Investigation and examination of vitro anti-arthritis activity by means of Cambogia fruit denaturation albumin

Raju PSN¹, Suhasini N.², Narayana Reddy³, Vignesh D³

¹Department of Obstetrics and Gynaecology, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
²Department of Ophthalmology, Konaseema Institute of Medical Sciences Research Foundation, Amalapuram, Andhra Pradesh, India
³Department of Orthopaedics, Meenakshi Academy of Higher Education and Research, Chennai, Tamilnadu, India

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ABSTRACT

With assessing those anti-arthritis actions in-vitro in chloroform extricate about garcinia Cambogia apples and oranges against egg whites denaturation. In regulated test condition egg whites might have been incubated for with different fixation for chloroform extricate Furthermore subjected will determination from claiming absorbance will assess the rate of protein restraint to Anti-arthritis movement utilizing diclofenac sodium as those standard medications regardless. Dosage reliant expand in the rate restraint might have been found. Likewise, an after effect. Restraint for egg whites denaturation might have been watched for every last one of centralization of the chloroform extricate from claiming garcinia Cambogia tree grown foods. Starting with that current study, it could be a chance to be closed that garcinia Cambogia tree grown foods possessed checked in vitro Anti-arthritis movement impact against denaturation for egg whites. Those impact might have been because of xanthone available Similarly as a standout amongst the phyto concoction segments On from claiming garcinia Cambogia tree grown foods.

INTRODUCTION

Rheumatoid Arthritis is automatic resistant diseases (Tripathi, 2008) where joint inflammation synovial proliferation and destruction of articular cartilage. Antigen-antibody immune complexes consist of IgM involved in activation and cytokine release (Selvarani and Stezlla, 2014) which are chemo tactic for neutrophils. Inflammation of cells produces lysosomal enzymes involved in cartilage damage and bone erosion.

Arthritis inflammation and tissue injury are due to oxidative stress is implicated in immune disease (Sree et al., 2015). In Rheumatoid arthritis disease, the making of auto antigens may be protein denaturation. (De et al., 2017)

Production of autoantigens are controlled in certain arthritic diseases and tissue proteins denaturation inhibition and lysis of membrane in rheumatic disease lead to anti-arthritis movement or anti-inflammatory activity (Mishra et al., 2011). Presently large portions non-steroidal What’s more immunosuppressive pills need aid used to control incendiary side effects What’s more ache.
they would be connected with certain undesirable side impacts. With these difficulties, those field of joint inflammation scrutinizes need advanced exponentially towards natural therapies (Geetha et al., 2011) that need been acknowledged safe. What’s more compelling on elevating ceaseless torment connected with joint inflammation.

Homegrown medication holds an expansive assortment of the different compound, a few about which need living movement. There may be an extraordinary interest for the homegrown medication in the formed and additionally creating nations like India, (Chandra et al., 2012) due to their totally living exercises higher safety from claiming edge discerned (Anju and Ramesh Kumar, 2017) efficacy, low frequency not kidding unfriendly impacts Furthermore Leesep expense. Homegrown medication arrangements with plants What’s more plant extricate clinched alongside treating disease.

Garcinia cambogia fruit-related species of guttiferae family. Garcinia cambogia (Garcinia gummi-gutta) commonly known as kodampuli or Malabar tamarind. (Jacob et al., 2015). Garcinia cambogia is a tiny, sweetish, exotic fruit found in South India and south-east Asia. The fruit is small in size and looks like a yellow or reddish pumpkin or purple pumpkin. The Garcinia cambogia fruit has been customarily utilized in the grounding of food and cooking with a distinctive taste. The bark is specified as a decoction, in use to treat rheumatism (Selvaraj and Advani, 2013) and gastrointestinal disorders.

The phytochemical test was performed presented the occurrence of alkaloids, tannins, phenolic flavonoids, carbohydrates and proteins (Negi et al., 2013). Benzophenones (Opie, 1962) are one of the important secondary metabolites in Garcinia gummi-gutta, followed by xanthones and bioflavonoid. The phytochemical test confirmed the presence of xanthones as one of the main constituent present in guttiferae family. Naturally, occurring xanthone seem to possess remarkable pharmacological and biological activities ant arthritis, antimicrobial, (Umaphathy et al., 2014) anti-inflammatory, analgesic, anti-viral. Denaturation of protein is the main reason for inflammation and rheumatoid arthritis (Patrick, 2005; Ngoua-Meye-Misso et al., 2018).

