Experimental study of the analgesic activity of infusion and water-soluble polysaccharides from the herb Ikotnik gray - Berteroa incana (L.) DC.

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The experimental study of analgetic activity of infusions and water-soluble polysaccharides from Berteroa incana (L.) DC. herb

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RESUME

The article describes the results of the study analgetic activity of the herb of the Berteroa incana (L.) DC. family Brassicaceae on two models: chemical and thermal effect. At comparison with a known analgetic preparation analginum studied infusion and water-soluble polysaccharides authentically render mild analgetic effect.

The experimental study of analgetic activity of infusion and water-soluble polysaccharides of Berteroa incana (L.) DC. has been investigated for the first time.

Keywords: Berteroa incana (L.) DC., Analgetic activity.

SUMMARY

The article presents the results of a study of the analgesic activity of the herb of gray hiccup (Berteroa incana (L.) DC.) Of the cabbage family (Brassicaceae) on two models: chemical and thermal exposure. When compared with the known pain reliever analgin, the studied infusion and water-soluble polysaccharides reliably have a moderate analgesic effect.

An experimental study of the analgesic activity of the infusion and water-soluble polysaccharides from the herb of gray hiccup has been studied for the first time.

Key words: gray hiccups, analgesic activity.

Introduction

According to the International Association for the Study of Pain (IASP), pain is an unpleasant sensation and emotional experience that arises in connection with a present or potential threat of tissue damage [1]. For the pharmacological correction of diseases accompanied by pain, modern medicine uses a different arsenal of drugs. Currently, substances with different chemical structures and mechanisms of action are used as analgesic drugs [2]. However, all synthetic analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) used are known to have significant side effects. For example, analgin and paracetamol interfere with hematopoiesis; aspirin, butadione, ibuprofen, indomethacin and ortofen have ulcerogenic action, causing gastric ulcer [3]. The source of substances with analgesic activity and significantly less pronounced side effects can be medicinal plants, including those that have long been widely used in folk medicine. The species diversity of medicinal plants used historically on the territory of our country in folk medicine exceeds their number for any

European countries and has more than 10 thousand species [4]. In many countries of the world, the experience of traditional medicine is already being used in the development of modern standardized herbal preparations for the prevention and treatment of various diseases [5]. Currently, the analgesic activity has already been proven for a number of medicinal plants of domestic and foreign flora [3, 6, 7, 8].

One of the potential available domestic plant sources of biologically active substances with versatile pharmacological activity is the gray hiccup (Berteroa incana (L.) DC.), A biennial herb of the cabbage family (Brassicaceae) [9, 10]. Ikotnik gray has a significant raw material base: in the flora of Russia, it is distributed in all regions of the European part, in the Caucasus, in Western and Eastern Siberia, in the Far East. It grows in all regions of Russia as a common plant in dry open places, in glades, forest edges, clearings, meadows, rocky slopes, sometimes as a weed in crops and near dwellings [9, 10].

Currently, gray hiccups are used only in folk medicine for diseases of the musculoskeletal system, nervous, reproductive, cardiovascular and digestive systems. This type has long been used for hiccups, headaches, arthritis, wounds, sprains, providing analgesic and anti-inflammatory effects [9, 10]. Since pain is one of the main components of the inflammatory process, it was of interest to study the analgesic activity of the herb, hiccups.

Purpose of work: experimental study of the analgesic activity of the herb gray hiccups.

Objects and research methods

The object of the study was the infusion and water-soluble polysaccharides (WSPP) obtained from the herb of gray hiccup. Medicinal plant raw materials for the production of infusion and WPC were harvested in the Kursk region during the period of mass flowering of plants. An infusion of gray hiccup herb was prepared according to SP XI [11]. VRPS was obtained according to the method described by N.K. Kochetkov [12].

An experimental study was carried out on outbred white mice of both sexes, weighing 20–25 g. The animals were kept under standard conditions in the vivarium of the Kursk State Medical University. The studies were carried out in strict accordance with the rules adopted by the European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes (Strasbourg, 1986) and Order No. 708n of the Ministry of Health and Social Development of Russia “On Approval of Laboratory Practice Rules” [13].

The studied drugs were administered to the animals orally through a tube (infusion in a volume of 0.2 ml and VRS in the form of an aqueous solution at a dose of 100 mg / kg). Analgin (at a dose of 100 mg / kg) was used as a reference drug. The analgesic activity of the common hiccup herb was studied using two models that are traditionally used to determine this type of activity, incl. and in the study of medicinal plants.

