Comparative assessment of gastroprotective properties 16 species of the genus Caragana Lam.

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Comparative estimation of gastroprotective properties of 16 species of Caragana Lam. genus

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SUMMARY

Based on the data of Chinese, Tibetan traditional medicine (its Mongolian branch), decoctions (1:10) of the aerial parts of 16 species of Karagana were chosen as the object of research. They were injected inside 7 days before the injury. We used original methods of erosive damage to the gastric mucosa in mice with the introduction of reserpine or with immobilization with cooling. Erosion of the gastric mucosa was graded in size in order to detect even a weak protective effect of the drug. Decoctions of all 16 types of Karagana showed a gastroprotective effect from weak to strong, which indicates their ability to increase the resistance of stomach tissues to alteration, to exhibit stress-limiting properties. The expediency of using caragana species in herbal medicine of traditional medicine has been confirmed.

Key words: traditional medicine, types of Karagana, herbal medicine, gastroprotective, antidestructive, stress-limiting action.

RESUME

On the ground of information of chineese and tibetan traditional medecine, its Mongolian branch, the objects of research were decoctions (1:10) of aboveground parts of 16 caragana species. Decoctions were injected to experimental mice for 7 days untill the alterative effect. Original methods of erosive damage to the gastric mucous were used, by introduction of reserpine or by immobilization with cooling. Erosion of the gastric mucosa were graded by size to discover even weak protective effect of the drug. All 16 caragana spicies showed gastroprotective effect from weak to strong. It may evidence about its ability to increase the resistance of stomach tissues to alteration, demonstrate stress-limiting properties. Expediency of application of caragan in phytotherapy in traditional medicine was confirmed.

Keywords: traditional medicines, Caragana Lam. species, phytotherapy, gastroprotective, antidestructive, stress-limiting action.

INTRODUCTION

The development of methods, an arsenal of traditional and traditional medicine has been recognized by the World Health Organization (WHO) as one of the priority directions of the development of medicine in the 21st century [10, 20, 34]. A large group of medicinal plants used in Tibetan and Chinese traditional medicine, growing in Russia, but not used in scientific European medicine, belongs to the legume family (Fabaceae, Leguminosae), genus Caragana Lam. One of the Karagana species is well known to everyone, since it is often planted in cities for decorative purposes and is called yellow acacia (C. arborescens). Its roots, according to the Mongolian treatise of the 19th century. "Dzeitskhar-Migzhan" [8], is prescribed for those diseases that are interpreted as sepsis and purulent-inflammatory diseases of soft tissues, muscles ("heat of blood vessels and heat of meat"). In the Mongolian branch of Tibetan traditional medicine, several types of caragana are known and used [18]: C. opulens Kom., C. versicolor Bench., C. chamlagu Lam., C. microphylla Lam., C. leucophloea Pojark .. C. arborescens Lam. ... as anti-inflammatory, anti-febrile, secretolytic, vasoprotective, tonic, nutritional (anabolic), gastric remedies. The third volume of the reference book "Plant Resources of the USSR" [17] contains very scanty data on the chemical composition and some information on the growth of 37 species of Karagana on the territory of the former USSR and on the use of only 10 species in folk and traditional medicine, unsupported by experimental and clinical studies. , which indicates the lack of study of plants versicolor Bench., C. chamlagu Lam., C. microphylla Lam., C. leucophloea Pojark .. C. arborescens Lam. as anti-inflammatory, anti-febrile, secretolytic, vasoprotective, tonic, nutritional (anabolic), gastric remedies. The third volume of the reference book "Plant Resources of the USSR" [17] contains very scanty data on the chemical composition and some information on the growth of 37 species of Karagana on the territory of the former USSR and on the use of only 10 species in folk and traditional medicine, unsupported by experimental and clinical studies. , which indicates the lack of study of plants versicolor Bench., C. chamlagu Lam., C. microphylla Lam., C. leucophloea Pojark .. C. arborescens Lam. as anti-inflammatory, anti-febrile, secretolytic, vasoprotective, tonic, nutritional (anabolic), gastric remedies. The third volume of the reference book "Plant Resources of the USSR" [17] contains very scanty data on the chemical composition and some information on the growth of 37 species of Karagana on the territory of the former USSR and on the use of only 10 species in folk and traditional medicine, unsupported by experimental and clinical studies. , which indicates the lack of study of plants nutritional (anabolic), gastric remedies. The third volume of the reference book "Plant Resources of the USSR" [17] contains very scanty data on the chemical composition and some information on the growth of 37 species of Karagana on the territory of the former USSR and on the use of only 10 species in folk and traditional medicine, unsupported by experimental and clinical studies. , which indicates the lack of study of plants nutritional (anabolic), gastric remedies. The third volume of the reference book "Plant Resources of the USSR" [17] contains very scanty data on the chemical composition and some information on the growth of 37 species of Karagana on the territory of the former USSR and on the use of only 10 species in folk and traditional medicine, unsupported by experimental and clinical studies. , which indicates the lack of study of plants

of this kind.

