Plant Foods Hum Nutr. 2009;64:303-311.
20. Sharma R and Singh VJ. *In vivo* antioxidant activity of *Moringa oleifera* leaf and pod extracts against carbon tetra chloride induced liver damage in albino mice. J Chem Pharm Res 2010; 2(6):275-283.
21. Bajpai M, Pande A, Tewari SK, et al. Phenolic contents and antioxidant activity of some food and medicinal plants. Int J Food Sci Nutr. 2005;56(4):287-291.
22. Das D, Dash D, Mandal T, et al. Protective effects of *Moringa oleifera* on experimentally induced gastric ulcers in rats. Res J Pharm Biol Chem Sci. 2011;2(2):50-55.
23. Aguwa CN, Nwako SO. Preliminary studies of the root extracts of Nauclea latifolia Smith, for anti-ulcer properties. Niger J Pharm Sci. 1988;4:16-23.

24. John TA, Onabanjo AO. Gastroprotective effects of an aqueous extract of Entandrophragma utile bark in experimental ethanol-induced peptic ulceration in mice and rats. J Ethnopharmacol. 1990;29(1):87-93.
25. Caceres A, Cabrera O, Morales O, et al. Pharmacological properties of *Moringa oleifera:* Preliminary screening for antimicrobial activity. J Ethnopharmacol. 1991;33(3):213-216.
26. Dahiru D, Onubiyi JA, Umaru HA. Phytochemical screening and antiulcerogenic effect of *Moringa oleifera* aqueous leaf extract. Afr J Tradit Complement Altern Med. 2006;3(3):70-75.
27. Medhi B, Khanikor HN, Lahon LC, et al. Analgesic anti-inflammatory and local anaesthetic activity of Moringa pterygosperma in laboratory animals. Pharmaceu Biol. 2003;41(4):248-252.
28. Ndiaye M, Dieye AM, Mariko F, et al. Contribution to the study of the anti-inflammatory activity of *Moringa oleifera* (*Moringaceae*). Dakar Med. 2002;47(2):210-212.
29. Cheenpracha S, Park EJ, Yoshida WY, et al. Potential anti-inflammatory phenolic glycosides from the medicinal plant *Moringa oleifera* fruits. Bioorg Med Chem. 2010;18(17):6598-6602.
30. Mahajan SG, Mali RG, Mehta AA. Effect of *Moringa oleifera* Lam. seed extract on toluene diisocyanate-induced immune-mediated inflamatory responses in rats. J Immunotoxicol. 2007;4(2):85-96.
31. Nandave M, Ojha SK, Joshi S, et al. *Moringa oleifera* leaf extract prevents isoproterenol-induced myocardial damage in rats: Evidence for an antioxidant, antiperoxidative and cardioprotective intervention. J Med Food. 2009;12(1):47-55.
32. Faizi S, Siddiqui BS, Saleem R, et al. Isolation and structure elucidation of new nitrile and mustard oil glycosides from *Moringa oleifera* and their effect on blood pressure. J Nat Prod. 1994;57(9): 1256-1261.
33. Gilani AH, Aftab K, Suria A, et al. Pharmacological studies on hypotensive and spasmolytic activities of pure compounds from *Moringa oleifera*. Phytother Res. 1994;8(2):87-91.
34. Rastogi T, Bhutda V, Moon K, et al. Comparative studies on anthelmintic activity of *Moringa oleifera* and *Vitex negundo*. Asian J Res Chem. 2009;2(2):181-182.
35. Chumark P, Khunawat P, Sanvarinda Y, et al. The *in vitro* and *ex vivo* antioxidant properties hypolipidaemic and antiatherosclerotic activities of water extract of *Moringa oleifera* Lam. leaves. J Ethanopharmacol. 2008;116(3):439-446.
36. Jain PG, Patil SD, Haswani NG, et al. Hypolipidemic activity of *Moringa oleifera* Lam., *Moringaceae*, on high fat diet induced hyperlipidemia in albino rats. Rev Big Pharmacogn. 2010;20:969-973.
37. Karadi RV, Gadge NB, Alagawadi KR, et al. Effect of *Moringa oleifera* Lam. root-wood on ethylene glycol induced urolithiasis in rats. J Ethanopharmacol. 2006;105(1-2):306-311.
38. Sudha P, Asdaq SM, Dhamingi SS, et al. Immunomodulatory activity of methanolic leaf extract of *Moringa oleifera* in animals. Indian J Physiol Pharmacol. 2010 54(2):133-140.