Plants of the genus Arizem - promising sources of medicinal raw materials

V.A. Ermakova, Nguyen Thi Kim Ngan, T.Yu. Kovaleva, N.V. Bobkova
(SBEE HPE "I.M.Sechenov First Moscow State Medical University" MH RF, Moscow)

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VA Ermakova, Nguen Thi Kim Ngan, T.Yu. Kovaleva, NV Bobkova
IMSechenov First Moscow State Medical University MH RF (Moscow, Russia)

SUMMARY

Purpose: Information and analytical study of scientific literature data on plants of the genus Arizem. Research methods: information and analytical. Results: an information-analytical study of scientific literature data on plants of the genus Arizem was carried out.

Conclusions: the results of the information and analytical research carried out indicate the promise of a versatile study of plants of the genus Arizem.

Key words: Amur arizema, Japanese arizema, three-leaved arizema, arizema consanguineous, reddish arizema, variegated arysema, saponins, mannose, starch, cerebrosides, expectorant action, anti-inflammatory action.

RESUME

Methods: information-analytical study. Results: information-analytical study of the scientific literature data about the plants of genus arizema was done. Conclusions: The results of the information and analytical studies of the genus arizema show promising information supporting future researches.

Keywords: Arizema, Arisaema erubescens, Arisaema amurense Maxim, Arisaema amurense, Arisaema heterophyllum.

The growing interest in the plants of oriental, in particular, Chinese, medicine in recent years, due to the therapeutic effectiveness of ethnomedicine prescriptions, makes the information-analytical study of scientific literature data on medicinal plants of the genus Arizem relevant. The genus Arizema (family Aroid) includes about 150 species, which are native to the tropical zone of East Asia and South America, about 10 species grow to the north, in the subtropical and temperate zones [24, 44]. In our country, only 7 species of ariem grow in the wild, mainly in the Far East (A. komarovii, A. amurense, A. robustum, A. sadoense, A. peninsulae, A. japonicum (Arisaema serratum), A. sachalinense), which are used by the local population for medicinal purposes [28, 29, 31, 37, 60].

Plants of the genus Arizem have been used as medicinal plants since ancient times by Chinese and Tibetan medicine in Mongolia and Buryatia [21, 23].

Plants are popular as ornamental and are grown in botanical gardens in open ground and in greenhouses [36].

The Arizem species are studied by researchers from different countries, but until now this genus remains poorly studied, the results are very scattered.

Official medicinal plants are representatives of the r. Arisema are only found in China. The State Pharmacopoeia of the PRC includes 3 types of arizema: Amur, reddish, variegated [35].

On the territory of Vietnam, 15 species of arizema grow, 5 of which are used in folk medicine for the treatment of various diseases, primarily respiratory diseases: A. decipiens (deceptive) (Lao Cai province); a. reddish - A. erubescens (Lao Cai, Khazang, Caobang provinces); A. franchetti - A. franchetianum (Caobang province); A. rhizomatum (Cao Bang province) and a. consanguineous - A. consanguineum (Lao Cai, Khazang, Caobang provinces).

In our study, we will consider aryzem species that are of medical importance and grow on the territory of the Russian Federation (A. amurense Maxim and A. japonicum Blume) and the Socialist Republic of Vietnam (A. consanguineum - A. consanguineum, as provided with a raw material base), as well as 3 official species of the aries of China.

Characteristics of the genus

Arisema, or One-cover (lat. Arisaema) is a genus of herbaceous plants of the Aroid family (Araceae) [46]. Aronnik (Latin Arum) is actually the central genus of perennial herbaceous plants belonging to the Araceae family, one of the most ancient and original plant families. It is believed that the Arums got their name from the Greek name for a poisonous plant ("Aron"). The British call arizema "lily-cobra" (lat. Cobra-Lilies) for the peculiar shape of the inflorescences, reminiscent of the cobra stance. Arizema are perennial herbaceous plants with a dormant period or evergreen, with an average height of up to 70 cm, some species up to 2 m.

The stem is underground, ending in a spherical tuber producing nodules or stolons, or, less often, in horizontal branched rhizomes.

Leaves. Cataphills from 3 to 5, often with noticeable spots. Leaves from 1 to 4 (most often one leaf), 1.5 to 55 cm in size, multiple finger or pinnately dissected, very rarely simple oval, some species are characterized by heteropholy. For example, in arizma, the consanguineous shape of the leaves changes during the life of the plant: the triple young leaf is replaced by a finger-dissected leaf into 15–19 parts. Long leafy sheaths, free or accrete throughout, form a long, often spotted, false stem. Leaflets lanceolate to broadly oval, sometimes rhomboid, sessile or on petioles, edges from whole to serrate. Sometimes long or short filamentous formations or thorns are present on the leaves. The venation is reticulate [27, 33, 47].

