



Anti inflammatory potential of alcoholic extract of resvaretol from fruits of *Vitis vinifera* linn.

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ABSTRACT

Anti-inflammatory activity of the ethanolic extracts of the fruits of resvaretol in *Vitis vinifera* linn was studied in Sprague dowley rats using the carrageenan induced left hind paw edema. The ethanolic extracts at the dose of 500 mg/kg body weight shows moderate to significant anti-inflammatory activity. The ethanolic extracts of resvaretol in *Vitis vinifera* linn reduced the edema induced by carrageenan by 25.87 % on oral administration of 500 mg/kg body weight as compared to the untreated control group. Diclofenac sodium at 10 mg/kg body weight inhibited the edema volume by 37.79%. The results indicated that the ethanolic extract 500 mg/kg body weight shows more significant ($p < 0.05$) anti-inflammatory activity when compared with the standard and untreated control.

Keywords: Anti-inflammatory; *Vitis vinifera* linn; Carrageenan.

INTRODUCTION

During the ancient Greek and Roman civilizations, grapes were revered for their use in winemaking. Nowadays, there are three main species of grapes: European grapes (*Vitis vinifera*), North American grapes (*Vitis labrusca* and *Vitis rotundifolia*) family Vitaceae and French hybrids. Grapes are classified as table grapes, wine grapes (used in viniculture), raisin grapes, and so on, with edible seeds or seedless. People often enjoy the various grape products, such as fruit, raisins, juice and wine. Grape fruit contains various nutrient elements, such as vitamins, minerals, carbohydrates, edible fibers and phytochemicals (Dr Nadkarni, 2002). Polyphenols are the most important phytochemicals in grape because they possess many biological activities and health-promoting benefits. The phenolic compounds mainly include anthocyanins, flavanols, flavonols, stilbenes (resveratrol) and phenolic acids. Anthocyanins are pigments, and mainly exist in grape skins. Flavonoids are widely distributed in grapes, especially in seeds and stems, and principally contain (+)-catechins, (-)-epicatechin and procyanidin polymers. Anthocyanins are the main polyphenolics in red grapes, while flavan-3-ols are more abundant in white varieties. From the clue of "French paradox", polyphenolics from grapes and red wines attracted the attention of scientists to define their chemical composition and their properties for human health (En-Qin Xia, 2010).

The reported evidences of beneficial health effects of phenolic compounds include inhibiting some degenerative diseases, such as cardiovascular diseases, and certain types of cancers, reducing plasma oxidation stress and slowing aging. Phenolic compounds are also regarded as preservatives against microbes and oxidation for food. What's more, in vivo assays showed that phenolic compounds are bioavailable. Therefore, besides wine and juice, grape diet supplements would be promising functional foods worthy of popularization. However, some reports have also shown that at higher concentrations the effect of phenolic compounds on health was negative and some structures in particular promoted the negative effects (Kirtikar and Basu, 2002). In addition, some high molecular weight phenolics could not be absorbed. Apparently, research on direct ingestion of different doses and compositions of grape products are the urgent task in the field.

This review summarizes current knowledge on extraction, isolation and identification methods, bioactivities, bioavailability and potential toxicity of grape phenolics. Special attention is paid to the bioactivities, including antioxidant, cardioprotective, anticancer, anti-inflammation, antiaging and antimicrobial properties. Finally, this paper tries to show some directions for further research and applications of grapes.

MATERIALS AND METHODS

Plant material

Fruits of *Vitis vinifera* linn. family Vitaceae were collected from Pune localities, Pune district (Maharashtra), the plant was identified and authenticated by Botanical Survey of India (No. BSI/WRC/Tech./2011), Pune. Preparation of extract Fruits of *Vitis vinifera* linn. (500 gm) were extracted with ethanol using macera-