In Tibetan medicine, K. maned C. jubata (Pall) Poir. was prescribed "for diseases of the liver, kidneys, spleen." It “melts frozen blood, heals the heat of the blood” [23], and in effect is equated to red sandalwood. It has the names "Tibetan sandalwood", "thorny tree", and in connection with its manedness - "camel's tail". Sandalwood red, in turn, is indicated for "all types of heat", "heals the excitement of blood and wind" and "destroys swelling of the extremities." C. maned, red sandalwood, skullcap, myrobolan emblicus, sage, Saussurea costus "are included in the group of drugs that cure blood diseases" [21, 22]. K. dwarf treats "heat of meat and heat of blood vessels", "induces vomiting", "collects scattered diseases" [2, 7, 21-23]. Beans of K. small-leaved "draw bile through the mouth"; cause vomiting of bile. She is with species of sorrel, thistle, mustard, bird mountaineer, calamus marsh is included in the group of emetics, which are widely used in Tibetan medicine as "evacuators and purifiers", in particular for poisoning. In the Atlas of Tibetan Medicine (sheet 27, fig. 46), created as an illustration to "Blue beryl", there is an image of K. dwarf [1, 36]. Valuable information about the fortifying effect of Karagan, their ability to prevent infectious diseases "mkhris", "prolong life" [8, 21, 22]. The food use of the fruits of the Caragana species, their nutritional value testify to the non-toxicity of these representatives of the Legume family. Of the most significant indications for the use of caragana species, metabolic diseases (atherosclerosis, diabetes mellitus, gout), hypertension, numerous inflammatory diseases of various localization, liver diseases should be distinguished, organs of the gastrointestinal tract, in particular a typical psychosomatic disease - peptic ulcer. Without setting the task of detailed information on the therapeutic use of Karagana species, we note that in traditional medicine in China and Tibet they have been used steadily for more than 1000 years [21, 22], which contrasts sharply with their absence in scientific European medicine, in medical practice. Therefore, the purpose of this work is the primary comparative assessment of the gastroprotective, in fact, antidestructive activity of 16 caragana species by the screening methods developed by us. From the point of view of resources, it was most rational to compare the pharmacological properties of the aerial parts of the Karagana species. Without setting the task of detailed information on the therapeutic use of Karagana species, we note that in traditional medicine in China and Tibet they have been used steadily for more than 1000 years [21, 22], which contrasts sharply with their absence in scientific European medicine, in medical practice. Therefore, the purpose of this work is the primary comparative assessment of the gastroprotective, in fact, antidestructive activity of 16 caragana species by the screening methods developed by us. From the point of view of resources, it was most rational to compare the pharmacological properties of the aerial parts of the Karagana species. Without setting the task of detailed information on the therapeutic use of Karagana species, we note that in traditional medicine in China and Tibet they have been used steadily for more than 1000 years [21, 22], which contrasts sharply with their absence in scientific European medicine, in medical practice. Therefore, the purpose of this work is the primary comparative assessment of the gastroprotective, in fact, antidestructive activity of 16 caragana species by the screening methods developed by us. From a resource point of view, it was most rational to compare the pharmacological properties of the aerial parts of the Karagana species. Therefore, the purpose of this work is the primary comparative assessment of the gastroprotective, in fact, antidestructive activity of 16 caragana species by the screening methods developed by us. From the point of view of resources, it was most rational to compare the pharmacological properties of the aerial parts of the Karagana species. Therefore, the purpose of this work is the primary comparative assessment of the gastroprotective, in fact, antidestructive activity of 16 caragana species by the screening methods developed by us. From a resource point of view, it was most rational to compare the pharmacological properties of the aerial parts of the Karagana species.

