Journal of Chemistry of Goods and Traditional Medicine

J Chem Good Trad Med, Volume 3, Issue 3, 2024 Traditional Medicine

DETERMINATION OF ANTI-INFLAMMATORY ACTIVITY OF THE FOOD ADDITIVE "AS-SULTAN"

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DOI: https://doi.org/10.55475/jcgtm/vol3.iss3.2024.322

Keywords:

Antiexudative activity, cotton wool granuloma, degree of exudation, cytoprotector, vasoprotector

Abstract

The effect of the extract of the food supplement "As-Sultan", prepared on the basis of medicinal plants and preventing and treating inflammatory diseases of the gallbladder, on various components of inflammation was studied. Compared with the control animals after the administration of carrageenan at a dose of 28 mg/kg, the food supplement "AS-Sultan" was 32,4 and 63,7% after 3 and 24 hours. The second stage of the study was studied on the "cotton wool granuloma" model, which made it possible to evaluate the anti-inflammatory activity of the food supplement "AS-Sultan" and Glycerin on the exudative and antiproliferative effect. The obtained results show that the food additive "AS-Sultan" reduces the level of exudation, this indicator in the control is 346,0±29,4 mg, and the dose of the food additive "AS-Sultan" 28 mg/kg was 269,1±25,8 mg ($p<0.05$).

How to Cite

Khojimatova, D. S. DETERMINATION OF ANTI-INFLAMMATORY ACTIVITY OF THE FOOD ADDITIVE "AS-SULTAN". Journal of Chemistry of Goods and Traditional Medicine, 3(3). https://doi.org/10.55475/jcgtm/vol3.iss3.2024.322

Introduction. Medicinal plants are of great importance in the healthcare system worldwide due to their proven effective medicinal properties. In recent years, medicinal plants' use in drug development has attracted researchers' attention due to their strong healing properties and safety. Plant phenolic compounds, including flavonoids, have been widely studied [1-2]. The most studied and widely used flavonoids include rutin and quercetin. Using various experimental models and biochemical tests, it has been established that they have antioxidant, cytoprotective, vasoprotective, neuro- and cardioprotective, anti-inflammatory, antimicrobial, antiviral, antitumor, and other effects. Flavonoids have a variety of pharmacological activities due to various molecular mechanisms and are one of the phytochemicals that have attracted the attention of the pharmaceutical industry.

The main mechanism of action of flavonoids on the cell is that they have high antioxidant properties, and due to this property, they have a broad spectrum of action. Despite the obvious biological activity of flavonoids in various in vitro systems, their biological effects in vivo systems are limited due to low bioavailability [3]. It was noted that among 30 flavonoids, the most effective in stopping the development of inflammation are flavonoids containing the pyrocatechin residue (catechin fragment). The anti-inflammatory effect of flavonoids was more pronounced in flavones and flavonols with 3',4'-dihydroxy- or 2',4'-dimethoxy-substituents, depending on the experimental model used.

Experimental part. The total number of experimental animals used in the studies was 16 rats [4-5]. The anti-inflammatory activity of the food supplement AS-Sultan in vivo was studied using a carrageenan tumor model. The experiments were conducted using a model of acute exudative inflammation caused by subplantar administration of carrageenan, which is considered a classic phlogogen. The experiment was performed on 6 male and female rats weighing 181±12 g. In the experimental and control groups, the initial volumes of the hind paw of the animals were measured before the administration of carrageenan. The anti-inflammatory effect of the drugs was recorded 1, 2, 3, 4, 5, and 24 hours after the induction of inflammation. The tumor size was estimated based on the difference between the volumes of the non-inflamed and inflamed hind paw. The AEF of the drugs was determined as a percentage by the difference in the reduction in swelling of the hind paw of the experimental animals compared to the control.

Antiexudative activity is calculated using the following formula:

$$\text{AEA} = \frac{\Delta V_{eg-\Delta Vk}}{\Delta V_{n\kappa}} * 100\%$$

AEA - anti exudative activity, in percent;

$\Delta V_к$ – hind paw size of the control group;

ΔV_{eg} – the size of the hind paw of the experimental group.

Model "Cotton Granuloma"

The "cotton wool granuloma" method was used to evaluate the antiproliferative and anti exudative effects of the studied drugs. The experiments were conducted on 12 purebred white rats weighing 181±12 g. Nembutal was injected into the abdominal cavity at a dose of 50 mg/kg and under its influence, the hair was cut off from the back and shoulders of the anesthetized rats, the skin was cut with scissors under aseptic conditions and the subcutaneous tissue was opened to a length of 1-2 cm. After this, a pre-sterilized cotton swab weighing 10 mg was inserted under the skin through the incision with tweezers, after which the skin incision was closed with a suture. The studied food additive "AS-Sultan" was injected into the stomach as an aqueous solution at a dose of 34 mg/kg for 7 days, and distilled water was administered to rats of the control group in the corresponding volumes. On the 8th day of the experiment, the implanted cotton ball was removed together with the granulation tissue formed around it, weighed, and dried at a temperature of 55-60 °C until a constant weight was achieved. The exudate mass (EM) was calculated based on the difference between the wet cotton ball and the dry cotton ball, the resulting mass of granulation scar tissue (GM) was calculated based on the dried cotton ball, and the amount of cotton measured before implantation was calculated based on the difference in ball mass (10 mg). The antiproliferative anti-inflammatory effect of the drugs was assessed as a percentage of suppression of the exudation process (EP) of these drugs:

