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Anti-genotoxic and anti-inflammatory effects of ethanol extract of *stoechospermum marginatum* (c. agardh) kutzing in rats

Abstract

Stoechospermum marginatum (C. Agardh) Kutzing is belongs to brown algae distributed from Indian Ocean to Australian ocean. It was obtained from the Gulf of Mannar near Mandapam coast (9º16´N,79º12´E) Tamilnadu. There was no novel scientific record as like in our present study so far. Therefore, in the present imperative pragmatic study revealed about the anti-genotoxic and anti-inflammatory activities of ethanol extract of *S. marginatum* in rats. For the anti genotoxicity, the reference genotoxin 4-NQO was adapted to induce genotoxic damage in terms of micronuclei in rat bone marrow cells via micronuclei assay scored using light microscopy. Acute inflammatory study was carried out by inducing paw edema through carrageenan injection in rat right hind paw. Subsequently, the chronic inflammation experiments were also carried out by stimulating granulomatous tissue mass around the cotton pellets implanted subcutaneously in the dorsal region of the rats. The pragmatic results showed that 4-NQO enhanced the MnPCEs frequency about 67±5.79 which was 4.5 fold higher than that of the control value, 15.0±2.23 MnPCEs/2500PCEs. Ethanol extract of *S. marginatum* alone treated group did not shown any changes in the frequency of MnPCEs (16.0±1.58, P>0.05). However, pretreatment with ethanol extract of *S. marginatum* plus 4-NQO treated groups were observed to be significantly reduced the frequency of MnPCEs ranging from about 12 to 73%. Similarly, paw volume in the control group was observed to be enhanced about 0.42±0.08 to 0.52±0.08 at time interval of 1-8hrs. Standard drug of diclofenac and ethanol extract of *S. marginatum* were also observed to be decrease the paw volume significantly based on the dose with time interval. Therefore, this imperative study concluded that the anti genotoxic and anti-inflammatory activities of ethanol extract of *S. marginatum* were significantly exhibited dose dependent effects as equally as standard drug of diclofenac.

Keywords: *stoechospermum marginatum*, ethanol extract, 4-NQO, anti-genotoxicity, anti-inflammatory

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Abbreviations: MnPCEs, micro nucleated polychromatic erythrocytes; Ac-4-HAQO, active form of 4-Hydroxyl-amino-quinoline-1-oxide; NCEs, normochromatic erythrocytes; CPCSEA, control and supervision of experiments on animals; AF, aqueous fractions; DMF, dichloromethane fractions; ECF, ethyl acetate fractions

Introduction

Marine organisms are having rich source biologically active metabolites and there are many reports of macro algae-derived compounds that posses a broad range of biological functions, such as antibiotic, antiviral, antioxidant, antifouling, anti-inflammatory, cytotoxic, and anti-mitotic activities.[1,2] Some of the marco algae-derived bioactive compounds are amino acids, terpenoids, phlorotannins, steroids, alkaloids, polyketides, glycerols, cyclic peptide, polysaccharides, phenolic compounds, fatty acids, and acrylic acid.[3,4] These bioactive potential of seaweeds are mainly used as a human food sources in Asian countries. Particularly, brown seaweed (*Phaephyceae*) is most complex group of algae and they are broadly distributed from tropical to polar zones of ocean in the world.[5] *Stoechospermum marginatum* (C. Agardh) Kutzing belongs to brown algae and distributed from Indian Ocean to Australian ocean.[6] It quiet effortlessly collected from the Gulf of Mannar near Mandapam coast (9º16´N,79º12´E) of Tamilnadu, India. Currently, this brown seaweed utilized for various aspects like used as a food in salads, fresh meal for breeding animals, manure for cultivation of vegetable and raw material for production of alginic acid and mannitol.[7] Different essential oils along with methanolic and dichloromethane (1:1) extract of *S. marginatum* possessed antioxidant and antibacterial potential were also documented.[3] Recent report revealed that the secondary metabolites present in *S. marginatum* were noticed to be boosted the activities of peroxidase, phenyl alanine lyase, catalyse, and poly phenol oxidase.[8] Spatane derivatives from *S. marginatum* were well established regarding their biological activity.[4] However, bioactive composition was differed depending on the geographical distribution, habitats including environmental conditions: water, temperature, salinity, light, and nutrients.[9] In the present novel study was seems to be lacking based on the review of literature and therefore in the present pragmatic study intended to evaluate the anti-genotoxic and anti-inflammatory effects of *Stoechospermum marginatum* ethanol extract in rat model.

Materials and methods

Chemicals and solvents

Following chemicals such as indomethacin, giemsa stain, may-grunwald stain and well-know genotoxin, 4-nitroquinoline-1-oixde (4-NQO) were procured from Sigma-Aldrich, USA. Other liquid solution like phosphate buffered saline and DMSO purchased through Hi-media, Mumbai, India. All the solvents used in the present study were of analytical grade.