MATERIAL AND RESEARCH METHODS

The employees of the Department of HCFC Pharmacognosy for experimental study in different regions collected aerial parts (conditionally - shoots) of 16 caragana species: 1) K. Altai C. altaica ((Kom.) Pojark. (Flowering), 2) K. orange C. aurantioca Koechne (flowering), 3) K arborescent C. arborescens Lam. (flowering), 4) K. bush C. frutex (L.) C. Koch. (fruiting) sample 1 - Kazakhstan, sample 2 - Moldova, 5) K. maned C. jubata (Pall.) Poir (fruiting), 6) K. Kirghiz C. kirghisorum Poir. (fruiting), 7) K. beautiful C. lacta Kom. (fruiting), 8) K. white-brown C. leucophloea Pojark. (flowering), 9) K. small-leaved C. microphylla Pesehk. (fruiting), 10) K. Buryat C. buriatica Yacovl. (fruiting), 11) K. multifoliate (fruiting), 12) K. frosty C. pruinosa Kom. (flowering - fruiting), 13) K. undersized C. pumila Pojark (flowering), 14) K. dwarf C. pigmaea (L.) DC. (flowering) 15) K. prickly C. spinosa (L.) DC. (flowering), 16) K. narrow-leaved C. stenophylla Pojark. (bloom). Leaves and leafy shoots were used as research material. Broths 1:10 oversight. parts were prepared daily according to the State Pharmacopoeia, administered to mice in the stomach through a tube at 0.5 ml / 10 g (5 g / kg in terms of dry raw materials) preventively 7 days before the damaging effect.

The destruction of the stomach in mice was caused by original methods developed by us [3]. One of the general universal mechanisms of destruction of the gastric mucosa is the depletion of the depot of catecholamines in the sympathetic terminals [9] with impaired adaptive-trophic function of the sympathetic nervous system [14]. A specific drug with just such a mechanism of action, providing a hypotensive, and as a complication - an erosive, ulcerogenic effect, is reserpine. Its solution at a dose of 3 mg / kg was administered to mice intraperitoneally after a week of preventive administration of Karagan infusions. During the first 2 hours, the mice were cooled at + 7 ° C, and then kept at the vivarium temperature (+ 18 ° C). The second method was to achieve the stage of stress depletion in mice by immobilizing them in cramped special metal houses for 18 hours. As in the case of reserpinization of mice, it was necessary to supplement with 2 hours of refrigeration to ensure the formation of destruction in all mice in the control. The destruction formed when using these methods does not penetrate the muscle layer, affecting only the mucous membrane. G. Selye [19] included not only hypertrophy of the adrenal glands and melting of the thymic-lymphatic apparatus, but also the formation of gastric erosions in the triad of the stage of depletion of stress. Therefore, the ability of phytopreparations to reduce the number of gastric erosions during the immobilization of animals is more correct

interpreted as an antidestructive, stress-limiting activity, and not an antiulcer effect, directly indicating the use only for peptic ulcer disease. The use of mice, not rats, makes it possible to simultaneously include a large number of animals in the experiment, to give a comparative assessment of the antidestructive activity of many herbal remedies and to choose the most effective ones, which is the meaning of the methods we have developed. The control group of mice was injected through a tube into the stomach in the same volume of water for 7 days. At night, before the experiments, the animals were deprived of food with free access to water. Erosion of the mucous membrane is not formed in all well-fed mice with full stomachs.

After 18 h, under a binocular magnifying glass, the erosion of the stomach was counted, which is facilitated by natural staining, the content of black hematin hydrochloric acid in them. It is inappropriate to operate only with the total amount of erosion. They were subdivided into small (less than 0.5 mm), medium (0.5–1 mm) and large (more than 1 mm), considering that an increase in the number of small destructions due to a significant decrease in medium and large is already an indicator of the protective effect of the phytopreparation. We have worked out and repeatedly used a system for assessing antidestructive activity by points [3] with statistical processing of a number of indicators (see Tables 1, 2) according to the Fisher-Student's t and -2 criteria. The change in the percentage of small, medium, large erosions was estimated at 1, 2, 3 points, the decrease in the average number of small, medium, bumpy erosion, in total of all erosion - at 4.5, 6, 7 points, an increase in the number of mice without them, respectively, in 8, 9, 10, 11 points. Complete protection against mucosal destruction is taken as 100% - 66 points. Such a calculation is necessary in order not to miss even a minimal, but statistically significant protective effect (Table 3), but also to grade it into a strong (≥ 33 points, 50%), distinct (21–33 points, 31–50%) , moderate (14–20 points, 21–30%), weak (1–13 points, <20%).