Inflorescence and flowers. The most characteristic feature of the genus is one inflorescence of a cob in a veil. The blanket is falling, its shape and color differ significantly in different types of arizem, the common thing is the presence of light stripes - aryzemas - optical traps. Once inside the tube of the bedspread, the insects try to get out, focusing on the light, but the light stripes present in the color of the bedspread knock them down and force them back inside: in this way, the insects stay inside the inflorescence for a much longer time and pollinate it better. In addition, often the veil or the inflorescence itself has a long tail-like outgrowth, which, with a specific smell, also attracts insects.

Arizema, as a rule, are dioecious plants, but this dioeciousness is not absolute and depends on the growing conditions and age of the plants. Dioecious plants include, for example, the Far Eastern species of aryzem: Arisaema amurense and Japanese arizema (Arisaema serratum), as well as consanguineous aryzema, common in the Yunnan province of China and Vietnam. If the plant is monoecious, then its bisexual ear has outwardly different female and male zones, and the flowers are always unisexual. The perianth is absent, male flowers contain from two to five stamens, female flowers - with a unilocular, ovate or oblong-ovate ovary; ovules - from 3 to 10 [21, 24, 27, 47].

Fruit. Fruits - berries from obovate to obovate conical, with a rounded apex, occasionally conical, usually with several seeds, bright red, occasionally yellow, shiny.

Seeds - from ovoid to spherical, the dough is hard, rough, light brown; the embryo is axial; the endosperm is abundant [24, 47, 48].

Distribution and ecology

Wild in Africa (Burundi, Rwanda, Zaire, Ethiopia, Somalia, Sudan, Kenya, Tanzania, Uganda), Asia (Afghanistan, Saudi Arabia, Yemen, China, Japan, Korea, Taiwan, India, Nepal, Pakistan, Sri -Lanka, Andaman Islands, Laos, Myanmar, Thailand, Vietnam, Borneo, Java, Philippines, Sumatra) and America (from Eastern Canada to Mexico). On the territory of Russia, plants of the genus are found in the Khabarovsk Territory, Primorye, on Sakhalin and the Kuriles, in the Ussuriysky Nature Reserve [22, 29].

Grows in temperate, subtropical and mountain tropical forests, occasionally in savannas, semi-deserts and mountain meadows (up to 4500 m above sea level); geophyte growing among forest litter, on rocks, occasionally in humid places; occasionally epiphyte, some species prefer limestone rocks. Arisaema amurense prefers damp valleys in mixed and riparian forests, in the Khingansky reserve the western border of the range [39].

Arizema reddish (Arisaema erubescens) grows in pine and mixed forests at an altitude of 3200 m, arizema nepentus (Arisaema nepenthoides) - in hemlock and oak forests at an altitude of 3600 m, and Jacquemont's arizema - in coniferous forests up to 4300 m above sea level. Japanese arizema is under

protection, included in the Red Data Books of the Sakhalin Region and Primorsky Krai. The limiting factors are changes in habitats and harvesting of tubers for medicinal raw materials. Three-leaf arizema (Arisaema ternatipartitum) is found only in Japan and belongs there to rare and endangered species, this is due to changes in habitat conditions and the digging of plants for transfer to flower beds [46, 47].

At the end of the last century, Japanese arysema was successfully introduced as a medicinal plant in northeastern Ukraine (Kharkov University Botanical Garden), which made it possible to recommend Japanese aryzema for mass cultivation as a medicinal plant [19]. Work on the introduction of three-leaved aryzema, which naturally grows in the humid forests of North America, in central Russia also yielded positive results [55, 58].

Despite their origin, Arizem can grow in central Russia. In particular, they feel good in the open ground of the Botanical Garden in St. Petersburg [3, 49, 50, 51].

Arisema Amur - Arisaema amurense Maxim

Perennial herb. Root tubers are almost spherical, 2–5 cm in diameter. One leaf, sits on a petiole 17–30 cm long; the leaf sheath is violet, covering 1/3 of the length of the petiole. The leaf blade is five separate, its lobes are obovate-lanceolate or oval, entire-extreme, the ends are shortly pointed, the base is wedge-shaped. Lateral leaf lobes sit in two on a petiole up to 1 cm long, the middle lobe is 7–12 cm long, 4–7 cm wide, has a petiole up to 2 cm long. The peduncle is shorter than the petiole. The tube of the inflorescence wing is funnel-shaped, green or purple with white longitudinal stripes; the wing plate is sharp at the end. Blooms in late April - early June; fruits ripen in June – July. The inflorescence is an ear. Male inflorescence - with widely spaced flowers, about 2 cm, female - 1 cm long. The ear thickens during the fruiting period, after the end of the fruiting period, it turns purple-red. The arrangement of nectaries is the same as in Arisaema consanguineum, but nectar is excreted by diffusion through the outer walls of the epidermis, cracks are rarely formed. Fruits are red, narrow-conical berries. Seeds - 4 in number, red, ovoid, smooth [41, 52] (Fig. 1).