Upon a literature survey, no reports are investigated for in-vitro anti-arthritis action Garcinia cambogia fruit. Hence, the current investigation is done to estimate the probable in-vitro Anti-arthritis activity in chloroform excerpt of Garcinia cambogia fruit in contradiction of albumin denaturation.

**Figure 1: Percentage of inhibition against the different concentration of Standard and Garcinia cambogia**

**MATERIALS AND METHODS**

**Gathering of fruits**

The Garcinia cambogia fruit is composed in the month of July from Thrisur Kerala State India. The Garcinia cambogia fruit and plant material was recognized and authenticated by GKVK, Bangalore.

The voucher specimen is bearing the number Reference NO. UASB-4551 is acknowledged in the herbarium file of the department. Cleaning of fruits was washed with water and cut into slices using a stainless steel knife.

The pericarp of the Garciaciambogia species was removed and the seeds were separated. The pericarp was shade dried for a period of 60 days. Pericarp was dried it was powdered coarsely in a mixer grinder.

**Drugs and chemicals**

Diclofenac sodium is obtained by Sigma Aldrich Mumbai India. The sum different chemicals were about explanatory evaluation acquired commercially. Twofold refined water starting with all-glass at present might have been utilized All around those ponder.

**Groundwork of the crude extract**

The pericarp powder was stored in an airtight container and used for further extraction about 100gm of powder of pericarp was extracted using 1000mL chloroform for a period of 6 hours separately using a Soxhlet apparatus. The chloroform crude extract was evaporated to dryness in a rotatory vacuum evaporator under reduced pressure and was stored at 4°C for further use.

**Phytochemical test for Xanthone**

One ml Garciaciambogia extract was added with 1ml of alcoholic ferric chloride. The creation of a chocolate colour indicates the occurrence of xanthones.
Table 1: Effect of Garcinia Cambogia on Albumin denaturation

| Concentration (µg/mL) | % embarrasement |
|-----------------------|-----------------|
| Control               |                 |
| 62.5                  | 0.78            |
| 125                   | 1.07            |
| 250                   | 4.28            |
| 500                   | 14.91           |
| 1000                  | 19.04           |

Table 2: Effect of Diclofenac sodium on Albumin denaturation

| Concentration (µg/mL) | % inhibition |
|-----------------------|--------------|
| Control               |              |
| 62.5                  | 20.68        |
| 125                   | 29.17        |
| 250                   | 41.44        |
| 500                   | 70.61        |
| 1000                  | 84.24        |

Assessment of in vitro Anti-arthritis action

Garcinia cambogia chloroform extract is liquified in the least quantity of dimethylformamide (DMF) and dilute by phosphate buffer saline (PBS (0.2M, pH 6.4)) final density of DMF in all solutions was less than 2.5%. Test solution (1ml) containing different concentration of Garcinia cambogia chloroform extract in the assortment of 31.25, 62.5, 125 µg, 250, 500, 1000 µg/ml is assorted in 1ml of mM albumin solution in phosphate buffer saline (Anju and RameshKumar, 2017) and incubated in BOD brooder for 15 min. The reaction mixture is reserved in a water bath for 10 minutes at 70°C for denaturation. Subsequently, cooling, the optical density of turbidity is restrained at 660nm (SHIMADZU, UV 1800) by dimethylformamide (DMF) as blank.

Diclofenac sodium in the concentration range of (31.25, 62.5, 125 µg, 250, 500, 1000 µg/ml) is by a standard drug and preserved in a similar manner for the determination of absorbance. Calculated percentage of the reserve of denaturation by the controller when the drug is not extra. Average of triplicate of each experiment was taken. Determination of absorbance standard diclofenac sodium was done in a similar manner. The percentage embarrassment of albumin denaturation is intended by means of the subsequent formulation,

\[ \% \text{ inhibition} = 100 \times \frac{V_t}{V_c} \]

where, \( V_t \) = absorbance of test sample, \( V_c \) = absorbance of control

EXPERIMENTAL CONSEQUENCES

In the current study of the In-Vitro Anti-arthritic activity result of chloroform excerpt of Garcinia cambogia fruit was determined in contradiction of egg albumin denaturation. The summary of the results given in Table 1.