RESULTS OF STUDIES

Given in table. 1 and 3, data on the change in the severity of destruction of the gastric mucosa in reserpinized mice allow us to note that of 17 samples, only a decoction of K. multifoliate did not have a protective effect. Decoctions of 16 samples are effective, which correlates with our earlier data on the wide representation of gastroprotective properties in medicinal plants [3]. There are no species whose decoctions were weak, and, therefore, doubtfully active. Moderate activity was recorded in decoctions of 2 types: K. narrow-leaved and K. maned, distinct - in 9 species and strong - in 5 species, which, in decreasing activity, can be arranged in the following row: K shrub (Kazakhstan)> K. prickly> K. beautiful = K. Altai> K. orange. A decoction of K. shrub reduced the average amount of each species and all destructions, as well as the number of animals with gastric erosions. K. shrub is introduced as an ornamental plant. It is significant that another sample of it (Moldavia) had a distinct anti-destructive effect. A decoction of K. treelike (yellow acacia), the most common mainly in plantings, showed distinct activity, which does not remove the question of the predominant use of this species in connection with more reliable resources.

In studying the effect of drugs on the trophism of stomach tissues, the overwhelming majority of authors limit themselves to one method [9]. The study of the antidestructive activity of phytopreparations not on one, but at least on 2 experimental models (taking into account the number of samples, the scale of research) is important that by comparing the protective effect during screening, the most active, most promising species can be identified as for further more in-depth study, and for the perspective of implementation in the clinic. Moreover, the correct interpretation of the results obtained according to a specific method allows making not narrowly craft conclusions (use only for stomach diseases), but more correct generalizations, for example, about stress-limiting activity, the ability to prolong the adaptive-trophic, antidestructive function of the sympathetic nervous system. Analysis of the protective activity of phytopreparations under immobilization stress allows one to register the presence of such in decoctions of all types of Caragana, however, 4 species (K. white-brown, K. treelike, K. shrub, K. orange) had a weak effect, changing only one indicator of erosive lesions of the gastric mucosa. A moderate effect, close to a distinct one, was shown by decoctions of K. prickly, K. Buryat, K. narrow-leaved, and a distinct - 8 species (see Tables 2, 3). Finally, only 2 species (K. Kirgizov, K. beautiful) had a strong protective effect. had a weak effect, changing only one indicator of erosive damage to the gastric mucosa. A moderate effect, close to a distinct one, was shown by decoctions of K. prickly, K. Buryat, K. narrow-leaved, and a distinct - 8 species (see Tables 2, 3). Finally, only 2 species (K. Kirgizov, K. beautiful) had a strong protective effect. had a weak effect, changing only one indicator of erosive damage to the gastric mucosa. A moderate effect, close to a distinct one, was shown by decoctions of K. prickly, K. Buryat, K. narrow-leaved, and a distinct - 8 species (see Tables 2, 3). Finally, only 2 species (K. Kirgizov, K. beautiful) had a strong protective effect.

Table 1

Influence of decoctions from aerial parts of plants of the genus Karagan Caragana Lam.
on gastric alteration in reserpinized mice

Group of animals, number	Indicator	Destruction			
		small	average	large	Total
one	2	3	4	5	6
Control n = 37	I II III	5.59 ± 1.11 64.5 0	2.22 ± 0.74 25.5 4	0.87 ± 0.37 10.0 nineteen	8.68 ± 1.39 one hundred 0
Mice receiving caragan decoctions:					
K. Altai C. altaica (Kom.) Pojark. n = 24	I II III	1.67 ± 0.66 * 57.1 9*	0.87 ± 0.44 * 30.0 12*	0.58 ± 0.38 12.9 17	2.92 ± 0.88 * one hundred 7 *
because the white-haired C. leucophloea Pojark. n = 28	I II III	2.57 ± 0.88 * 59.5 5*	1.22 ± 0.39 * 28.1 eleven*	0.53 ± 0.39 12.4 eighteen	4.32 ± 1.17 * one hundred 3
K. Buryat C. buriatica Yakovl. n = 23	I II III	2.09 ± 1.14 * 53.9 4*	1.09 ± 0.45 * 28.1 10*	0.70 ± 0.34 18.0 eleven	3.88 ± 0.91 one hundred 3
because the maned C. jubata (Pall.) Poir.n = 27	I II III	3.44 ± 1.31 * 61.2 6 *	1.63 ± 0.50 28.9 eight*	0.56 ± 0.30 9.9 sixteen	5.63 ± 1.31 * one hundred 4*
to. tree-like C. arborescens Lam. n = 29	I II III	3.90 ± 0.76 * 68.9 2	1.24 ± 0.47 * 22.0 eleven*	0.52 ± 0.38 9.1 twenty	5.66 ± 1.23 * one hundred one
to. frosty C. pruinosa Kom. n = 27	I II III	2.41 ± 0.90 * 58.0 7 *	1.11 ± 0.40 * 26.8 eleven*	0.63 ± 0.30 15.2 15	4.15 ± 1.10 * one hundred 5
to. dwarf C. pigmaea (L.) DC.n = 21	I II III	3.91 ± 1.11 * 67.2 5*	1.19 ± 0.37 * 20.5 7 *	0.71 ± 0.24 12.3 eight	5.81 ± 1.48 * one hundred 3
K. Kirghiz C. kirghisorum Pojark. n = 24	I II III	2.33 ± 1.10 * 57.1 6 *	1.08 ± 0.44 * 26.5 7	0.67 ± 0.44 * 16.4 thirteen	4.08 ± 1.43 * one hundred 2
to. barbed C. spinosa (L.) DC.n = 25	I II III	1.88 ± 0.85 * 67.1 eleven*	0.64 ± 0.32 * 22.9 12*	0.28 ± 0.10 * 10.0 eighteen	2.80 ± 0.85 * one hundred 6
to. beautiful C. laeta Kom. n = 24	I II III	3.17 ± 0.99 * 60.8 6 *	1.17 ± 0.55 * 22.4 9*	0.88 ± 0.55 16.8 14	5.22 ± 1.88 * one hundred 4*
to. shrub C. frutex (L.) C. Koch. (sample I) n = 25	I II III	3.04 ± 1.17 * 76.8 eight*	0.80 ± 0.32 * 20.2 12*	0.12 ± 0.10 * 3.0 22 *	3.96 ± 1.28 * one hundred 5*
to. shrub C. frutex (L.) C. Koch. (sample II) n = 27	I II III	2.74 ± 1.00 * 59.7 5*	1.19 ± 0.50 * 25.8 thirteen-	0.67 ± 0.30 14.5 sixteen	4.60 ± 1.00 * one hundred one
because small-leaved C. microphylla Pesehk. n = 29	I II III	4.07 ± 1.33 74.7 4	1.03 ± 0.47 * 19.0 14*	0.35 ± 0.19 6.3 twenty	5.46 ± 1.42 * one hundred 3