Fig. 1. Amur arizema rhizome. Arisema Amur -Arisaema amurense Maxim. Sem. Aroid - Araceae

In autumn, an ear studded with juicy scarlet berries can be seen from afar. But it is better not to touch it: the fact is that the plant is highly poisonous, and causes burns to the skin and mucous membranes; you need to be very careful with this plant.

Distributed in the Far East: Russia (Khabarovsk Territory, Primorye, Sakhalin), China (Hebei, Heilongjiang, Jilin, Liaoning, Inner Mongolia, Shanxi, Shandong), Korea. Arisema Amur is a relict species. It grows in deciduous and mixed forests, among trees, in clearings and edges of cedar-broad-leaved forests, along river banks, at an altitude of no higher than 100-200 m above sea level [10, 17, 18, 28, 31, 34, 40, 41, 43 , 48, 41]. Cultivation. The culture of this plant is not easy. It is most promising to cultivate it in the south of Primorsky Krai.

A. Japanese - A. japonicum

Long (40-60 cm) brownish-brown petioles are decorated with a pattern that resembles the skin of a snake. In spring, exotic spotted shoots appear from the soil. Tuber with numerous

daughter nodules. False "stem" formed by sheaths of two leaves, up to 50 cm in height. Leaves 5–11 lobed, long sheath, leaf petioles 20–40 cm long. The lower leaf is wider with an almost straight petiole up to 25 cm in length. The terminal leaflet is oblong or broadly lanceolate, up to 30 cm long and 8 cm wide. The lobes are oblong-lanceolate, growing on long, up to 60 cm, petioles. The petioles are brownish-brown with a pattern resembling the skin of a snake. Blooms in late May for about two weeks. Bracts - greenish, located above the leaves. Blooms in late May for 12-16 days. Inflorescence is a cob covered with a leaf-like veil of dark purple or greenish color, with longitudinal white stripes. It hibernates without green leaves (summer green), renewal buds are below the soil level (geophyte). The plant is dioecious. Arizema japonica grows in shady forests along the banks of the rivers of the warm temperate zone of the Far East, Northeast China, Korea, and Japan. In Russia, it grows on the northwestern border of its range. A. Japanese is more thermophilic than A. Amur.

Grows in forests in the south of Primorye and on the Japanese islands. The peduncle is 30–50 cm high. The coverlet is gray with dark stripes and spots. The leaves are not triangular, but consist of 5–11 oblong lobes. Vegetation begins only in the second half of May. Blooms in early June. Grows in the forests of the Far East [17, 18, 19, 28, 31, 34, 40, 43, 58].

Arizema reddish - Arisaema erubescens

Perennial herbaceous tuberous plant, a species of the genus Arisaema of the Aroid family (Araceae). The tuber is compressed globular, 2–7 cm in diameter. There are three cataphylls, dark green, with whitish stripes and spots, up to 55 cm long, sharp at the apex. One sheet, sometimes two. The petiole is green, smooth, without spots, up to 100 cm long and about 2 cm in diameter, inserted up to about 50 cm in the vagina, forming a false stalk. The leaf blade is palmate-divided; leaflets are sessile, 18-23 in number, green below, dull green above, narrow oval or narrow-linear, 18-28 cm long, 2-20 mm wide, wedge-shaped at the base, long-pointed at the apex, with a tail-like formation with a filamentous part 7-10 cm long. Veins raised from below, recessed from above; the lateral veins are numerous, obliquely ascending. Inflorescences and flowers: the peduncle is shorter than the petioles, up to 75 cm long, with a free part about 9 cm long. The coverlet is green, with or without indistinct whitish longitudinal stripes; the tube is cylindrical, 6–7 cm long, about 1.5 cm in diameter, the edges of the aperture are curved and auricular; plate green, sometimes with purple margins outside, pale green inside, triangular-oval, 8–12 cm long, 4–8 cm wide, pointed at apex, with a long filamentous purple caudal formation, curved. The ear is unisexual. The female zone is conical, the male zone is cylindrical. Blooms in June – July. Hanging fruit. The fruits are red berries. Found in Nepal. It grows in pine, mixed forests, on grassy slopes, lake shores, between rocks, at an altitude of up to 3200 m above sea level [1, 48]. with or without indistinct whitish longitudinal stripes; the tube is cylindrical, 6–7 cm long, about 1.5 cm in diameter, the edges of the aperture are curved and auricular; plate green, sometimes with purple margins outside, pale green inside, triangular-oval, 8–12 cm long, 4–8 cm wide, pointed at apex, with a long filamentous purple caudal formation, curved. The ear is unisexual. The female zone is conical, the male zone is cylindrical. Blooms in June – July. Hanging fruit. The fruits are red berries. Found in Nepal. Grows in pine, mixed forests, on grassy slopes, lake shores, between rocks, at an altitude of 3200 m above sea level [1, 48]. with or without indistinct whitish longitudinal stripes; the tube is cylindrical, 6–7 cm long, about 1.5 cm in diameter, the edges of the aperture are curved and auricular; plate green, sometimes with purple margins outside, pale green inside, triangular-oval, 8–12 cm long, 4–8 cm wide, pointed at apex, with a long filamentous purple caudal formation, curved. The ear is unisexual. The female zone is conical, the male zone is cylindrical. Blooms in June – July. Hanging fruit. The fruits are red berries. Found in Nepal. It grows in pine, mixed forests, on grassy slopes, lake shores, between rocks, at an altitude of up to 3200 m above sea level [1, 48]. pale green inside, triangular-oval, 8–12 cm long, 4–8 cm wide, pointed at the apex, with a long filamentous purple tail-shaped formation, curved. The ear is unisexual. The female zone is conical, the male zone is cylindrical. Blooms in June – July. Hanging fruit. The fruits are red berries. Found in Nepal. It grows in pine, mixed forests, on grassy slopes, lake shores, between rocks, at an altitude of up to 3200 m above sea level [1, 48]. pale green inside, triangular-oval, 8–12 cm long, 4–8 cm wide, pointed at the apex, with a long filamentous purple tail-shaped formation, curved. The ear is unisexual. The female zone is conical, the male zone is cylindrical. Blooms in June – July. Hanging fruit. The fruits are red berries. Found in Nepal. It grows in pine, mixed forests, on grassy slopes, lake shores, between rocks, at an altitude of up to 3200 m above sea level [1, 48].