The exhibit discoveries exhibited focus indigent restraint from claiming egg whites (protein) denaturation Toward garcinia Cambogia chloroform tree has grown foods extricate All around the fixation extent about 31. 25 will 1000. µg/ml. Diclofenac sodium at the fixation extends of 31. 25 on 1000 µg/ml might have been utilized as reference medication regardless (Sangeetha and Vidya, 2016). Which likewise exhibited reliant focus restraint from claiming protein denaturation outcomes are summarized clinched alongside Table 2. Graphical representation of percentage inhibition against various concentrations of standard and Garcinia cambogia fruit extract are shown in Figure 1.

DISCUSSION

Problems are encountered in by means of animals for investigational pharmacological study, such as Animal ethical of Garcinia cambogia fruit. Inflammation and arthritic disease are caused due to denaturation oft issue proteins. Autoantigens are produced in inflammatory arthritic disease might be owing to in-vivo protein denaturation (Padmanabhan and Jangle, 2012), therefore, would be worth file for rheumatoid arthritis and drug development.
Protein denaturation means lose of biological properties of protein molecule (Williams et al., 2008). As a part of the examination, the method of anti-arthritic and anti-inflammatory action of the plant to inhibit protein denaturation is considered. Denaturation of protein is a cause of inflammation (Kumar et al., 2013) and Rheumatoid arthritis. Thus, protection against protein denaturation would be the main mechanism against inflammation and Rheumatoid arthritis. The test sample increased in absorbance by the controller indicated protein steadiness, i.e. inhibition of heat brought protein (albumin) was investigated. It is stated that the features of numerous NSAID are their ability to stabilize (prevent denaturation) heat-treated albuminate physiological pH6.2-6.5. So the analysis of our study reveals that the chloroform extract of the Garcinia cambogia fruit exhibits strong invitro anti-arthritis activity against albumin denaturation. Therefore anti-inflammatory drugs produced dose-dependent inhibition of albumin denaturation.

CONCLUSION

Due to global alarm against side effects caused by allopathic drugs, there is the trend of returning back to nature. The vast number of natural species need been customarily alternately as society drugs against incendiary disorders. The current research is to explore the usage of Garcinia cambogia fruit against arthritis and inflammation experimentally representing the significant activity. Hence, Garcinia cambogia fruit can be used as a potent natural anti-arthritic activity and anti-inflammatory agent. The anti-arthritic and anti-inflammatory activity might be due to xanthones present as one of the secondary metabolite. Further isolation of xanthone is necessary to ascertain the mechanism behind Anti-arthritis activity and anti-inflammatory activity. The exploration is grounded on the essential for anti-arthritis and anti-inflammatory agents by natural herbal sources to effective activity and fewer side effects. The source of new Anti-arthritis and Anti-inflammatory agents by natural herbal sources to effective activity and fewer side effects. The source of new Anti-arthritis and Anti-inflammatory activity might be due to xanthones present as one of the secondary metabolite. Further isolation of xanthone is necessary to ascertain the mechanism behind Anti-arthritis activity and anti-inflammatory activity. The exploration is grounded on the essential for anti-arthritis and anti-inflammatory agents by natural herbal sources to effective activity and fewer side effects. The source of new Anti-arthritis and Anti-inflammatory drugs from herbal medicine is a fruitful and follows a logical research strategy in evaluation.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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REFERENCES

Anju, V., RameshKumar, K. B. 2017. Phytochemicals and bioactivities of Garcinia gummi-gutta (L.) N. Robson - A review. Chapter 10. Diversity of Garcinia Species in the western ghats: Phytochemical Perspective, pages 151–161.

Chandra, S., Chatterjee, P., Dey, P., Bhattacharya, S. 2012. Evaluation of in vitro anti-inflammatory activity of coffee against the denaturation of protein. Asian Pacific Journal of Tropical Biomedicine, 2(1):S178–S180.