$$\text{M}E = \frac{\text{M}Ek - \text{M}Eog}{GMkg} * 100\%$$

and suppression of proliferation (SP, in percent):

$$EV = \frac{\text{EMcg} - \text{GMeg}}{\text{GMcg}} * 100\%$$

EMex.g. in this. exudate mass in experimental groups;

EMcg. exudate mass in control groups;

GMeg. dry granuloma mass in experimental groups;

GMcg. dry granuloma mass in control groups.

Quantities in the formula:GMeg., GMcg., EM., EMex.g. measured in mg.

Result received. Acute exudative inflammation induced by carrageenan was detected in rats 3 and 24 hours after the administration of the phlogogen. As shown in Table 1, the maximum level of edema was formed in control rats after 3 hours. The same dynamics were maintained in the groups receiving the food additive "AS-Sultan" and glycerol, but the degree of edema was small. Thus, 3

hours after the administration of carrageenan to rats receiving the food additive "AS-Sultan" in doses of 28 and 32 mg/kg, the swelling of the paws decreased by 32.4% and 63.7% after 24 hours, respectively. volume.

Table 1

The effect of the drug "AS-Sultan" and Glycerin on the progression of carrageenan inflammation in rats (M-m; n=6)

Medicines	Dose, mg/kg	In 3 hours		In 24 hours	
		Swelling size,%	AEA, %	Swelling size,, %,	AEA, %
Control		94,8±4,60	-	51,0±6,5	-
"AS-Sultan"		69,5±1,85**	32,4	19,8±2,24**	63,7
Glycerol	0.5 ml	44,1±6,80***	53,0	13,4±2,75***	74,4

Note: * - p < 0.05, ** - p < 0.01, *** - p < 0.001 compared to the control.

The obtained results show that the activity of the food additive "AS-Sultan" exceeds the activity of Glycerin. Intramuscular administration of the biologically active additive AS-Sultan effectively reduced the paw edema caused by carrageenan from 3 to 24 hours compared to the control. Thus, the study of the anti exudative effect of the food additive "AS-Sultan" in inflammatory conditions showed that this drug is more effective than Glycerin in all the studied doses. When studying the anti-inflammatory activity of the food additive AS-Sultan and Glycerin on the "cotton granuloma" model, the following results were obtained, which makes it possible to evaluate their anti-exudative and antiproliferative effects. The obtained results show that the sample "AS-Sultan" reduces the level of exudation, this indicator in the control is 346.0 ± 29.4 mg, and the food additive "AS-Sultan" at a dose of 28 mg/kg - 269.1. ±25.8 mg ($p<0.05$); respectively, the values were (Table 2). A decrease in the level of proliferation suppression and a decrease in the mass of cotton balls were observed when measuring the mass of granulation-fibrous tissue: they were 86.5±9.70 20 mg in the control, 28 mg of the food additive "AS-Sultan" / kg was 55.8±7.4 mg. The low-dose food additive "AS-Sultan" in the form of a Glycerol complex when using doses of 0.5 mg/kg compared to the control was higher in the studied doses. At the same time, the indicators of a decrease in the mass of exudative and granulation-fibrous tissue were in 1.5 or more cases of the control at a statistically significant level.

Table 2

Study of the anti-inflammatory activity of the extract of the drug "AS-Sultan" and Glycerin on the model of "cotton wool granuloma" in rats (M±m; n=6)

Groups	Quantity (mg/kg)	EM, мг	AEF, %	GM, мг	SEP, %
Control	-	346,0±29,4	-	86,5±9,70	-
№1 X1	28	269,1±25,8*	32,6	64,7±5,98	29,0
Control	20	228,0±22,4*	34,1	55,8±7,4*	35,5

Note: * - p < 0.05, ** - p < 0.001 compared to the control.

Thus, the study of the effect of Glycerin on the model of "cotton granuloma" showed that its food additive "AS-Sultan" was effective in all studied doses compared to the extract in conditions of clearly expressed proliferative processes.

Conclusion: The anti-inflammatory activity of the food additive "AS-Sultan" and Glycerin was studied on the model of "cotton granuloma", which allows us to evaluate their anti exudative and antiproliferative action, showing that the drug reduces the level of exudation. The indicator was higher than the control. Based on the experiments, it was proven that the extract of the sample sharply reduces inflammation in the skin of rats.

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