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Research Article

Screening of anti-inflammatory activity of *Kigeliaafricana* fruit extracts

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Abstract

Cause of occurrence of different diseases in human being is getting increased by means of increased inflammatory conditions in the body hence the development of anti-inflammatory drugs has become the hotspot for the current scientists.The signs of inflammation are redness, increased heat production at the particular area, swelling, pain. Inflammatory process plays a crucial role in body's defensive mechanism but in some condition this inflammation turn to produce autoimmune disorders like arthritis, lupus erythematous. Hence there is need of searching various phytoconstituents for protecting the body from inflammatory responses. *Kigelaafricana*is having various therapeutic uses and it was used in different parts of Africa. Which is also known as elephant trumpets. Our study related to identify the fruit extracts for anti-inflammation using two solvents of hexane and ethanol solvents and the extracts were fed to the animals of Wister albino rats in two graded doses[250 mg/kg b.w and 500 mg/kg b.w]by using carrageenan induced paw oedema model. Anti-inflammation was found to be concentration dependent at a dose 500mg/kg of ethanolic extract has shown potent anti-inflammatory activity, may be due to presence of flavonoids. The folklore use of*Kigeliaafricana* was authenticated by our anti-inflammatory study the possible mechanism could be by acting on cyclooxygenase enzymes.

Keywords: *Kigeliaafricana*, anti-inflammation, carrageenan induced paw oedema model

Introduction

About eightieth of world's population depends on ancient medicines for his or her primary health care. The family Bignoniaceae is characterised by the woody stem, opposite, compound leaves, zygomorphousflowers(Cragg GM, et al, 2001). The family is comprised of concerning 112 genera and 725 species typically distributed in tropical and semitropical elements of world. In India, the family is drawn by fifteen genera and forty species(Olatunji AG,2009). Kigelia could be a genus of flowering plants within the family Bignoniaceae(Jackson S,2012), that consists of only 1 species, that's *Kigeliaafricana*, fruit grows up to two feet long, weighs concerning fifteen lbs, and appears like sausage,

Kigeliaafricana is often referred as sausage or Magnolia acuminata thanks to its immense sausage or cucumber like fruit(Khan SS,2002).

Inflammation refers to body's traditional protecting response to tissue injury caused by physical trauma, hepatotoxic chemicals or microbiological agents(Zoghbi, M.G.B, 2009). The classical signs of inflammation square measure skin redness, swelling, pain, heat, and loss of function(Giovannini.P,2015). The method of inflammation involves changes in blood flow, destruction of tissues, exaggerated vascular porosity and therefore the synthesis of pro-inflammatory mediators(Both, Fernanda & Kerber,2008). The bruised cells, lymphocytes, phagocytes, mast cells and blood proteins square measure the sources of inflammatory mediators. the foremost necessary inflammatory mediators embrace bradykinins, serotonins, histamine, growth mortification, interleukin-6, interleukin-1β, leukotrienes, phospholipase A2, gas (NO), lipoxygenases and enzyme two (COX-2)(Abbott FV,2004). The demand for seasoning medication is increasing because of the growing recognition of natural product having fewer facet effects, simply accessible, higher cultural satisfactoriness and being relatively affordable(Adzu B,2007). This study was, designed to judge for the anti-inflammatory drug potential of the 2 completely different extracts of *Kigeliaafricana* fruit belong to Bignoniaceae family act as a preliminary step towards the event of additional economical plant-derived anti-inflammatory drug agents.

Methodology

Plant material collection:*Kigeliaafricana* fruits were procured from the Guntur district fields in the year February 2019. Prof D.Ramakanthraju Retire botanist authenticated the plant material.

Extract preparation:

Obtained fruits of *kigeliaafricana* were made shade dried pulverised into coarse form by passing through the sieve # 20. It has been successively soxhelated using solvents of hexane and ethanol for 3 days using a rota evapourator extracts were made solvent free. Yield was found to be 9%, 18.5% W/W was given the naming as *Kigeliaafricana* hexane extract (K.A.H.E) and *Kigeliaafricana*ethanolic extract (K.A.E.E). The concentrate extracts were stored in an air tight container and stored in vacuum desiccator until further use.

