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ANTI-INFLAMMATORY ACTIVITY OF MORINDA CITRIFOLIA EXTRACT-AN INVITRO STUDY

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Abstract:

Inflammation is the first response of the immune system to infection or irritation, and plays important pathological roles in the development of diseases such as cancer, diabetes, atherosclerosis, and arthritis. It is often characterised by redness, swelling, pain and immobility. Arthritis is an inflammation of the joints. It can affect one joint or multiple joints. There are more than 100 different types of arthritis, with different causes and treatment methods. Two of the most common types are osteoarthritis and rheumatoid arthritis. Symptoms generally include joint pain and stiffness. *Morinda citrifolia L.* commonly known as 'Noni' is native to south-east Asian countries and Australia. It is one of the most important traditional medicinal plants and has a wide range of uses particularly as anti-inflammatory, depurative, anti-rheumatic and antiulcer remedy. The infusion of *M. citrifolia L.* leaves is used in popular medicine in Northeast of Brazil to treat inflammatory and painful diseases. This study aims at evaluating the uses of *Morinda citrifolia* extract in treating inflammatory diseases.

Keywords: *Morinda citrifolia*, Inflammation, Arthritis, Anti-inflammatory

Introduction:

Inflammation is the first response of the immune system to infection or irritation, and plays important pathological roles in the development of diseases such as cancer, diabetes, atherosclerosis, and arthritis.¹ It is a localized reaction that is characterised by redness, warmth, swelling, pain and is the most common reason for physician consultation in most developed countries. It is a major symptom in many medical conditions, and can interfere with a person's quality of life and general functioning.² It is a protective and defensive mechanism of body. Inflammation types are acute and chronic. There are various components to an inflammatory reaction such as edema formation, leukocyte infiltration and granuloma formation that can contribute to the associated symptoms and tissue injury.³

Non-steroidal anti-inflammatory drugs and steroidal drugs are widely used to treat several inflammatory conditions; however, their ability to cause many and severe adverse effects limits their uses. In this regard, traditional medicine continues to use medicinal plants as a substitute for allopathic medicine.¹

The world health organization has estimated that over 75% of the world's population still relies on plant derived medicines, usually obtained from traditional healers, for its basic health care needs. Herbal medicines are in great demand in the developed as well as developing countries for primary healthcare because of their wide biological and medicinal activities, higher safety margins and lesser costs.⁴ *Morinda citrifolia* is a small tropical tree that has been used in folk remedies for over 2000 years. All parts of the plant, including the leaves, fruit, bark, and roots have several pharmacological properties. It has been reported for its antibacterial, antiviral, antifungal, antitumor, anti-helminthic, analgesic, hypotensive, anti-inflammatory and immune enhancing effects.⁵ Over the past decade, herbal and ayurvedic drugs have become a subject of world importance, with both medicinal and economical implications.⁶ It is hoped that assessment of the traditional remedies could become the basis for a future classification of herbal medicines, as well as for evaluative studies on their efficacy and safety, and their potential use in national health care systems in different parts of the world.⁷ The aim of this study was to investigate the therapeutic potential of an aqueous extract of *M. citrifolia* leaves against inflammation and to determine the possibility of using that extract as a commercial health-promoting product.

Materials and Methods:

Plant Material: *Morinda citrifolia* extract is obtained from Green Chem Herbal extracts and fermentation, Bengaluru.

Chemicals: Diclofenac sodium is obtained from sigma Aldrich (USA), All the chemicals used were of analytical grade.

Evaluation of Invitro Anti-Arthritic Activity

Inhibition of protein denaturation method:^{8,9}

Concentration of test substance: 1000 to 200µg/ml.

Standard: Diclofenac sodium. Chemicals Required: Bovine serum albumin, 1N HCl, Phosphate buffer (pH 6.3)

Instrument : Incubator, Spectrophotometer - 660nm. The following 4 solutions is used

Test solution (0.5ml) consists of 0.45ml of bovine serum albumin (5% w/v aqueous solution) and 0.05ml of test solution.

Test control solution (0.5ml) consists of 0.45ml of bovine serum albumin (5%w/v aqueous solution) and 0.05ml of distilled water.

2. **Product control** (0.5ml) consists of 0.45ml of distilled water and 0.05ml of test solution

3. **Standard solution** (0.5ml) consists of 0.45ml of bovine serum albumin (5%w/v aqueous solution) and 0.05ml of Diclofenac sodium (200µg/ml).

All of the above solutions were adjusted to pH 6.3 using a small amount of 1N Hcl. The samples were incubated at 37°C for 20minutes and heated at 57°C for 3 minutes. After cooling, add 2.5ml of phosphate buffer to the above solutions. The absorbance of the solutions was measured using UV-Visible spectrophotometer at 416nm. The percentage inhibition of protein denaturation was calculated using the formula. The percentage inhibition of Protein denaturation will be calculated as follows.

$$\text{Percent inhibition} = \frac{100 - \text{OD of test solution} - \text{OD of product control}}{\text{OD of test control}} \times 100$$

The control represents 100% protein denaturation. The result is compared with Diclofenac sodium treated sample.¹⁰

Results and Discussion:

The inflammatory response is a dynamic process involving complex interactions among inflammatory molecules that arise in any tissue in response to traumatic, infectious, post-ischaemic, toxic, or auto-immune injury.¹¹ From the present study, it is evident that *Morinda citrifolia* extract has high anti-inflammatory efficacy. When tested against 50 MCG, the extract showed 89.32% inhibition, 100 MCG, it showed 90.63% inhibition, 250 MCG it showed 92.34% inhibition and at 500 MCG, 94.56% inhibition and 1000 MCG of extract showed 96.23% inhibition respectively.