to. multi-leaved C. pleiophylla (Regel) Pojark. n = 27	I II III	5.15 ± 0.90 70.2 0	1.59 ± 0.50 21.7 eight	0.59 ± 0.40 8.1 17	7.33 ± 1.20 one hundred 0
to. undersized C. pumila Pojark. n = 25	I II III	2.96 ± 0.64 * 57.4 5-	1.24 ± 0.42 * 24.0 eight	0.96 ± 0.53 18.6 12	5.16 ± 1.07 * one hundred 4
because orange C. aurantiaca Koechne n = 24	I II III	2.33 ± 0.66 * 56.6 5*	1.17 ± 0.44 * 28.3 7	0.63 ± 0.44 15.1 14	4.13 ± 1.32 * one hundred 4-
to. narrow-leaved C. stenophylla Pojark. n = 30	I II III	3.80 ± 1.02 * 61.6 one	1.63 ± 0.46 26.5 10-	0.73 ± 0.27 11.9 eighteen	6.16 ± 1.11 * one hundred one

Note

Vertical indicators: I - the average number of destruction per animal in the group $\overline{X}$ - S $\cdot\overline{X}$; II - percentage of the total number of destructions; III - the number of animals without destruction; * - differences are significant (p≤ 0.05).

table 2

Influence of decoctions from aerial parts of plants of the Caragana Lam genus.
on gastric alteration in immobilized mice

Group of animals, number	Indicator	Destruction			
		small	average	large	Total
one	2	3	4	5	6
Control n = 30	I II III	5.20 ± 1.48 64.2 3	1.70 ± 0.37 21.0 7	1.20 ± 0.55 14.8 thirteen	8.10 ± 1.85 one hundred 0
Mice receiving caragan decoctions:					
K. Buryat n = 26	I II III	2.81 ± 0.83 * 64.0 5	1.15 ± 0.41 26.3 10*	0.42 ± 0.20 * 9.7 15	4.38 ± 1.14 * one hundred 2
because the maned n = 32	I II III	4.22 ± 1.11 75.0 4	1.00 ± 0.46 * 17.8 sixteen*	0.40 ± 0.18 * 7.2 21	5.63 ± 1.31 * one hundred 2
to. tree-like n = 27	I II III	4.19 ± 1.41 * 69.8 6	1.30 ± 0.50 21.6 eight	0.51 ± 0.40 * 8.6 17	6.00 ± 1.20 one hundred 3
to. frosty n = 24	I II III	3.08 ± 0.99 * 59.2 6	1.54 ± 0.66 29.6 10	0.58 ± 0.33 11.2 17	5.20 ± 1.32 * one hundred 5*
to. barbed n = 28	I II III	2.86 ± 1.07 * 59.7 4	1.28 ± 0.39 26.9 3	0.64 ± 0.29 * 13.4 sixteen	4.78 ± 1.56 * one hundred one
because small-leaved n = 24	I II III	2.17 ± 0.66 * 52.6 5	1.38 ± 0.66 33.3 10	0.58 ± 0.33 * 14.1 eighteen*	5.46 ± 1.42 * one hundred 4
to. multi-leaved n = 29	I II III	3.24 ± 1.52 70.2 3	0.90 ± 0.38 * 11.4 sixteen*	0.48 ± 0.57 10.4 twenty	4.62 ± 1.62 * one hundred 3

