ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Anti-Inflammatory Activity of Ethanolic Extract of *Physalis alkekengi*

Estakhr J*, Sanchooli N, Najafi Sh, Javdan N

Department of Biology, Faculty of Science, University of Zabol, Zabol, Iran.

ABSTRACT

The present study investigates the anti-inflammatory activity of ethanolic extract of Physalisalkekengi. The medicinal values of the Physalisalkekengi have been mentioned in ancient literature as useful in disorders. The effect of ethanolic extracts of Physalisalkekengi were studied on carrageenan induced paw edema. The ethanolic extract decreased the edema induced in hind paw. The ethanolic extract of Physalisalkekengi (200 mg/kg b.w.) has showed significant anti-inflammatory. It has been concluded that ethanolic extract of Physalisalkekengi (200 mg/kg b.w.) augments that it is having good anti-inflammatory activity against carrageenan induced paw edema.

Key words: Anti-inflammatory, Physalisalkekengi, carrageenan, paw edema.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Nature has provided a complete store-house of remedies to cure all aliments of mankind. The use of herbal medicine has become increasingly popular worldwide and medicinal plants are believed to be an important source of new chemical substances with potential therapeutic effects. Physalisalkekengi, belongs to the family Solanaceae. It is distributed in Asia (Iran, India, Japan and China) and Europe (Spain, Italy and Turkey) has a large history of herbal use, and an interesting chemistry but it is seldom used in modern practices [1]. Chemical studies have demonstrated the presence of physalin, citric acid and vit C as the major components of P. alkekengi extract. Physalin is the most chemical compound with various pharmacological characteristics including, anti bacterial, anti leishmanial and anti tumor and anti-spermatogenesis and anti-conception [2-7]. The whole plant is anti phlogistic, anti pyretic, anti tussiveand expectorant [8-10]. It is used in treatment of urinary and skin diseases [11]. Its extract has been used for treatment of wide range of diseases, including kidney and bladder stone, febrile diseases, and arthritis [12].

Hence researches are on full swing to develop effective medicines from plant sources, so Physalisalkekengi were subjected to anti-inflammatory screening in experimentally induced acute and chronic inflammation in rats.

Materials and Methods

Plant material

Physalisalkekengi was collected from Guilan province, and then was identified by a botanist. Its leaves and fruits were dried under shade and powdered. The extract was prepared by the maceration method (80% ethanol in 300 gr/lit for 48 hours), filtered with filter paper. After filtration ethanol was removed by rotary evaporator. The extract was dissolved in normal saline and administrated orally into rats.

Animals

Adult Wistar rats of both sexes weighing between 200-250 g were used for experiment and were obtained fromRazi Institute, (Karaj, Iran) and maintained according to the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals, Razi Institute, Karaj, Iran. They were housed in standard environmental condition like, ambient temperature (250 ± 10C), relative humidity (55±5%) and 12/12h light dark cycle. Animals had free access to standard pellet diet and water ad libitum.

Anti-inflammatory activity by Carrageenan induced rat paw edema method

The rat paw edema method of Winter et al (1962) was used [13]. Albino rats of either sex weighing 200 – 250 g were divided in 4 groups (N=6). Group-I received 0.5% CMC

ISSN: 0975-8585

suspension (control), Group-II, III and IV received ethanolic extract (100, 150, 200 mg/kg, P.O) of physalisalkekengi respectively. Group-V received Diclofenac (reference standard 1mg/kg, P.O) [14]. Animals were treated with drugs by oral route and subsequently 1 h after treatment; 0.1ml of 1% suspension of carrageenan in normal saline was injected into the subplanter region of left hind paw to induce edema. The paw volume was measured initially at 0, 1, 2, 3 and 4hr after carrageenan injection using digital paw edema meter (520-R, IITC Life Science - USA). The difference between the initial and subsequent values gave the actual edema volume which was compared with control.

The inhibition of inflammation was calculated using the formula, % inhibition =100 (1-Vt/Vc), Where 'Vc' represents edema volume in control and 'Vt' edema volume in group treated with test extracts.

Statistical analysis

Data analysis was carried out using one-way analysis of variance (ANOVA) followed by Dunnett's multiple comparison tests. $P < 0.05$ was considered statistically significant.

RESULTS

The effect of Physalisalkekengi extract (100, 150, 200 mg/kg) in carrageenan induced paw edema in rats is shown in Table 1 and 2. The met extract of P. alkekngi (200 mg/kg) prevented the formation of edema induced by carrageenan and thus showed significant anti-inflammatory activity ($p<0.05$). This does (200 mg/kg) reduced the edema induced by carrageenan by 23.45% after 3h injection of noxious agent as compared to the control vehicle treated group. Diclofenac sodium at 10mg/kg inhibited the edema volume by 12.60 %. On carrageenan induced acute inflammation model the extract (200 mg/kg) produced better inhibition of paw edema.

Table: 1 Effect of Physalisalkekengiextract on carrageenan induced paw edema in rats.

