

Assessment of the activity of medicinal plants in the flora of Bashkortostan K.A.
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The estimation of activities of the medicinal plants of Bashkortostan flora
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RESUME

The article provides information on the study of anti-inflammatory activity of some wild plants and introduced in the Republic of Bashkortostan in screening model of formalin paw edema in mice. Species, which have a more pronounced anti-inflammatory effect were selected: among four species of thyme - thyme Marschallianus, among Monardae species - Monarda fistulosa. A comparative evaluation of the antioxidant activity of species of thyme, Monarda, different raw materials of burnet and creeping thistle was done, species exhibiting the highest antioxidant effect were identified.

Keywords: Thyme, Monardae, Sanguisorba officinalis, Cirsium arvense, anti-inflammatory activity, antioxidant activity, Republic of Bashkortostan.

SUMMARY

The article provides information on the study of the anti-inflammatory activity of some wild plants and those introduced in the Republic of Bashkortostan on a screening model of formalin edema of the paw in mice and highlights plant species that have a more pronounced anti-inflammatory effect: among the four types of thyme, this is Marshall's thyme, among the species of monarda - tubular monarda ... A comparative assessment of the antioxidant activity of the species of thyme, monarda, different types of raw materials of the common burnet and thistle was carried out, and the species showing the greatest antioxidant effect were identified.

Key words: thyme species, monarda, medicinal burnet, thistle field, anti-inflammatory activity, antioxidant activity, Republic of Bashkortostan.

One of the most important tasks of pharmaceutical science is to expand the range of effective and safe herbal medicines. The therapeutic value of medicinal plants is determined by their constituent biologically active substances, which include all substances capable of influencing biological processes in the human body. Additional studies of studied and widely used medicinal plants are of interest, since sometimes they allow revealing a new aspect of their biological activity. Currently, there are a large number of anti-inflammatory drugs, however, their use is accompanied by the emergence of serious undesirable effects on the part of the blood and gastrointestinal tract [3]. The problems of oxidative stress regulation and the search for biologically active substances with antioxidant activity are also in the focus of researchers. Therefore, the urgent task of pharmaceutical science is to find

new and more detailed study of already known medicinal plants with low toxicity, mild action, the possibility of using for the prevention and treatment of many diseases. We were interested in a comparative study of some species of medicinal plants growing wild and introduced in the conditions of the Republic of Bashkortostan.

The aim of the study was a comparative study of the anti-inflammatory and antioxidant activity of water extracts of some plant species, growing wild and introduced in the Republic of Bashkortostan.

Materials and research methods

The objects of the study were samples of various raw materials of some wild plants of the Republic of Bashkortostan: Marshall thyme (*Thymus Marschallianus*), creeping thyme (*Th. Serpyllum*), Taliev thyme (*Th. Talievi*), Bashkir thyme (*Th. Bashkiriensis*); medicinal burnet (*Sanquisorba officinalis*), field thistle (*Cirsium arvense*), as well as four types of monarda introduced in the Botanical Garden-Institute of the Ufa Scientific Center of the Russian Academy of Sciences: tubular m. (*Monarda fistulosa*), m. double (*M. didyma*), m. hybrid (*M. hybrida*), m. lemon (*M. citriodora*). The raw materials were collected in different phases of plant vegetation, dried, and the anti-inflammatory and antioxidant activity of aqueous extracts was determined. Infusions from plants were prepared in accordance with the requirements of the GF-XI edition in a ratio of 1: 10 taking into account the coefficient of water absorption from raw materials sifted through a sieve with a hole diameter of 5 mm. The extract was prepared in a boiling water bath in the infusion mode: 15 min. heated and 45 min. cooled at room temperature, then filtered [2]. Anti-inflammatory activity was determined on white outbred male mice weighing 18-24 g. The experimental animals were kept in vivarium conditions (with natural lighting; at a temperature of 22-24 ° C; relative humidity 40-50%) and free access to water and food. Before the experiment, the animals were quarantined for 10-14 days. Then the animals were injected intragastrically using a special probe infusions of various types of plants, at a dose of 0.08 ml in a preventive mode, a course for 7 days. The control group received water. Diclofenac sodium at a dose of 10 mg / kg was used as a reference drug. On the last day, an hour after the infusion was administered, a phlogogen was introduced. Acute inflammation was induced by subplantar injection of 0.05 ml of 1% formalin solution under the plantar aponeurosis of the mouse right paw. This caused an edema of the paws that developed over time [5, 6]. Statistical data processing was performed using the Statistica 710 (Stat Soft, USA) and Exel 2003 (MS office 2003, USA) software packages. The description of the obtained samples was carried out by the median and by the upper and lower quartiles. To compare the groups, the statistical Mann-Whitney test was used ($p < 0.05$) [1]. Antioxidant activity of aqueous extracts was determined by the method of registration of chemiluminescence on the device "Chemilumimer KHLM-003" in a system that simulates the production of reactive oxygen species (ROS) [4].