Arizema variegated - Arisaema heterophyllum

Perennial herbaceous tuberous plant, a species of the genus Arisaema of the Aroid family (Araceae). Bulbous perennial herbaceous plants. The tuber is compressed globular, 2–6 cm in diameter. Cataphylls 4 or 5, scaly. There is usually one sheet. The petiole is gray, 30–60 cm long, about ¾ nested in the sheath, forming a false stalk. The leaf blade is finger-dissected into 11-19 [28] leaflets, short petiolate or sessile, pale green below and dull green above, of various shapes, lanceolate, oblong or linearly oblong wedge-shaped at the base, pointed at the apex; central leaflet 3–15 cm long, 0.7–5.8 cm wide, often much shorter than lateral ones; outermost leaves 7.7–24.2 [4] cm long, (0.7) 2–6.5 cm wide, following leaves gradually decreasing; the distance between the leaves is 0.5–5 cm. The pedicel is usually longer than the petiole, 50–80 cm long. The cover tube is gray on the outside, whitish-green on the inside, cylindrical, 3.2–8 cm long, 4–9 cm wide. The cobs are bisexual or male. Blooms in April – May. Fruits are yellowish red or red, cylindrical berries about 5 mm long. The seed is usually one, club-shaped. The berries ripen in July – September.

Distributed in South and Central China, Japan (Honshu, Kyushu, Shikoku), Korea and Taiwan. They are found in forests, thickets, in clearings, at an altitude of up to 2700 m above sea level [1, 48].

Arizema consanguineous - Arisaema consanguineum

Perennial herbaceous tuberous plant, a species of the genus Arisaema of the Aroid family (Araceae). Bulbous perennial herbaceous plants. Spherical tuber

forms, 1.5–4 cm in diameter. There is one leaf, the leaf blade is palmate-divided, the lobes are 7–14, sharp at the apex, the petiole is 20–45 cm long, green-gray, slightly brown, striated or spotted. The inflorescence is typical of the genus, with a filiform elongated apex and vertical light stripes in the lower half of the bedspread (Fig. 2, 3). Distribution: Vietnam (Lao Cai, Khazang, Caobang, Kontum, Hoabing), India, China, Thailand [24].

Fig. 2. Arizema consanguineous -Arisaema consanguineum (L.) Schott. Sem. Aroid - Araceae

During flowering, the flower has a fishy smell, the tip of the cob and the coverlet are strongly colored, drops of nectar are visible on both sides of the coverlet, there is a drop near each slit, the slit can be closed [41].

