RHIZOME DRYNARIA QUERCIFOLIA AND ITS ANTI-INFLAMMATORY ACTIVITY – REVIEW

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ABSTRACT
The rhizomes Drynaria quercifolia was mainly used in treating ailments like bone fracture, cholera, headache, jaundice, rheumatism and vomiting. The present study was aimed to justify the medicinal use of rhizome Drynaria quercifolia as anti-inflammatory agent. The rhizome is powdered and extracted using methanol and water. The invitro studies are studied using inhibition of albumin denaturation, membrane stabilization test and cox1 & cox2 inhibition assay. The in-vivo studies studied using carrageenan induced paw edema. Both the extracts show significant inhibition of protein denaturation and carrageenan induced method and MEDQ is more significant. These results claims that the rhizome Drynaria quercifolia possess anti-inflammatory activity mainly due to cox1 and cox2 inhibition.

KEYWORDS: Drynaria quercifolia, Anti-inflammatory, cyclooxygenase and paw edema.

INTRODUCTION
Inflammation is part of body’s defense mechanism and plays a vital role in the healing process. An inflammatory response occurs when the body's immune system recognizes harmful stimuli, such as pathogens, damaged cells, toxic compounds, or irradiation. It removes these stimuli and initiates the healing process. The process of inflammation is necessary in healing of wounds. Nevertheless, unchecked inflammation can lead to diseases like vasomotor rhinnorhoea, rheumatoid arthiritis, and artherosclerosis.

An acute inflammation is characterized by edema, erythrema, pain, heat, and loss of function. Classical signs are induced by the infiltration of serum and white blood cells (leucocytes) into
the tissues. A chronic inflammatory condition results in a progressive change in the type of cells present in the inflammatory area. It is characterized by the simultaneous destruction and recovery of the injured tissue from incidence of inflammation (Janaranjani et al, 2014).

Plants used in traditional healthcare have become one of the main sources of drug discovery and development (Ahmed MN et al, 2015). Medicinal plant is any plant which in one or more of its organ contains substance that can be used for therapeutic purpose or which is a precursor for synthesis of useful drugs (According to WHO). Medicines are prepared from variety of plant materials like leaves, stems, root, barks and so on. They mainly contain biologically active ingredients and are used primarily for treating mild or chronic ailments (Korwar et al, 2010).

Drynaria quercifolia (L.) J. Smith of the family Polypodiaceae of Pteridophyta is distributed widely in the evergreen forests of India, locally called ‘Marappanakizhangu’ or ‘Attukalkizhangu’(Anuja GI et al, 2010). The rhizomes are 2cm thick and wooly. The rhizomes of drynaria are creeping and densely covered in brown scales and are 20-25mm long and 0.25mm wide and soft. The rhizome is reported to be used by tribal communities of Tamil Nadu and Kerala to cure various diseases like dyspepsia and cough. The leaves are used to treat body ache, headache and with other drugs in rheumatic pain. The whole plant of Drynaria Quercifolia is anthelmintic, pectoral, skin diseases and loss of appetite. The plant is known to have therapeutic uses in tuberculosis and fever (Nithin MK et al, 2020). Consumption of Drynaria quercifolia can help to heal and strengthen broken bones and also be used to promote the treatment of bone fracture by the sub-Himalayan tribal communities. The soup prepared from the rhizomes of Drynaria quercifolia is popularly used by some tribes of Eastern Ghats, Tamil Nadu to get relief from rheumatic complaints (Debabrata Modak et al, 2021).

These rhizomes have been collected, dried and grinded into coarse powder. The above powder obtained were extracted with methanol and water.

The extracted mixture has been used for studying invitro anti-inflammatory activity by using methods like inhibition of albumin denaturation, membrane stabilization study, cox1 and cox2 inhibition assay.
The albumin denaturation was carried out using different concentration with diclofenac sodium as standard for both MEDQ and AEDQ. Both sample and standard extracts were incubated and heated for 20 minutes and measured spectrophotometrically (Banani Das et al, 2014).

Fresh whole human blood was collected, centrifuged and washed with equal volume of normal saline. The volume of blood was measured and reconstituted as suspension with normal saline. The heat induced haemolysis evaluated using test sample (both MEDQ and AEDQ) at different concentration and erythrocyte suspension was added with diclofenac sodium as standard drug. The reaction mixture was centrifuged and absorbance of supernatant was measured and percentage inhibition of haemolysis was calculated (Debabrata Modak et al, 2021).

The cox inhibition was assessed at different concentrations with diclofenac sodium and etoricoxib as positive control solution and the percentage inhibition was calculated as per manufacturer instruction and activity was expressed as IC 50.

Then both AEDQ and MEDQ were assessed by in-vivo studies for the anti-inflammatory activity using determination of acute toxicity and by reading carrageenan induced paw edema. Both in-vivo studies were carried out in albino mice maintained at standard conditions (Banani Das et al, 2014).

The acute toxicity test was done by administering drug extracts orally at appropriate concentrations and abnormal behaviours were observed.

The paw edema was induced using carrageenan injection in divided animal groups which were pre-treated using control, standard and AEDQ & MEDQ extracts and paw volume was measured before and after administering carrageenan at different time intervals. The inhibition of inflammation was calculated after the treatment (Banani Das et al, 2014) and (Janaranjani et al, 2014).

CONCLUSION

Based on the article that both the aqueous and methanolic extract shown inhibition of thermally induced protein denaturation but their activity was less compared to the standard drug (diclofenac sodium). Methanolic extract shown better cox1 and cox2 inhibition than aqueous extract. Both extracts were compared with standards. Both extracts were shown a
significant (*p< 0.01) anti-inflammatory activity in dose dependent manner when compared with the normal control group. The study shows that the edema measured after carrageenan injection resulted in dose dependent inhibition of inflammation by different groups of animals when compared to control group of animals.

The acute toxicity study indicated that *D. quercifolia* was a safe and nontoxic to experimental animals, as *D. quercifolia* is being used extensively by different cultural groups of India to treat various ailments. The present study established scientific basis of using *D. quercifolia* in traditional practice for treatment of inflammatory disorder. The anti-inflammatory activity of *D. quercifolia* rhizome could be at least partially due to COX-1, COX-2 enzyme inhibition and thus *Drynaria quercifolia* could be a potent anti-inflammatory agent for use in future.

**ABBREVIATION**

MEDQ - Methanolic Extract of *Drynaria quercifolia*

AEDQ – Aqueous Extract of *Drynaria quercifolia*

**REFERENCE**


6. Debabrata modak, Subhash paul, Sourav sarkar, Subarna thakur, Soumen Bhattacharjee. Validating potent anti-inflammatory and anti-rheumatoid properties of *Drynaria*