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STUDY OF THE BIOLOGICAL ACTIVITY OF THE DRY EXTRACT OF THE LEAVES OF THE ISABELLA GRAPE VARIETY

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Abstract: This experimental study explores the biological properties of dry grape leaf extract from Vitis vinifera L. 'Isabella.' Extracts from medicinal plants, including grape leaves, often exhibit potent pharmacological effects comparable to conventional drugs. Previous research revealed various compounds in grapevine leaves, suggesting medicinal potential. We focused on evaluating the anti-inflammatory, diuretic, and hemostatic effects of the grape leaf extract in laboratory animals (Wistar rats), comparing it to a sage leaf tincture. Our findings highlighted a significant reduction in exudation (by 21.6%) and proliferation (by 35.9%) compared to the control group. These plant extracts offer therapeutic potential with lower toxicity than synthetic drugs, making them valuable in experimental pharmacology.

Keywords: experiment, cultured grape leaf extract, laboratory animals, diuretic, anti-inflammatory, hemostatic activity.

Introduction. The use of plant-derived medications has gained widespread popularity due to their advantages over synthetic drugs. Plant-based substances offer convenience for long-term treatment of chronic ailments or post-acute recovery, presenting minimal side effects and ease of administration. Despite their slower onset of action compared to synthetic analogs, these medications exhibit stable therapeutic effects with minimal systemic harm when administered appropriately. Medicinal preparations from plants remain integral in the pharmaceutical industry, attracting attention for their potential in long-term pharmacotherapy [1, 2]. Among these, the grapevine stands out, historically employed in treating various conditions from kidney to lung diseases, demonstrating diverse therapeutic properties. Grape-based medications aid in reducing cholesterol, possess expectorant and diuretic properties and are beneficial for anemia, gastrointestinal disorders, and respiratory ailments. Furthermore, grape leaves, containing compounds like quercetin and tannins, hold promise for medicinal applications. Flavonoids, prevalent in these plants, exhibit varied physiological effects, including the enhancement of capillary function and cardiovascular correction [4, 5]. Therefore, investigating the hemostatic potential of aqueous grape leaf extracts becomes an intriguing area of research. Understanding the multifaceted therapeutic potential of plant-based medicines, especially those derived from grapes, holds promise for future pharmaceutical applications.

Research aim: To investigate the effects of dry extract from the leaves of cultivated Vitis vinifera L. "Isabella" on laboratory animals. Conduct experimental research to assess its anti-inflammatory, diuretic, and hemostatic activities compared to the control group of animals and a comparative drug [3**].**

Materials and Methods. A study involving 56 Wistar line laboratory rats (250-270 g) adhered to European animal handling standards. The anti-inflammatory action of a grape leaf extract is aqueous solution was tested on rats using the cotton pellet method to evaluate inflammation phases. Rats in vivarium conditions (23-24°C) underwent surgery, with some groups receiving grape leaf extract or sage infusion while the control received saline. Granulomas formed around inserted cotton balls were weighed after 7 days, assessing the inflammatory and proliferative phases.

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Diuretic and hemostatic activities were also examined. The grape leaf extract was obtained through dispersion in 40% ethyl alcohol, followed by vacuum evaporation and drying at 60-70°C. The extract contained flavonoids (1.55%), tannins (4.7%), phenolic acids (0.94%), carotenoids (3.75 mg/%), and vitamin K (0.13 mg/%). Statistical analysis was performed using BioStat 4.03 with a significance level of $p < 0.05$.

Results and Discussion. Given that grape leaves contain flavonoids known to influence vascular permeability, it was of interest to investigate the effect of a grape leaf extract's aqueous solution on wound hemostasis. The experimental outcomes are presented in Table 1.

Table 1 Influence of the aqueous solution of dry grape leaf extract on the duration of bleeding from a wound in white rats (n=8, M+m)

Solutions	Number of animals	M± m (sec.)
An aqueous solution of dry grape extract (Vitis vinifera L.)	8	20,0 ± 0,8 *
Physiological saline solution (control)	8	32,0 + 0,54

Note: * - reliable with respect to control.

The investigated aqueous solution of dry grape leaf extract significantly reduces bleeding time compared to the control, demonstrating hemostatic properties. When applied to the wound, this solution promoted hemostasis 1.6 times faster than the physiological saline solution. The hemostatic system, governed by neurohumoral mechanisms, plays a pivotal role in this process. These mechanisms regulate blood clotting, preventing blood loss without triggering general intravascular coagulation [10; 11]. Local hemostatic agents offer advantages meeting the requirements for such medications: they promptly stop bleeding, prevent its recurrence, and usually do not cause irritation. Grape leaf infusion has long been used in traditional medicine for inflammation, prompting an investigation into its anti-inflammatory activity in rats. The results of the anti-inflammatory activity study are presented in Table 2.

Table 2. The effect of an aqueous solution of dry grape leaf extract on anti-inflammatoryактивность (n=8, M±m)

solutions	Number of animals	Exudation (mg)	Proliferation (mg)
Aqueous solution of dry grape extract (Vitis vinifera L.)	8	241,4 ± 5,2 &*	48,8 ± 1,34 & *
Comparison example	8	267,1 ± 3,4 &	57,3 ± 1,31 &
control	8	307,8 ± 3,2	76,2 ± 3,1

Notes: & - $p < 0.05$, the results are reliable relative to the control; * - $p < 0.05$, the results are reliable

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relative to the comparison drug.

The difference in weight between the raw granuloma and the dried one indicated the exudative reaction. The proliferative reaction was assessed by the difference in weight between the dried granuloma and the initial weight of the cotton ball. The study of the influence of the aqueous solution of dry grape leaf extract on the inflammatory process revealed a reduction in the proliferation phase by 14.9% and the exudation phase by 9.7% compared to sage medicinal infusion, and by 35.9% and 21.6% respectively compared to the physiological solution. The experimental work showed that the aqueous solution of Vitis vinifera L. grape extract has anti-inflammatory effects, which are more active compared to sage medicinal infusion. Grape seed decoction is traditionally used as a diuretic in folk medicine. It is known that plants containing flavonoids have diuretic activity by influencing kidney filtration, hence the interest in studying the diuretic activity of the aqueous solution of dry grape leaf extract [12]. The experimental results underwent statistical analysis and are presented in Table 3.

Table 3 Effect of an aqueous solution of dry grape leaf extract on diuresis in white rats (n=8,M +m)

Solutions	Number of animals	M ± m (ml)
An aqueous solution of dry extract of grape leaves (Vitis vinifera L.)	8	5,72 ± 1,3*
0.9% sodium chloride solution (control)	8	2,4 ± 0,3

Примечание: * - достоверно относительно контроля.

The experiment results indicate a high diuretic activity of the aqueous solution of dry grape leaf extract compared to the control. To more accurately assess urine volume, it was recalculated per 100 grams of animal weight. Animals receiving the control solution (0.9% sodium chloride solution) had a diuresis of 0.96 milliliters per 100 grams of weight, while those receiving the aqueous solution of dry grape leaf extract showed a diuresis of 2.3 milliliters per 100 grams of weight. This means that the urine volume collected from animals receiving the grape extract was 2.4 times higher than that of the control group.

Conclusion: Experimental pharmacological studies have demonstrated that the dry extract of Vitis vinifera L. 'Isabella' grape leaves possesses hemostatic, anti-inflammatory, and diuretic effects. This was reflected in the reduction of the exudative and proliferative phases of inflammation. These properties render the grape leaf extract promising for use in modern experimental and clinical pharmacology, suggesting its inclusion in the comprehensive treatment of various conditions.

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