Acute toxicity studies:

Adult swiss albino mice 20-25gm were taken for acute toxicity tests. The mice were divided into control and test groups containing six animals every. The control group receive vehicle (5%of traditional saline) and also the test group receive graded doses of extracts. The animals were observed rigorously up to four hours then sometimes up to forty-eight hours for sign of any activity changes and motility and LD 50 values were calculated[10]

Experimental protocol:

Selection of animals:

Wister albino rats consideration 150-200gm of either sex were used. The animals were fed with diet and water spontaneously. The animals were maintained at temperature and 40-70% RH with 12hr light amount (6:00-18:00). The animals were divided into seven groups every group contains six animals.

Group I sever as a control received 0.5% DMSO not induced inflammation,

Group-II (Negative control) was induced with inflammation and received 1% carrageenan in 0.5% DMSO,

Group-III (Positive control) received Diclofenac at a dose of (15mg/kg b.w) dissolved in 0.5% DMSO,

Group-IV received K.A.H.E -500mg/kg b.win 0.5% DMSO

Group-V received K.A.H.E -250mg/kg b.w in 0.5% DMSO

Group-VI received K.A.E.E – 500 mg/kg b.w in 0.5% DMSO

Group-VII received K.A.E.E- 250mg/kg b.w in 0.5% DMSO

Model used in present work for screening of anti-inflammatory activity:

Carrageenan evoked paw swelling in rats for the assessment of acute inflammation: Among the numerous strategies used for screening of anti-inflammatory drugs, one among the foremost usually used techniques is based upon the ability of such agents to inhibit the oedema produced within the hind paw of the rat once injection of phlogistic agent. measuring systems used for the assessment of induced swelling within the paw volume to observe the event of the induced swelling within the paw. In the present work the pholgostic agent is the 1 % carrageenan[10].

Induction of paw edema:

Edema was elicited within the rats by injecting subcutaneously 0.1ml of 1 chronicles carrageenin suspension in saline into the sub-plantar tissue of the left hind paw of every rat(Inmaculada P, 2004).

Measurement of Percentage inhibition of paw edema:

Measurement of inflammation is done by using Ugo Basil plethismometer till 6hours after induction of phologostic agent. The percentage inhibition of inflammations was determined by using the formula

%Inhibition of oedema =

$$\frac{\text{Mean Paw oedema produced by control - Mean paw oedema produced by test}}{\text{Mean paw edema produced by test}} \times 100$$

Statistical analysis:

The results are expressed as mean ± s.e.m and also the applied statistical significance of distinction between groups was analysed by one-way anova followed by Dunnett's multiple comparison take a look at *p<0.05, **P<0.01 was considered as significant.

Results

From results of dose toxicity studies up to the dose of 5000mg/kg b.w there is no toxic effects have been identified for the selected plant extracts hence $1/10^{th}$ of 5000mg that is 500mg/kg b.w is taken for screening the activity of inflammation as a step towards preliminary screening of the anti-inflammatory action. The values of percentage inhibition of oedema at various time intervals was given in Table:1. The inflammatory response exhibited by the respective groups was represented in Graph:1

Table:1 Indicated the values of Mean oedema exhibited by various groups of Wister albino rats