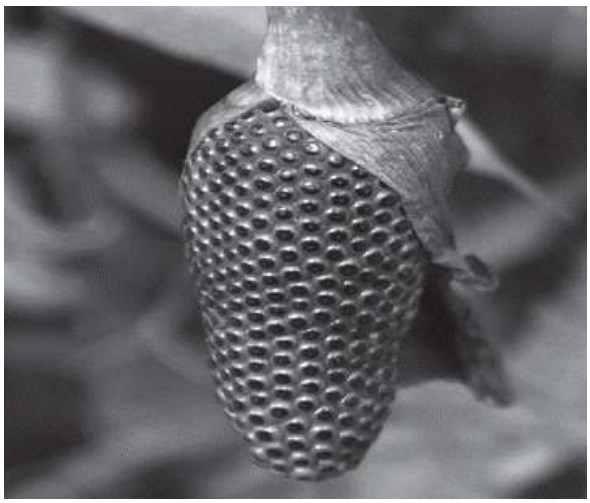


Fig. 3. Compound of arizema consanguineous. Arizema consanguineous -Arisaema consanguineum (L.) Schott. Sem. Aroid - Araceae.

Procurement of raw materials

A. Japanese and A. Amur rhizomes are harvested in spring before the leaves appear [42, 43]. A. three-leafed. Tuberous rhizomes are harvested after fruit ripening [42, 54]. A. consanguineous. The rhizomes are harvested when the plant is dormant, in fall or winter, and dried for later use.

Rhizomes are dug up and dried to neutralize toxins: corrosive substances are easily destroyed when heated and dried [32, 33].

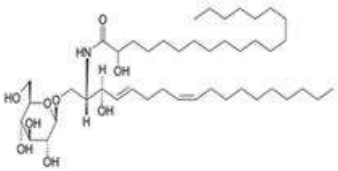
Arizema are wild plants, in recent years, raw materials have been in short supply due to depleting wildlife resources and increased demand, but the plant is easily introduced into cultivation and research is being conducted in this direction.

In China, raw A. reddish is harvested mainly in the Henan, Hebei, and Sichuan provinces; A. variegated - mainly in the provinces of Jiangsu and Zhejiang; A. Amur - mainly in the provinces of Liaoning and Jilin. In raw rhizomes, fibrous roots and bark are removed and dried in the sun; Rhizoma Arisaematis Preparatum (Zhi Nan Xing) should be prepared with consideration for further processing.

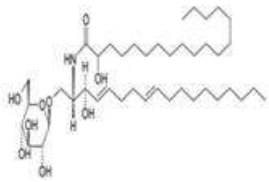
Chemical composition of arizem species

Arisema Amur

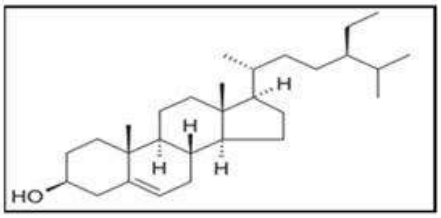
The chemical composition of the Amur arizema tubers has been studied; found: alkaloids, glycosides, β-sitosterol, D-glucoside, styrene, fatty acids, amino acids, pectin, carbohydrates, etc. The herb contains saponins, phenolic compounds, resinous substances, sterols, organic acids, free sugars, silicon compounds, flavonoids, traces of alkaloids. Tubers contain saponins, phenolic compounds, organic acids, flavonoids and free sugars, starch and alkaloids, fruits - about 60 mg%, and leaves - only traces of ascorbic acid. There is an assumption that the toxicity of the plant is due to saponins with a strong irritating effect and if carelessly handling it, it is possible to develop a rather strong inflammatory reaction, up to the formation of blisters on the skin [8, 14, 15, 26, 43, 45, 61, 62, 63].



cerebroside 1 [5]



cerebroside 5 [5]



β-sitosterol [5]

Japanese arizema

Contains a large amount of a toxic substance that is easily destroyed by heating and drying, as well as starch, phenolic compounds, organic acids [42]. The herb contains flavonoids, saponins, and gives an obscure positive reaction to alkaloids. Tubers contain saponins and starch. Their hemolytic index is 333 [62, 63].

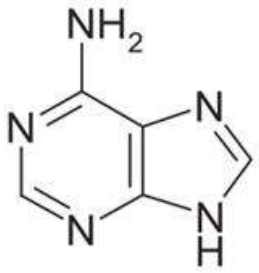
Arisema three-leafed

In addition to toxic components, tubers contain a lot of starch, resins, proteins, sugars, calcium and potassium. After removing toxic substances by heating, a delicate and nutritious product is obtained from the tubers. The plant contains calcium oxalate in the form of crystals in all parts, and this causes an irritant effect. It can irritate the mouth, gastrointestinal tract and, in rare cases, swelling of the mouth and throat, making it difficult to breathe.

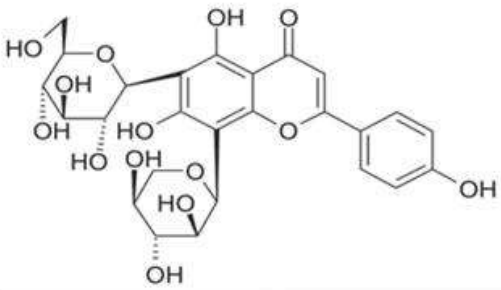
Properly dried and cooked tubers are eaten [56].