Control n = 38	I II III	4.16 ± 1.02 66.5 5	1.21 ± 0.55 19.3 15	0.89 ± 0.37 11.2 nineteen	6.26 ± 1.76 one hundred 2
K. Altai n = 23	I II III	2.04 ± 0.91 * 58.8 9	1.00 ± 0.57 28.8 10	0.43 ± 0.22 * 12.4 17	3.47 ± 1.37 * one hundred 5
because the white-haired n = 27	I II III	3.00 ± 1.00 59.7 eight	1.44 ± 0.60 28.6 thirteen	0.59 ± 0.30 11.7 sixteen	5.03 ± 1.81 one hundred 7 *
to. dwarf n = 25	I II III	2.84 ± 1.28 66.4 10*	1.12 ± 0.75 26.2 12	0.32 ± 0.32 * 7.4 twenty*	4.28 ± 1.50 one hundred 6
K. Kirghiz n = 21	I II III	1.67 ± 1.11 * 67.3 eleven*	0.62 ± 0.49 * 25.0 14	0.19 ± 0.24 * 7,7 eighteen	2.48 ± 1.60 * one hundred 7 *
to. beautiful n = 23	I II III	1.83 ± 0.68 * 62.7 10*	0.83 ± 0.34 28.4 thirteen	0.26 ± 0.22 * 8.9 nineteen*	2.92 ± 1.14 * one hundred 7 *
to. shrub (sample I) n = 28	I II III	2.78 ± 0.78 * 69.5 9*	0.79 ± 0.39 19.8 sixteen	0.43 ± 0.28 10.7 23 *	4.00 ± 1.86 one hundred eight*
to. shrub (sample II) n = 31	I II III	3.13 ± 0.63 * 57.9 10	1.51 ± 0.65 27.9 thirteen*	0.77 ± 0.37 14.2 14	5.42 ± 1.57 one hundred 6
to. undersized n = 31	I II III	1.87 ± 0.65 * 49.2 14*	1.19 ± 0.46 31.3 15	0.74 ± 0.37 19.5 twenty	3.80 ± 1.39 * one hundred 10*
because orange n = 30	I II III	3.03 ± 0.92 68.9 9	0.83 ± 0.47 18.9 17	0.53 ± 0.27 12.2 twenty	4.40 ± 1.48 one hundred 9
to. narrow-leaved n = 29	I II III	2.38 ± 0.57 * 68.4 6	0.62 ± 0.28 * 17.8 17	0.48 ± 0.57 13.8 21	3.48 ± 1.04 * one hundred 4

Vertical indicators: I - the average number of destruction per animal in the group $\overline{X}$ - S $\cdot\overline{X}$; II - percentage of the total number of destructions; III - the number of animals without destruction; * - differences are significant (p≤ 0.05).

The total assessment of the antidestructive activity of decoctions of 17 samples of the aboveground part of Karagan is presented in the summarizing table. 3. A somewhat unexpected result is the presence of such activity, more or less pronounced, but statistically significant in all species. The results obtained earlier made it possible to register gastroprotective activity in 123 out of 203 studied herbal preparations, i.e. in 60.6%. At the same time, only 27 natural compounds out of 81 (33%) were active [3, 4]. The differences between the presence of gastroprotective properties in herbal preparations and natural compounds (flavonoids, catechins, phenolcabonic acids, terpenoids, coumarins) are statistically significant. The widespread gastroprotective properties in galenic forms are also characteristic of the Karagana species. The species-specific comparison of activity on the two models to some extent makes it possible to note the reproducibility of the result regardless of the nature of the damaging effect, which serves as a kind of marker of adaptogenic action. With reserpinization and with immobilization stress, almost all types of Caragana repeated the ability to increase the resistance of the gastric mucosa to alteration. With regard to the most pronounced activity, special attention deserves K. beautiful, which showed a strong protective effect on both models. Paired With regard to the most pronounced activity, special attention deserves K. beautiful, which showed a strong protective effect on both models. Paired With regard to the most pronounced activity, special attention deserves K. beautiful, which showed a strong protective effect on both models. Paired

combinations of strong and distinct activity are noted for K. Altai, K. Kirgiz, K. shrub (sample 1). Also noteworthy are those species that showed pronounced distinct activity on both models: frosty K., dwarf K. small-leaved (the last two types are used in Tibetan medicine), stunted K.. K. maned, popular in traditional medicine, was moderately active during reserpinization and distinctly during immobilization of mice. Treelike, the most promising in terms of resource science, the fruits of which are eaten (no toxicity), was weakly active under immobilization stress, but distinctly - during reserpinization of mice. With all the orientation of the results of screening studies, the least pronounced activity was shown by K. narrow-leaved.