Results and discussion

The results of a comparative study of the anti-inflammatory activity of four types of thyme growing in the Republic of Bashkortostan (creeping thyme (*Thymus serpyllum* L.), Marshall thyme (*Th. Marschallianus* Willd), Taliev thyme (*Th. Talievii* Klok. Et Schost.) *Th. Baschkiriensis* Klok. Et. Schost.) And four species of monarda (m. Tubular (*Monarda fistulosa*), m. Double (*M. didyma*), m. Hybrid (*M. hybrida*), m. Lemon (*M. citriodora*), introduced into

conditions of the Republic of Bashkortostan are presented in table. one.

Table 1

Anti-inflammatory activity of water infusions of plants

No.	Study group	n (number of live)	Weight gain of the foot, mg Me [25%; 75%]
one	Control	6	85.0 [82.0-88.0]
2	Diclofenac sodium	4	72.0 [68.0-82.0]
3	Creeping thyme	6	78.0 [70.0-86.0]
4	Timyan Talieva	6	60.0 [52.0-70.0] *
5	Control	6	90.0 [70.0-96.0]
6	Bashkir thyme	6	83.0 [80.0-90.0]
7	Marshall thyme	5	61.0 [41.0-70.0] *
eight	Control	6	92.5 [92.0-94.0]
9	Tubular monard	6	77.5 [70.0-86.0] *
10	Monarda lemon	6	84 [76.0-90.0] *
eleven	Double monard	6	89.5 [81.0-100]
12	Monarda hybrid	6	68.5 [66.0-73.0] *

Note: * - the differences are significant compared with the control group according to the Mann-Whitney test ($p < 0.05$).

Analyzing the results obtained, it can be noted that all tested aqueous extracts of thyme and monarda herb when administered intragastrically have anti-inflammatory activity (Table 1). The greatest activity was shown by aqueous infusions of the herb Taliev thyme, Marshall thyme, the introduction of which significantly reduced the edema of the paws in mice by 29.4% and 32.2%, respectively, in comparison with the control group. Among the types of monarda, infusions of tubular monarda and hybrid monarda showed more pronounced anti-inflammatory activity, significantly reducing paw edema by 16.2% and 12.3%, respectively.

The antioxidant activity of medicinal plants is associated with the content of certain groups of biologically active substances (carotenoids, ascorbic acid, organic acids, flavonoids), which prevent the formation of reactive oxygen species and, therefore, provide antioxidant protection. The main most informative characteristics of chemiluminescence were the luminescence sum, determined from the radiation intensity, and the maximum luminescence amplitude. Model systems without the addition of aqueous extracts served as control. The results of the study are presented in table. 2.

table 2

Influence of waterx extracts on the processes of ROS generation in the model system subject

No.	Test samples	CL in the ROS model,%
one	Control	one hundred
2	Marshall thyme herb	2.33 ± 0.11
3	Bashkir thyme herb	8.01 ± 0.39
4	Thyme Taliev herb	13.83 ± 1.19
5	Creeping thyme herb	10.22 ± 0.66
6	Monarda tubular herb	2.85 ± 0.11
7	Monarda double grass	5.67 ± 0.16
eight	Monarda hybrid grass	8.42 ± 0.24
9	Lemon monarda herb	7.96 ± 0.31
10	Field thistle herb	3.15 ± 0.11
eleven	The roots of the thistle of the field	4.78 ± 0.16
12	Burnet grass	6.51 ± 0.18
thirteen	Rhizomes with burnet roots	2.20 ± 0.11

The obtained research data indicate a significant inhibitory effect of the studied samples on the kinetics of free radical oxidation in the ROS system. The greatest antioxidant effect in this system among the thyme species was shown by an infusion of the herb Marshall thyme, from the types of monarda - an infusion of monarda tubular; also pronounced antioxidant properties in the system of ROS generation were shown by water extracts from rhizomes with roots of the bloodworm and herb of the field thistle.

Conclusions:

1. Studied the anti-inflammatory activity of water infusions of plants from the flora Bashkortostan and it was found that water infusions of Taliev thyme and Marshall thyme, as well as infusions of tubular monarda and hybrid monarda, reliably reduce paw edema in mice.

2. Studied the antioxidant activity of some medicinal plants, wild-growing and introduced in the conditions of the Republic of Bashkortostan, by the method of registration of chemiluminescence, the species exhibiting the most pronounced activity were established - these are Marshall's thyme, tubular monarda, rhizomes with roots of burnet and grass of the field thistle.

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