Arizema consanguineous

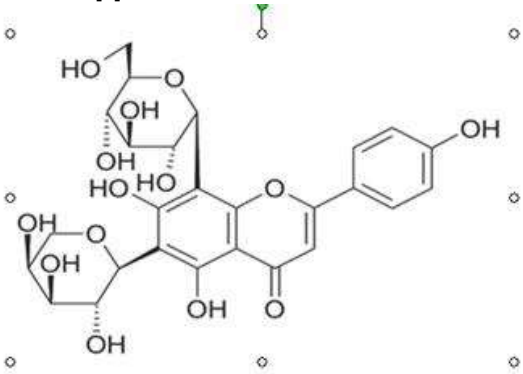
The tubers contain saponins and D-mannitol. The fruits contain muscarinic substances, as well as nitrogen-containing adenine (0.018%), flavonoids (shaftoside up to 0.185%, isoshaftoside up to 0.02%), D-mannitol, β-sitosterol up to 0.13% [5].



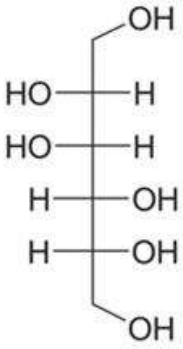
adenine [5]



shaftoside [5]



isoshaftoside [5]



D-mannitol [5]

Arisema reddish

The herb contains saponins, and - mannitol, benzoic acid and alkaloid-like ve Arysema consanguineous tubers contain saponins and D-mannitol. The fruits contain muscarinic substances, as well as nitrogen-containing adenine (0.018%), flavonoids (shaftoside up to 0.185%, isoshaftoside up to 0.02%), D-mannitol, β-sitosterol up to 0.13% [5].

Arisema variegated

Contains flavonoids: shaftoside (from 0.009% to 0.0555%, more often the content is about 0.052%), isoshaftoside (from 0.0081% to 0.0263%, more often the content is about 0.0193%); β-sitosterol [5].

Information on pharmacological properties

Arisema Amur

Modern pharmacological studies have shown that Amur arizema rhizomes have many important types of biological activity: such as anti-inflammatory, antitumor, sedative, anti-arrhythmic, expectorant, etc. [3, 9, 11, 43].

In experiments on animals, the hepatoprotective activity of cerebrosides 1 and 5 was shown, as well as in various models of several types of tumors, the antitumor activity of β-sitosterol [5].

Tubers are a part of the disinfectants, anti-eruptions, antispastic and expectorants of Chinese medicine. Tuber juice is used for rheumatism, anemia and some diseases of the digestive tract. In Chinese and Russian folk medicine, they are used as a wound healing agent, taken orally as an expectorant. Considered narcotic, sedative, hypotensive, anticonvulsant for spasms and epilepsy, used as an analgesic for radiculitis, etc.; promotes bone healing in fractures. In Chinese medicine, it is used as an analgesic and antispasmodic agent for scrofula. The entire plant and especially its underground parts contain a burning poisonous substance [5].

Arizema decoction (1: 4) at a dose of 4 ml / kg, when administered to a rabbit's stomach, has a long-lasting expectorant effect. The effect is traced for 4 hours. Arizema decoction in experiments on

animals has a weak sedative effect, lengthens the duration of the effect of drugs and hypnotics.

In experiments in vitro aryzema decoction inhibits growth Candida albicans. The minimum lethal dose of alcoholic tincture of arizem for white mice when injected into the stomach is 50 ml / kg [61].

The irritating properties of the juice of arizema tubers are recommended as a distraction, for about the same indications as mustard plasters. Arizma juice is part of some ointments, and is also used as an expectorant. However, the caustic substance contained in the juice is very unstable and loses its properties when heated and dried. In folk medicine, the juice of arizema tubers is used as an antirheumatic, antianemic, disinfectant, antivenom and antispastic agent [8, 43]. It is used in the treatment of leukoderma; the active ingredient is diacylglyceryl galactoside [6, 8].

Preparations from arizema are used in certain diseases of the gastrointestinal tract. They are used for epilepsy, fainting, headache, dizziness, facial paralysis, treatment of consequences after a stroke, rheumatoid arthritis, bruises, chronic and acute bronchitis. The daily dose is 4–6 g [8, 15, 61.62].

In Chinese medicine, it is used as an analgesic and antispasmodic. The whole plant and especially its underground parts contain a burning poisonous substance. Homogenate of tubers when injected intraperitoneally to mice at a dose of 1 ml per 20 g of weight did not cause changes in their behavior. Freshly harvested herb causes itchy hands and blisters. Perhaps this is not a poisonous plant, but only containing burning substances - silicon compounds. Fresh rhizomes have a strong local irritant effect [57, 63].