Treatment groups (n=6)	Dose (mg/kg)	Edema Diameter (cm)				
		0hr	1hr	2hr	3hr	4hr
Group I	10 ml/kg	**0.94** ± 0.003	**0.97** ± 0.004	**0.98** ± 0.003	**1.02** ± 0.021	**1.03** ± 0.03
Group II	100	**0.89** ± 0.02a	**0.86** ± 0.006 a	**0.83** ± 0.005a	**0.82** ± 0.03a	**0.78** ± 0.04a
Group III	150	**0.87**± 0.006a	**0.85** ± 0.01a	**0.83** ± 0.006a	**0.81** ± 0.004a	**0.78** ± 0.001a
Group IV	200	**0.79** ± 0.008a	**0.78** ± 0.006a	**0.76** ± 0.009a	**0.75** ± 0.01a	**0.73** ± 0.004a
Group V	10	**0.92** ± 0.004b	**0.90** ± 0.008a	**0.89** ± 0.005a	**0.85** ± 0.007a	**0.82** ± 0.004a

Each value is mean ± SEM N=6 rats

a $P < 0.01$
b $P < 0.05$
One way ANOVA followed by DunnetMultiple comparison test
Statistically significant when compared to control

ISSN: 0975-8585

Table 2: Percentage of inhibition of paw edema exhibited by ethanolic extract of physalisalkekengi

Treatment	Percentage inhibition (%) at various times intervals			
	1hr	2hr	3hr	4hr
Ethanolic Extract 100 mg/kg	10.24	**12.32**	**18.64**	**26.45**
Ethanolic Extract 150 mg/kg	**12. 16**	**13.21**	**19.07**	**26.37**
Ethanolic Extract 200 mg/kg	**26.13**	**28.68**	**30.02**	**33.15**

DISCUSSION

Carrageenaninducededema has been commonly used as an experimental animal model for acute inflammation and is believedto be biphasic. The early phase (1 – 2 h) of the carrageenan model is mainlymediated by histamine, serotonin andincreased synthesis of prostaglandins in the damaged tissue surroundings. The late phase is sustained byprostaglandin release and mediated by bradykinin, leukotrienes, polymorphonuclear cells and prostaglandinsproduced by tissue macrophages [15, 16]

Folkloric treatment of inflammation of various etiologies, using medicinal plants, is well known to masters of the art of traditional medicine practice.

The significant inhibitory activity shown by the extract of physalisalkekengi (100, 150, and 200 mg/kg)over a period of 4 h in carragenan-induced inflammation was quite similar to that exhibited by the group treated withdiclofenac sodium. The highest percentage inhibition activity was found in the dose of 200 mg/kg. These results indicate that the extract actsin later phases in dose dependent manner, probably involving arachidonic acid metabolites, which produce an edemadependent on neutrophils mobilization [17]. Also, this extract may have inhibited the release of pro-inflammatorymediators of acute inflammation such as histamine and prostaglandin. Given the data it can be concluded that it is concluded that the ethanolic extract of physalisalkekengi (200 mg/kg) having good anti-inflammatory activities and it shown dose dependent activities. The results support the traditional use of this plant in inflammatory conditions and suggest the presence of biologically active components which may be worth further investigation and elucidation.

ACKNOWLEDGEMENTS

The author is grateful to Zabol University for supporting this study. We are also thankful to staff of Medicinal Plants and Drugs Institute, Shahid-Beheshti University for providing necessary facilities for this study.

ISSN: 0975-8585

REFERENCES

[1] Bown D. Encyclopedia of herbs and their uses. London: Dorling Kindersley; 1995.
[2] Chaudhary M, Iqbal DH. ChemBiodiver 2005; 2(9): 1164-1173.
[3] Janurio AH, Rodrigues Filho E, Pietro RC, Kashima S, Sato D, Franca S. Phytother Res 2002; 16(5): 445-448.
[4] Masao K, Toichi O, Masaki N. BCSJ 1988; 61(7): 2696-2698.
[5] Vessal M,,Mehrani HA, Omrani GH. J Ethnopharmacol 1991; 34(3): 69-78.
[6] Montaserti A, Pourheydar M, Khazaei M, Ghorbani R. IJRM 2007; 5(1): 13-16.
[7] Sanchooli N, Estakhr J, Shams Lahijani M, Hashemi SH. Pharmacologyonline, 2008; 3: 110-118.
[8] Launert E. Edible and medicinal plants. Hamlyn: 1981.
[9] Amini A. Dictionary of therapeutic plant. Tehran: Tehran University; 2004: 157-159.
[10] Zargari A. Medical plants. Tehran: Tehran University; 2003: 3595-3596.
[11] Chopra RN, Nayar SL, Chopra IC. Glossary of Indian medicinal plants (including the supplement). New Delhi: CSIR; 1986.
[12] Mirheydar H. Herbal information usage of plants in preventaion and treatment of diseases. Tehran: Tehran University; 2003. 39-42.
[13] Winter CA, Risley EA, Nuss W. ProcSocExpBiol Med 1962; 111:544-547.
[14] Brooks RR, Carpenter JI, Jones SM, Zieglerm TC, Pong SF. J Pharmacol Methods 1991; 25: 275-283.
[15] Brito ARMS, Antonio MA. J Ethnopharmacol 1998; 61: 215-228.
[16] Gupta M, Mazumder UK, Gomathi P, Thamilselvan V. BMC Complementary and Alternative Medicine 2006; 36 (6): 1472-6882.
[17] Just MJ, Recio MC, Giner RM, Cullar MJ, Manez S, Bilia AR. Plant Med 1998; 64: 404-407.