De, S., Das, D. C., Mandal, T. 2017. In vitro anti-inflammatory and antidiabetic activity of methanolic extract of Cardanthera Difformis Druce. International Research Journal of Pharmacy, 7(12):56–60.

Geetha, R. V., Lakshmi, T., Roy, A. 2011. Garcinia Cambogia (Malabar Tamarind): Pharmacological Review. Journal of Pharmacy Research, 4(5):1464–1466.

Jacob, K. M. P., Ali, M. A., et al. 2015. Evaluation of the antibacterial and antioxidant activity of Garcinia gummi-gutta. Int. j. Drug Dev &Res, 7(3):57–59.

Kumar, S., Bajwa, B. S., Kuldeep, S., Kalia, A. N. 2013. Anti-inflammatory activity of herbal plants: Review. International Journal of Advances in Pharmacy, 2(2):272–281.

Mishra, N. K., Bstia, S., Mishra, G., Chowdary, K. A., Patra, S. 2011. Anti-arthritic activity of Glycyrrhiza glabra, Boswellia Serrata and their synergetic activity in combined formulation studied in Freund’s adjuvant induced arthritic rats. J. Pharm. Edu. Res, 2(2):92–99.

Negi, J. S., Bisht, V. K., Singh, P., Rawat, M. S. M., Joshi, G. P. 2013. Naturally Occurring Xanthones: Chemistry and Biology. Journal of Applied Chemistry, 1:1–9.

Ngoua-Meye-Misso, R.-L., Sima-Obiang, C., Ndong, J. D. L. C., Ondo, J. P., Abessolo, F. O., Obame-Engonga, L.-C. 2018. Phytochemical screening, antioxidant, anti-inflammatory and antiangiogenic activities of Lophira procera A. Chev. (Ochnaceae) medicinal plant from Gabon. Egyptian Journal of Basic and Applied Sciences, 5(1):80–86.

Opie, E. L. 1962. On the relation of necrosis and inflammation to denaturation of proteins. Journal of Experimental Medicine, 115(3):597–608.

Padmanaban, P., Jangle, S. N. 2012. Evaluation of In-vitro anti-inflammatory activity of herbal preparation a combination of four medicinal plants: International Journal of Basic and plants Applied medical sciences, 2(1):109–116.
Patrick, G. L. 2005. An introduction to Medicinal chemistry, Third edition. volume 168. Oxford university press. ISBN: 9780199275007.

Sangeetha, G., Vidya, R. 2016. In Vitro anti-inflammatory activity of different parts of Pedalium murex. *International Journal of Herbal Medicine*, 4(3):31–36.

Selvaraj, M. T. I., Advani 2013. Medicinal properties of Malabar tamarind (Garcinia Cambogia) (Gaertn) Desr. *Int. j. pharm sci. Rev. Res*, 19(2):101–107.

Selvarani, K., Stezlla, G. V. B. 2014. Antiarthritic activity of Cayratia pedata leaf extract in Freund’s adjuvant-induced arthritic rats. *International Journal of Research in Plant Sciences*, 4(2):55–59.

Sree, C., Kumari, Y., Hussain, N., Raffiq, M., Babuselvam, M. 2015. Invitro Anti-inflammatory and Anti-Arthritic property of Rhizophora Mucronata Leaves. *International Journal of Pharma Sciences and Research*, 6(3):482–485.

Tripathi, K. D. 2008. Essentials of Medical Pharmacology. 6th edition. page 188. Jaypee Brothers Medical Publishers (P) LTD.

Umapathy, E., Ndebia, E. J., Meemea, Adam, B., Menziwa, P., Nkehchungagbn 2014. An experimental evaluation Albuca Setosa aqueous extract on membrane stabilization protein denaturation and white blood cell migration during acute inflammation. *J.Med.PlantsRes*, 4(9):789–795.

Williams, L., Connar, A., Latore, L., Dennis, O., Ringer, S., Whittaker, J. A. 2008. The invitro anti-denaturation effects induced by natural products and non-steroidal compounds in heat-treated (immunogenic) bovine serum albumin is proposed as a screening assay for the detection of anti-inflammatory compounds, without the use of animals, in the early stages of the drug discovery process. *West Indian Med J*, 57(4):327–331.