Japanese arizema

The rhizomes of arizema japonica have antimicrobial action and are used in traditional medicine to treat diseases of the gastrointestinal tract, as an expectorant, in diseases accompanied by cough: in bronchitis, whooping cough and pneumonia, in bronchial asthma, used as an analgesic, antipyretic and anticonvulsant agent, it is used for the treatment of seizures of various origins, especially epileptic ones, as well as for the treatment of malignant neoplastic skin in China and Korea [23, 25].

Prescribed to children for diseases accompanied by convulsions, and also prescribed internally for snake bites and malignant skin formations. It is used externally as a distraction for pleurisy, as well as in the form of an ointment for some skin diseases [32, 59]. It is used for bone growths. Take a decoction of the tuber harvested before the leaves appear, a single dose of 0.3–1.5 g [13, 20, 32, 42, 58, 62, 63].

A decoction of tubers in Chinese medicine is used as an expectorant, analgesic, antispasmodic and anticonvulsant for various diseases accompanied by cough. Tuber juice or ointment made from them is a mustard-type distracting agent applied to the body for back pain, rheumatic pain in joints and muscles, chest pain, pleurisy, and some skin diseases [63].

In the experiment, the anticonvulsant activity of tubers in convulsions caused by the introduction of morphine, strychnine and metrazol was noted. The tubers are used as an insecticide. Fresh herb, which contains burning substances, causes itching of the skin, but its preparations, when injected intraperitoneally, are not poisonous [63].

It is recommended to study the antispasmodic, anticonvulsant, sedative, and diaphoretic action of A. japonicum and, above all, the saponins contained in its tubers [62, 63, 64]. The toxicity of arizema Japanese and Amur is 45 ml per 1 kg of body weight [31].

Arisaema ternatipartitum (Arisema three-leafed) is used in homeopathy to treat diseases with lesions of the mucous membranes of the mouth and nasopharynx, with hoarseness in singers.

Arisema three-leafed

Expectorant and diaphoretic. Recommended for flatulence, croup, whooping cough, stomatitis, bronchial asthma, chronic laryngitis and sore throat, sudden hoarseness and loss of voice, bronchitis, chest pain, colic, etc. Used externally to treat skin conditions.

Arisaema erubescens (Wall.): In experiments on rabbits, the possibility of using purified lectin in experimental inflammation [16].

Arisaema consanguineum

It has been used in Chinese herbal medicine for thousands of years, and is especially prized in the treatment of respiratory diseases when dry combined with fresh ginger root. The herb and rhizomes are used as an analgesic, antibacterial, antifungal, anti-inflammatory, antitumor, antispasmodic, expectorant, sedative and gastric remedy. The dried rhizome is used internally in the treatment of various diseases. Fresh rhizome is applied externally as a poultice for skin diseases. The whole plant is an anticoagulant, anti-inflammatory, antispasmodic and analgesic agent [2].

AI of Arisaema Species Used in Scientific Medicine

As a drug in the Russian Federation, only one (homeopathic) drug is registered, containing Arisaema tryphyllum (arizema three-leafed) 3C: "Homeovox", dragee d / resorption, Boiron Laboratory (France). Pharmacotherapeutic group: Homeopathic remedies used for diseases of the upper respiratory tract. Pharmacological action: Anti-inflammatory.

Indications for use: Laryngitis of various etiology, incl. loss of voice, hoarseness, fatigue of the vocal cords. Raw materials of Arisaema species, usually underground organs, are included in multicomponent preparations of traditional Chinese medicine (TCM), some of which are supplied to the Russian Federation and sold, as a rule, in specialized stores, less often in pharmacies as dietary supplements.

In China, there are three categories of drugs - Chinese bioactive additives (BAA), synthetic drugs, and traditional Chinese medicine drugs are separated into a separate group. In Russia, there are only two categories - dietary supplements and medicines. All preparations of traditional Chinese medicine in our country are certified as dietary supplements.

TCM preparations, which include raw materials of various types of arizema:

- Xiao huo luo wan (China), pills;
- Qing Qi Hua Tan Wan, China, pills;
- Capsules "Zhusyankan" (PRC) - healthy breast gland;
- Therapeutic pain reliever plaster Wutong (PRC);
- Jian Nao Wan, pills;
- Da Ho Luo Dan.

The use of raw materials of arizema species in folk medicine in different countries In Russia:

- Pour 1 cup of cold water 1 tsp. dry chopped tubers, insist for 4-6 hours, bring to a boil, cook in a sealed container over low heat for 10 minutes, cool, strain. Take 1 tsp. 3 times a day for 20 minutes. before meals. Apply externally in the form of compresses, lotions, washings (indications are listed above).