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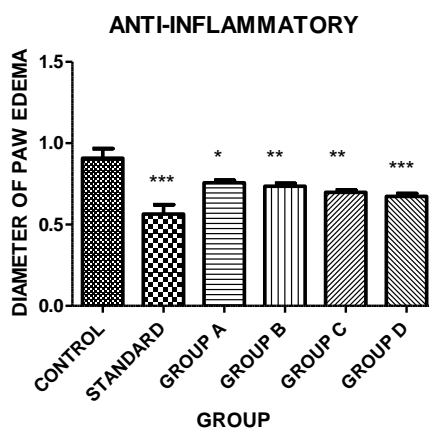
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Table 1: Effect of ethanolic extracts of resvaretol from fruits of *vitis vinifera* on carrageenan induced rat paw edema

Group	Paw edema diameter						
	0Hr.	1Hr	2Hr.	3Hr.	4Hr.	5Hr.	% Inhibition
CONTROL	0.69±0.05	0.80±0.05	0.92±0.05	0.96±0.05	0.98±0.05	1.10±0.05	--
STANDARD	0.67±0.05	0.78±0.05	0.58±0.05	0.47±0.05	0.46±0.05	0.43±0.05	37.79%
GROUP A	0.69±0.01	0.79±0.01	0.79±0.01	0.77±0.01	0.76±0.01	0.74±0.01	16.69%
GROUP B	0.67±0.01	0.79±0.01	0.77±0.01	0.75±0.01	0.72±0.01	0.71±0.01	19.07%
GROUP C	0.65±0.01	0.75±0.01	0.72±0.01	0.70±0.01	0.69±0.01	0.68±0.01	23.12%
GROUP D	0.65±0.01	0.75±0.01	0.69±0.01	0.67±0.01	0.65±0.01	0.63±0.01	25.87%

Values are expressed as mean \pm S.D. (n=6). *p value compared to control ($p < 0.001$) i.e. significant; ** p value compared to control ($p < 0.05$).

**Figure 1: Graphical representation of anti-inflammatory activity of resvaretol from fruits of *vitis vinifera* linn.**

tion. The resulting extract was evaporated in air and stored in desiccators for future use. The fruit extract was dissolved in ethanol prior to the experiment and used. Phytochemical screening, the phytochemical examination of ethanolic extract of resvaretol from fruits of *vitis vinifera* linn. was performed by standard methods. (Harbone, 1984).

Animals

Sprague dowley rats (150 – 180 g) of either sex were selected for the experiments. Animals were allowed to be acclimatized for a period of 2 weeks in our laboratory environment prior to the study. Animals were housed in polypropylene cages (4 animals per cage), maintained under standard laboratory conditions (i.e. 12:12 hour light and dark sequence; at an ambient temperature of $25\pm 2^\circ\text{C}$; 35-60% humidity); the animals were fed with standard rat pellet diet and water ad libitum. The experiments on animal were conducted in accordance with the international accepted principles for laboratory animal use and the experimental protocols duly approved by the Institutional Ethical Committee (Reg. No. 922 /ac/ 05/ CPCSEA).

Acute toxicity studies

The animals were divided into control and test groups containing six animals each. The control group received the normal saline while the test groups received graded doses of extracts orally (p. o.) and were ob-

served for mortality till 48 h and the LD50 was calculated (Ghosh, 1994). Carrageenan induced rat paw edema ethanolic extracts of resvaretol from fruits of *vitis vinifera* linn. was evaluated for anti inflammatory activity by carrageenan induced hind paw edema method (Winter et al., 1962). The rats were divided into six groups of six animals each. First group (control) received 5 ml/kg body weight of normal saline; second group (standard) received 10 mg/kg body weight (i.p) Diclofenac sodium, third group received ethanolic extract (100 mg/kg body wt, p.o.), fourth group received ethanolic extract (250 mg/kg body wt, p.o.), and fifth group received ethanolic extract (400 mg/kg body wt, p.o.) and sixth group received ethanolic extract (500 mg/kg body wt, p.o.), of resvaretol from fruits of *vitis vinifera* linn respectively. After 1 hr, the rats were challenged with subcutaneous injection of 0.1 ml of 1 % w/v solution of carrageenan (Sigma chemical co, St. Louis MO, USA) into the plantar side of the left hind paw. The paw diameter was measured immediately after injection (0 hr) and then every hour till 5hr after injection of carrageenan to each group with the help of Vernier caliper. The difference between the initial and subsequent reading gave the actual edema volume. The level of inhibition of edema was calculated for each extract using the relation.