Table 3

Comparative assessment of the protective effect of decoctions from aboveground parts of plants of the genus Karagan on alteration of the gastric mucosa in reserpinized and immobilized mice

Type of caragana	With reserpinization, the assessment of the effect, the protective effect in%	With immobilization, the assessment of the effect, the protective effect in%
K. Altai	strong, 67	distinct, 38
K. white-haired	distinct, 50	weak, 17
K. maned	moderate, 29	distinct, 41
K. treelike	distinct, 38	weak, 9
K. frosty	distinct, 50	distinct, 33
K. dwarf	distinct, 50	distinct, 36
K. Kirgizov	distinct, 36	strong, 70
K. prickly	strong, 76	moderate, 26
K. is beautiful	strong, 67	strong, 70
K. shrub sample 1	strong, 91	distinct, 47
sample 2	distinct, 50	weak, 6
K. small-leaved	distinct, 32	distinct, 41
K. Buryat	distinct, 50	moderate, 26
K multi-leaved	absent, 0	distinct, 32
K. undersized	distinct, 36	distinct, 46
K. orange	strong, 53	weak, 17
K. narrow-leaved	moderate, 30	moderate, 24

Note: the degree of protective effect is calculated according to the sum of the points of this drug, attributed topercentage of the maximum possible total of points with full protection from erosive lesions of the gastric mucosa.

THE DISCUSSION OF THE RESULTS

Evaluation of the significance of the results of these studies, the detection of a wide representation of gastroprotective, anti-destructive properties in Caragana species requires at least a brief review of the state of knowledge of their medicinal properties. In the available literature, we have not found works by domestic authors dedicated to the Karagan. The increased interest of foreign researchers in the Karagana species is manifested in the traditional scheme for the release of active substances, for example, inhibiting neuroinflammatory factors, which is essential in neurodegenerative diseases [35], in particular in multiple sclerosis, Parkinson's disease, senile mental changes, Alzheimer's disease. The representation of antidestructive, antidegenerative properties is higher in galenic forms than in natural compounds, which has been proved by us experimentally [3, 4] and was confirmed by high clinical results in the treatment of extemporal water extracts (teas) from multicomponent collections of patients with destructive brain diseases [5]. Such teas, in contrast to substances, can (and should) be taken for life, for example, with the threat of stroke, recurrence of multiple sclerosis, progressive blue changes. It is the way of isolation from C. sukiensis, identification of cycloartanic triterpenoids and determination of some types of their biological activity (in particular, insecticidal) that was chosen by other authors [32]. progressive bluish changes. It is the way of isolation from C. sukiensis, identification of cycloartanic triterpenoids and determination of some types of their biological activity (in particular, insecticidal) that was chosen by other authors [32]. progressive bluish changes. It is the way of isolation from C. sukiensis, identification of cycloartanic triterpenoids and determination of some types of their biological activity (in particular, insecticidal) that was chosen by other authors [32].

Allocated lectins from K. treelike with the possibility of using them in oncology [28] at

hepatocellular carcinoma of the liver. The same possibilities, based on the data of Tibetan medicine during the screening of medicinal plants, were revealed for an extract from K. tibetan, and the authors consider naringenin to be one of the active substances [34]. The stress-limiting activity of two glutamate decarboxylases from C. intermedia, or rather their identification, is the subject of a study on the resistance of woody plants to heat and other stresses [24]. The protective effect of the amount of caragana flavonoids (species not specified) in hypoxi-reoxygenation has been proven [27] in relation to the cerebral vascular endothelium, i.e. confirmed the vasoprotective activity of flavonoids from one plant, which manifests itself in a specific situation. The extract of K. chinese (C. sinica) has been proposed as a therapy for Alzheimer's disease [29, 33]. Revealing the thrombolytic activity of fragments of the alcohol fraction from K. maned (C. jubata) [26] confirms the data of traditional Tibetan medicine that it “melts frozen blood” [23]. The anti-inflammatory activity of C. pruinosa, which has been used for centuries in traditional medicine, has been confirmed for an alcoholic extract of roots in a model of collagen arthritis in rats [31], found for an extract of K. small-leaved in a number of models [25], for an ethyl acetate fraction from K Tangut C. tangutica [30].