- In some cases, it is possible to directly use the juice of tubers (for diseases Gastrointestinal tract), a single dose of which is 5-7 drops. For long-term preservation of the juice, it can be preserved with alcohol in a ratio of 4: 1 [43].

- A decoction of the rhizomes of Japanese arizema: 2 tsp. dry chopped root of arizema 250 ml water is boiled for 5 minutes, insisted for 2 hours in a warm place, filtered. Take 50 ml 3 times a day before meals as an expectorant, as well as for diseases accompanied by convulsions [42]. Topically for the treatment of skin malignant neoplasms [43].

- Decoction from the rhizome of arizema three-leafed: 2 tsp. dry chopped tuber of arizema for 300 ml of boiling water is boiled for 5 minutes, insisted for 12 hours in a warm place, filtered. Take 70 ml 4 times a day before meals as a disinfectant, antiseptic.

- Take 5-7 drops of arizema root juice 2 times a day before meals for rheumatism, gastritis and anemia [42, 43].

- Arizem preparation: Sanseym. Arizem root, catnip leaves - 1 g each, elecampane - 2 g brew in water and drink 2 doses per day. Use for epilepsy [61].

- Old recipes: For headaches, aryzema root and catnip leaves are equal grind into powder, add ginger juice and knead with boiled starch. Make balls weighing 0.3 g. Take 40 balls at a time, washed down with a decoction of ginger [61].

In homeopathy: in the form of an essence from fresh tubers of Amur arizema for diphtheria, inflammation

skin, hoarseness and inflammation of the larynx [30, 43].

In China and Vietnam, types of bile arysema are traditionally used.

Arizema with bile is prepared from a fine powder of arizema rhizome (special treatment) and bile of bovine, sheep and pigs. It has an expectorant and sedative effect. Caution should be exercised when working with Arizem medicines. In case of careless handling and skin lesions with arizema juice, it is useful to carry out the same therapeutic measures as in the case of skin lesions with common cow parsnip [38, 43]. Arizema tubers are a strong irritant to the skin and mucous membranes. This can lead to damage to the tongue, pharynx, erosion of the mucous membrane, hoarseness, etc. Skin contact may cause allergic itching.

Information about the pharmacognostic study of various types of arysema

In the PRC: the 2005 Chinese Pharmacopoeia includes 3 types of arizema [12, 35]. Arisaematis rhizome - Dried tubers (Arisaema erubescens (Wall.) Schott, Arisaema heterophyllum Bl or Arisaema amurense Maxim. (Fig. 3). (Aroid family - Araceae) Harvested in autumn and winter, when the stem and leaves are dry, remove the fibrous roots and outer fabrics and dried.

Description flattened, 1–2 cm long, 1.5–6.5 cm in diameter. Outside, whitish or brownish, relatively smooth, dents on top (traces from cut off trunks), surrounded by numerous traces from cut off roots; some tubers surrounded by small flattened lateral buds. The structure is rigid, the color is white. The smell is pungent, the taste is pungent, causing numbness.

Microscopy. Powder: Whitish. Starch granules, mostly simple, spherical or oblong, 2–17 cp in diameter. Needle crystals of calcium oxalate, single or in groups. Prismatic calcium oxalate crystals are mainly found in parenchymal cells accompanying vessels, 3–20 septimeters in diameter.

Processing of raw materials (accepted in TCM). The rhizomes of arizema, depending on their size, are prepared by soaking in water, changing the water 2-3 times a day. Alum is added after changing the water (for every 100 kg of arizema rhizomes, 2 kg of alum are added), after soaking, the water is changed again. Then boil with pieces of ginger rhizome. Place alum in a saucepan with water and add rhizomes of arizem, ginger and bring to a boil, dry the raw material in air to a residual moisture content of 40–80%, cut into thin slices and dry completely.

For every 100 kg of arizema rhizomes, add 12.5 kg of ginger rhizomes and 12.5 kg of alum.

Pharmacological action: expectorant, anticonvulsant and antitumor effect, reduces edema. Indications: stagnant sputum on coughing, dizziness, stroke, hemiplegia, epilepsy and seizures. External use for the treatment of boils, ulcers, snake and insect bites.

Usage and dosage: 3-9 g of processed drug: for external use, the appropriate amount of medicinal raw material is ground into powder and mixed with vinegar, used for topical use /

Precautions: use with caution during pregnancy.

Storage: store in a ventilated and dry place, protected from barn pests. The results of the information and analytical research carried out indicate the promise of a versatile study of plants of the genus Arizem.

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Author's address
Ph.D. Kovaleva T.Yu. PMGMU them. THEM. Sechenov, Department of Pharmacognosy
tatyana@lekrast.ru

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