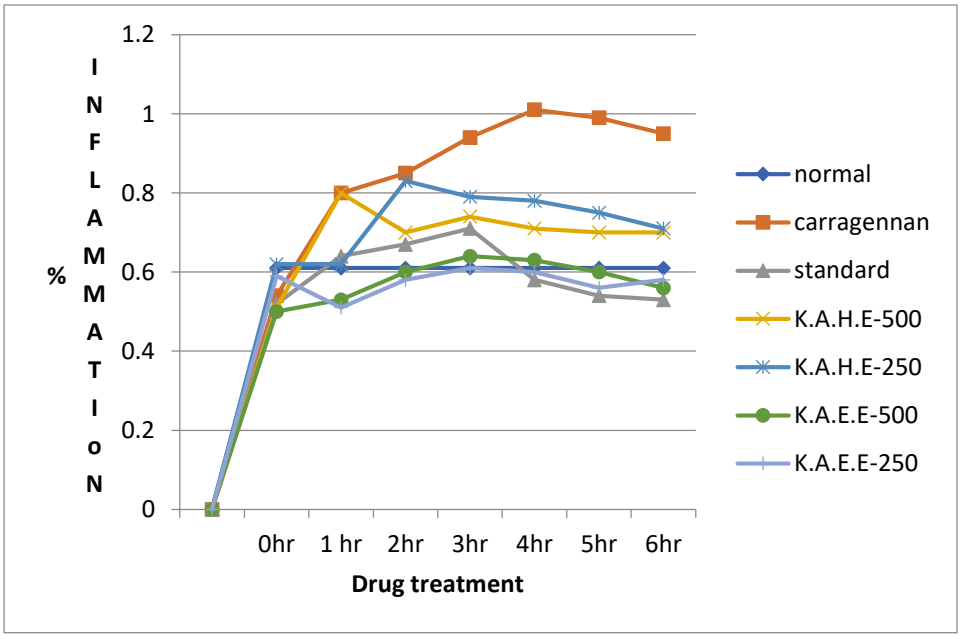
Groups	0hr	1 hr	2hr	3hr	4hr	5hr	6hr
Normal	0.61±0.06	0.61±0.06	0.61±0.06	0.61±0.06	0.61±0.06	0.61±0.06	0.61±0.06
Carrageenan	0.54±0.05	0.80±0.06*	0.85±0.03**	0.94±0.05**	1.01±0.21**	0.99±0.09**	0.95±0.07**
Standard	0.52±0.24*	0.64±0.05*	0.67±0.06**	0.71±0.09**	0.58±0.05**	0.54±0.06**	0.53±0.06**
K.A.H.E-500	0.51±0.06*	0.8±0.09#	0.70±0.1#	0.74±0.08#	0.71±0.07*	0.70±0.03*	0.70±0.07**
K.A.H.E-250	0.62 ±0.08	0.62±0.14	0.83±0.32#	0.79±0.05#	0.78±0.16*	0.75±0.14*	0.71±0.03**
K.A.E.E-500	0.50±0.05*	0.53±0.08*	0.60±0.07**	0.64±0.52**	0.63±0.06*	0.60±0.33*	0.56±0.12**
K.A.E.E-250	0.59±0.26	0.51±0.13	0.58±0.54**	0.61±0.26**	0.6±0.18*	0.56±0.14*	0.58±0.18*

Values are mean ± SEM (n=6)

*Indicates statistically significant difference from respective groups using one-way ANOVA, followed by Dunnett's Multiple comparison test (*P<0.05, **P<0.01)

# Indicates statistically non-significant different from respective groups.

Graph:1 Percentage inflammation exhibited by the drug protocol in Wister albino rats



Discussion

Carrageenan has produced inflammation to rats which was measured by plethismometer. There is profound increase of inflammation in the carrageenan group (Red graph) which was not treated with any anti-inflammatory agent. In normal control (Blue graph) represents the uniform volume of paw throughout study period. In standard group (green graph)

inflammation has increased up to 3 hours and slowly started decreasing from 3rd hour onwards. Anti-inflammation exhibited by the plant extracts were of dose dependent action 500mg dose shown significant action while 250mg has shown less significant action compare to 500mg dose. In case of plant extract treated groups of *Kigeliaafricana* Hexane and ethanolic extracts has shown significantly potentiating action and reduced inflammation significantly when compared to standard group and toxic group. The present study is evaluated for anti-inflammatory activity by exploitation carrageenan causation rat paw oedema model has proved that K.A.E.E -500 has proved as best anti-inflammatory once compare the inflammation between two extracts of *Kigeliaafricana* fruits.

Conclusion

Body immune system is going to protect the cells by producing inflammatory mechanism, but due to negative effect sometimes our own body's cells will be considered as antigens and produces antibody which results in diseases like multiple sclerosis, rheumatoid arthritis, psoriasis, atherosclerosis, osteoarthritis hence there is quest in searching phytoconstituents which can reduce inflammation. *Kigeliaafricana* is showing potent anti-inflammatory property which was authenticated by treating the extracts on wistar albino rats, from the results of ant-inflammatory action. K.A.E.E-500mg dose has shown best anti-inflammation when compare to rest of the groups. The anti- inflammation exposed by *Kigeliaafricana* may be due to flavonoids.

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Conflict of interest:

We declare that we have no conflict of interest.

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