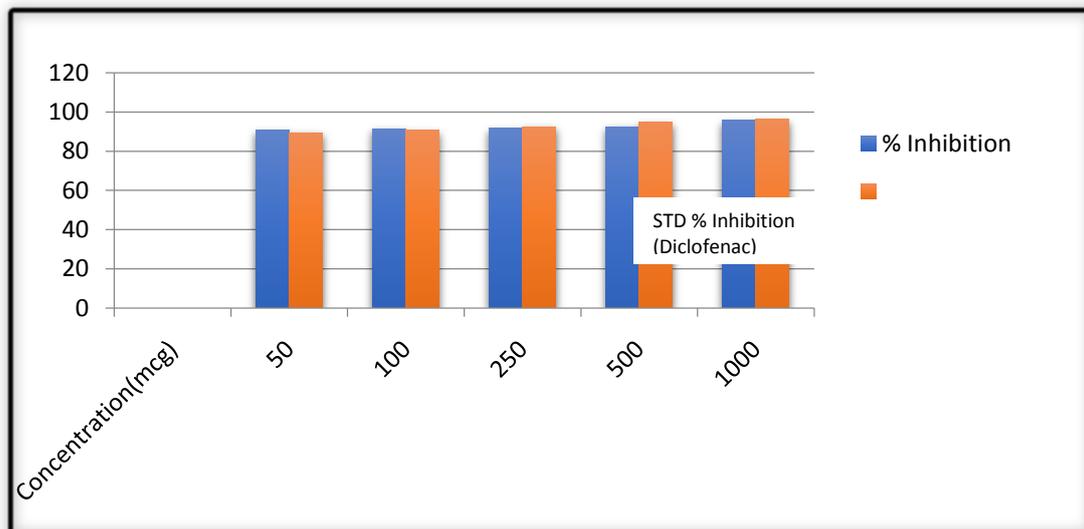


Table 1:

<i>Morinda citrifolia</i> extract (MCG)	MC % inhibition	Standard % inhibition
50	89.32	90.56
100	90.63	91.23
250	92.34	91.58
500	94.56	92.32
1000	96.23	95.34

Conclusion:

This study shows that *Morinda citrifolia* has been proven in-vitro as an anti-inflammatory agent. Altogether, the results obtained in this study suggest that this plant maybe an interesting candidate for the development of new therapeutic options for the treatment of inflammatory disorders. Further in-vivo and clinical trials are required to prove it's anti-arthritis efficacy and it's benefit to mankind.

References:

1. Aurosorn Sarapanchotiwithhaya et al, "Anti-inflammatory effect of Morindacitrifolia leaf extract on macrophage RAW 264.7 cells". Science Asia 41(2015) : 4-11.
2. Karthik EVG et al, "Anti-inflammatory activity of lavender oil using HRBC membrane stabilising method." Int. J. Pharm. Sci. Rev. Res., 40(1), September – October 2016; Article No. 46, Pages: 254-258.
3. T.Sunil Kumar Reddy et al, "ANTI-INFLAMMATORY AND ANALGESIC ACTIVITY OF LEAF EXTRACT OF MORINDACITRIFOLIA IN EXPERIMENTAL MODELS". International Journal of Pharmaceutical development and Technology. Vol 1, Issue 1, Jan- June 2011. 34-37.
4. Lakshmi T. et al, "PANAX GINSENG - A UNIVERSAL PANACEA IN THE HERBAL MEDICINE WITH DIVERSE PHARMACOLOGICAL SPECTRUM –A REVIEW." Asian Journal of Pharmaceutical and clinical research. Vol 4, Suppl 1, 2011, 14-18.
5. D.R.Singh, "Morindacitrifolia L. (Noni): A review of the scientific validation for its nutritional and therapeutic properties." Journal of Diabetes and Endocrinology Vol. 3 (6), pp. 77-91, December 2012.
6. Sarah Sathiyawathie et al, "Nature's recipe for oral health." Research Journal of Pharmaceutical, Biological and Chemical Sciences. September-October 2015. 6(5), 243-252.

7. Lakshmi T., Anitha R., Geetha RV Acacia catechu willd -A gift from ayurveda to mankind – A Review. T. Ph. Res, 2011; 5(2); 273-93.
8. Mizushima Y and Kbayashi m. interaction of anti-inflammatory drugs with serum proteins, especially with some biologically active proteins. J. Pharma Pharmacol, 20, 1968, 169-173.
9. Sadique J, Al Rqobahs WA, Bughaith, EI Gindi AR. The bioactivity of certain medicinal plants on the stabilization of RBC membrane system. Fitoterapia, 60, 1989, 525- 532.
10. Ghayathiri et al, “Anti-inflammatory activity of acacia catechu bark extract-in vitro study.” Journal of chemical and pharmaceutical research. 2015, 7(7): 1184-1187.
11. Zedler S et al, “The impact of endogenous triggers on trauma-associated inflammation.”CurrOpinCrit Care 12, 595-601.