Analysis of indications for the use of tens of thousands of plants [17], including plants of Tibet [1, 2, 7, 8, 18, 21, 22, 23, 36], allows us to reasonably assume the background nature of anti-inflammatory properties for phytopreparations, which is confirmed by the above single studies. Our studies suggest that the ability to limit the stage of not only exudation and proliferation (actually anti-inflammatory effect), but also the stage of alteration is widely represented in the Caragana species. Obviously, a comparative assessment of anti-alterative, anti-destructive properties in a model of gastroprotective action is more significant than confirmation of the obvious fact that plants were at the origins of the emergence of a group of non-steroidal anti-inflammatory drugs (salicylic acid, Salix - willow). Since phytopreparations from almost all plants exhibit antioxidant properties [16], the discovery of such in the acetone extract from the stems of only one species - K. Tibetan [37] only confirms this biologically determined phenomenon. The assessment of the above works, devoted, as a rule, to one medicinal plant and one of its properties, can be questioned from the point of view of their practical significance. For thousands of years, traditional medicine in China, Korea, Japan, India has successfully used combinations of medicinal plants (collections), mainly aqueous extracts from them.

The school of domestic pharmacologists at the first stages revealed that classical phytoadaptogens are capable of determining the state of nonspecifically increased body resistance (SNPS) [12, 13]. Subsequently, this was confirmed for many other medicinal plants and their combinations [3, 4, 6, 15, 16]. This condition is characterized by an increase in the resistance of organs and tissues, and in the whole organism to various damaging influences, limitation of the volume of alteration, which was shown in this work for caragan on two models of experimental gastric erosions. SNPS is characterized by the mobilization of self-defense (for example, antioxidant, antiatherogenic [5]), prolongation of the stage of stress resistance, delaying the stage of exhaustion, manifestation of stress-limiting properties [3], found for all types of Karagana in these studies. It is illogical to look for a substance - the carrier of the effect, which is responsible for the SNPS. Obviously, in addition to structural effects in phytotherapy, it is necessary to take into account signaling and informational mechanisms [6], due to the flow of chemoinformation, hundreds of substances present in complex herbal herbal preparations, especially in extracts from multicomponent collections, which remain the dominant means of traditional medicines.

Since simple dosage forms for the most part exhibit anti-alterative, anti-destructive, stress-limiting, antioxidant, antiphlogistic and other properties that manifest SNPS [3-6, 11, 12, 13, 15, 16], it is logical to focus on their study and application. since, as noted earlier, "herbal teas" can be drunk throughout life, and the use of pure substances, even of natural origin, is fraught with side effects, is less effective, non-physiological and, finally, economically impractical. Analysis of the chemical composition of plants, pharmacological properties and mechanisms of action of natural compounds is undoubtedly a necessary component of the knowledge of the world. However, the analysis is not synonymous with the goals of treatment, the achievement of a high clinical effect in the process of phytotherapy, which should be based on biological laws, determining the interest of plants in preserving the health of animals - their distributors. The use of a natural extractant - water excludes denaturation of the plant by extraction with acetone, ethanol, ethyl acetate, liquid carbon dioxide. Isolation of this or that substance is interesting from a cognitive point of view, but leads away from the path of using effective,

time-tested simple galenic forms from plants and their combinations.

On the example of our comparative studies of the antidestructive properties of decoctions from the Caragana species, one can be convinced of the promise of experimental confirmation of the experience of traditional medicine, the dosage forms used in them, the expediency of forming their arsenal. The results obtained pose a rather specific task for further research: to find out whether the antidestructive effect of decoctions of Karagana species is limited only to the gastric mucosa, or whether it is also manifested in relation to other organs and systems, i.e. significant at the organismic level.

CONCLUSIONS

1. On the model of toxico-dystrophic erosions of the stomach in mice caused by reserpine, 15 of 16 The studied species of Karagana showed, to varying degrees, a pronounced protective, preventive activity, which makes it possible to recommend phytotherapeutic support in the treatment of patients with aggressive medications that cause erosive gastritis, exacerbation of peptic ulcer disease.

2. On the model of erosions of the gastric mucosa in mice, formed in the stage of exhaustion immobilization stress, all types of Karagana showed a protective effect from weak to strong. In this regard, it is advisable to further study the antidestructive, stress-limiting properties of the Karagana species.

3. The results obtained confirm the feasibility of using Karagana species in traditional medicine of Asian countries.

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