$$\text{Inhibition (\%)} = 100 [1 - (a - x/b - y)]$$

Where,

a= mean paw diameter of treated animals after carrageenan
 x= mean paw diameter of treated animals before carrageenan

b= mean paw diameter of control animals after carrageenan
 y= mean paw diameter of control animals before carrageenan

Statistical analysis

The experimental data were calculated as mean \pm SEM., evaluated by unpaired one way ANOVA test. Values of $p < 0.001$ were considered statistically significant.

RESULTS

The average percentage yield of the ethanolic extracts of resveratrol from fruits of *vitis vinifera* linn. was found to be 2.39 % w/w. Preliminary phytochemical screening of the resveratrol from fruits of *vitis vinifera* revealed the presence of anthocyanins, flavanols, flavonols, stilbenes (resveratrol) and phenolic acids. The LD50 was found to be 5000 mg/kg for ethanolic extract of resveratrol from fruits of *vitis vinifera*. So the 1/10 of

tonin and kinins after injection of carrageenan. A more prolonged second phase is related to the release of prostaglandins like substance (Vogel, 2002). The present study has shown that the ethanolic extracts of resveratrol from fruits of *vitis vinifera* linn at dose 500 mg/kg exhibited significant anti-inflammatory activity being reported for first time. Preliminary phytochemical screening showed that the resveratrol from fruits of *vitis vinifera* linn revealed the presence of anthocyanins, flavanols, flavonols, stilbenes (resveratrol) and phenolic acids. The flavonoids are known to possess anti-inflammatory activity by inhibiting the cyclooxygenase responsible for synthesis of inflammatory prostaglandins. Thus the anti-inflammatory activity of many plants have been attributed to their flavonoids, It is assumed that the effect could be due to the constituents such as flavonoids supporting the results for the present study. It can be concluded that ethanolic extract of resveratrol from fruits of *vitis vinifera* linn is endowed with centrally acting anti-inflammatory activity on acute inflammatory processes.

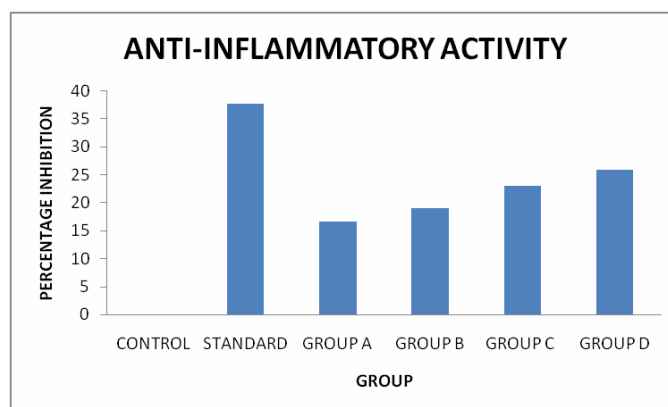


Figure 2: Graph of Anti-inflammatory activity of resveratrol from fruits of *vitis vinifera* linn.

LD50 dose was considered as an effective dose. The effect of ethanolic extract of resveratrol from fruits of *vitis vinifera* on carrageenan induced edema in rats is shown in Table 1.

The results obtained indicate that the ethanolic extract at a 500 mg/kg body weight had more significant anti-inflammatory activity in rats. The ethanolic extracts of resveratrol from fruits of *vitis vinifera* linn reduced the edema induced by carrageenan by 25.87 % on oral administration of 500 mg/kg body weight as compared to the untreated control group. Diclofenac sodium at 10 mg/kg body wt inhibited the edema volume by 37.79%. The results indicated that the ethanolic extract 500 mg/kg body weight shows more significant ($p < 0.05$) anti-inflammatory activity when compared with the standard and untreated control.

DISCUSSION

Carrageenan induced paw edema was taken as a prototype of exudative phase of inflammation where development of edema being described as biphasic. The initial phase is attributed to release of histamine, sero-

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