1. The model of "vinegar writhing" is aimed at the study of acute visceral and somatically deep pain. A specific pain reaction of "writhing" by the method of chemical irritation of the peritoneum, accompanied by characteristic movements of animals [14], was induced by intraperitoneal injection of 0.75% solution of acetic acid in a dose of 0.2 ml to mice. Under the influence of acid, the pH decreases, which stimulates the formation of kinins with a pronounced pain effect [6]. The studied infusion, VRPS, and the reference drug were administered to the animals for 5 days, the last time - 1 hour before the administration of acetic acid. "Writhing" caused by acetic acid began to be recorded immediately after the injection of the agent for 20 minutes. The effectiveness of the infusion and VSP was assessed by the decrease in the number of "writhing" in comparison with the group of control animals.

2. The hot plate model is the main standard operating room.

a procedure for measuring the threshold of acute pain sensitivity and the potential analgesic effect of the studied drugs in response to thermal irritation. This test is the basis for the study of analgesic activity and is used to identify analgesically active compounds that somatically suppress superficial and acute pain [14]. A painful reaction in mice under local thermal exposure was induced by placing them on a plate heated to 55.0–55.5 ° C, limited by a glass cylinder [2]. The study drugs were administered 45 minutes before the experiment. To assess the analgesic effect, two criteria were chosen: the first - lengthening the latency period for the manifestation of the first signs of pain (licking the paws), the second - inhibition of the pain reaction at the threshold of pain tolerance (jumping to the edge of the cylinder) [14].

Statistical processing of the experimental results was carried out using Student's t-criterion. The results were considered statistically significant when the effect was observed in 95% of cases ($p < 0.05$) [11, 15].

Results and its discussion

The results of an experimental study of the analgesic activity of gray hiccup herb are presented in table. 1 and 2.

From these tables it can be seen that the analgesic activity during chemical irritation (model of "vinegar writhing") manifested itself with the introduction of infusion and VSP in the studied doses, significantly reducing the number of writhings by 31.0% and 17.2%, respectively. Analgin reduced this indicator by 48.8% in comparison with the group of control animals. In case of thermal stimulation (hot plate model), the infusion and VRPS significantly lengthen the latency period for the manifestation of the first signs of pain by 125.8% and 62.9%, respectively, and also inhibit the pain response at the pain tolerance threshold by 458.2% and 72.4%, respectively. The comparison drug, analgin, increased this indicator in the first case by 166.1% and by 673.5% in the second as compared with the control.

Table 1

Influence of the infusion and VDPS of the herb of hikotnik gray on pain sensitivity in mice with chemical irritation (model "vinegar writhing")

A drug	Dose	The number of "cramps"		Reduction of cramps,%
		Absolute (M ± m)	%	
Control	-	33.20 ± 1.05	one hundred	-
Analgin	100 mg / kg	17.00 ± 0.70 *	51.2	48.8
Infusion	0.2 ml	22.90 ± 0.60 *	69.0	31.0
VRPS	100 mg / kg	27.50 ± 0.69 *	82.8	17.2

Note: "*" - the results are statistically significant in comparison with the control ($n = 10$; $P < 0.05$).

table 2

Influence of the infusion and VDPS of the herb of hikotnik gray on pain sensitivity in mice with local thermal irritation (hot plate model)

A drug	Dose	Time lick-niya, sec.	Increase latent period sec.		Time out givaniya, sec.	Increase in latent period	
			Sec.	%		Sec.	%
Control	-	6.20 ± 1.03	-	-	9.8 ± 0.68	-	-
Analgin	100 mg / kg	16.50 ± 1.45 *	10.3	166.1	75.80 ± 2.78 *	66.0	673.5
Infusion	0.2 ml	14.00 ± 1.13 *	7.8	125.8	58.70 ± 2.58 *	48.9	458.2
VRPS	100 mg / kg	10.10 ± 1.40 *	3.9	62.9	16.90 ± 1.22 *	7.1	72.4

Note: "*" - the results are statistically significant in comparison with the control (n = 10; P <0.05).

The results obtained indicate the presence of a gray analgesic effect in the infusion and VRS of hiccup herb. The use of infusion and VRPS as an independent analgesic agent or as a component in complex therapy will expand the range of herbal pain relievers. The analgesic activity of the herb hiccups was studied for the first time.

conclusions

Thus, the results of the experimental studies carried out allowed us to draw the following conclusions:

1. Infusion and RVPS of the herb of gray hiccups reliably reduce the level of pain sensitivity on the model of "vinegar writhing" by 31.0% and 17.2%, respectively. On the “hot plate” model, the infusion and VRSA of gray hiccups significantly lengthen the latent period of manifestation of the first signs of pain by 125.8% and 62.9%, respectively, and also inhibit the pain response at the pain tolerance threshold by 458.2% and 72.4 %, respectively.

2. The results obtained provide a basis for further in-depth research. infusion and VDPS of herb hiccups as potential analgesics.

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