

*Materials of Conferences***THE «AJUGA GENEVENSIS L.» CHEMICAL COMPOSITION AND THE BIOLOGICAL ACTIVITY STUDY**

Butenko L.E., Kuleshova S.A., Postnikova N.V.,  
Loviyagina S.A.

STM ALPA «The Pyatigorsk State Pharmaceutical  
Academy», Pyatigorsk  
e-mail: Polechka2802@eandex.ru

The «Ajuga Genevensis L.» ecdysteroids and the flavonoids quantitative content has already been defined. The acute toxicity, the wound healing and the antibacterial action of the «Ajuga» dry extract have already been fixed up.

Our ancient ancestors have known a lot of the herbs and the herbage, and they, moreover, have given them the very apt names. So, they have named and entitled the «Ajuga Genevensis L.» modest inconspicuous – looking plant, and they widely have used it for the sick people healing. And although the modern medicine still has not recovered all the «Ajuga Genevensis L.» herb health – giving properties, it seems, that, in the nearest future, especially that popularity would come to the «Ajuga Genevensis L.» one, which it is deserved much. So, the «Ajuga» plant's botanic name origin and its meaning are quite unknown, though it has been mentioned still in the writings of Roman scholar and scientist of the 1 – st century Pliny the Elder (or Gaius Plinius Secundus). So, this medicinal herb and the country simple has been the favorite medicative and the medicinal plant of the English phytotherapist and the phytophysician Nicholas Culpepper. Then, he treated the injuries and healed the bruises, the internal hemorrhages, the bloody diarrheas, the tuberculosis (TBC) and the hangover (e.g. «the morning after the night before») by the syrup, having prescribed inside. In the domestic national medicine, this plant was also quite well – known long ago, and it had been mentioned in many antique and the ancient manuscripts. During the Crimean War, they medically treated the malaria by the «Ajuga», instead of the traditional quinine, but the freshly squeezed juice and the mashed leaves were applied by them to the various and the different wounds, to the burns, to the ulcers and to the injuries and to the bruises. That is why, the folk medicine and the folksy remedy are recommended the herbal potion to be medical treated against the malaria, at the simple and the bloody diarrheas, at the gastritis, at the gastric ulcer and at the duodenal ulcer, at the cholelithiasis disease, at the pulmonary tuberculosis (TBC), at the haemoptyses or the blood spitting, at the female's genital

organs inflammation, at the rheumatism, as well as the diaphoretic drug, at the catarrhal infections and the cold diseases.

So, there are about 16 «Ajuga» species in the world, which are being grown, as in Europe, well as in Asia. Now, only two «Ajuga» species are being used, as in the scientific, well as in the folk medicine and the folksy remedy – the «Ajuga Reptans» and the «Ajuga Genevensis L.». So, in the North Caucasus region, they are usually being met at the forest lawns and at the grassy glades of the forest, at the forest borders and at its edges, at the meadows, at the greenlands, and at the grasslands. It is sufficiently simple to be distinguished one species from another one: the caulis is become stink and downy only from the both sides, and there are the creeping stems at the «Ajuga Reptans», but at the «Ajuga Genevensis L.» – there is downiness along the whole stem. The herbal potion – is in the form of the washes, the lotions, and the washings are being used at the wounds, at the ulcers, at the burns, but in the form of the rinsings – at the inflammatory processes and the oral mucosa ulceration, the gingivites, and the quinsies. So, the herb juice and its herbage are being used for the corns, the freckles, and also the aphthous precipitations smearing at the children's thrush of the mouth or at the oral moniliasis, at the bees' sting, and also at the burns. The crumbled up and the chopped fresh leaves are usually applied to the purulent wounds, to the cuts, and to the ulcers. The potion and the infusion from the leaves or the herbs and the herbage are being applied for the hair growth strengthening.

Thus, the present paper's purpose is the chemical composition and the pharmacological activity research of the «Ajuga Genevensis L.» herb, having grown up in the North Caucasus region.

They have already proved by the generally accepted chemical reactions, that the «Ajuga Genevensis L.» herb is being rich by the ecdysteroids, by the phenolic compounds, by the saponins, and by the other biologically active substances (BAS).

So, it had been determined, preliminarily, by the paper chromatography method with the witnesses' authentic samples, that the luteolin was the predominant flavonoid just in the «Ajuga Genevensis L.» raw material, therefore, flavonoids quantitative definition was carried out by the methodology, having described in the pharmacopoeia, with the luteolin standard sample application [1].

So, the ecdysteroids quantitative definition has been carried out by the spectrophotometric method [2]. The obtained results have been shown in the Table 1.

**Table 1**  
The «Ajuga Genevensis L.» herb BAS quantitative analysis results

| BAS Class             | The Results, % | The definition method      |
|-----------------------|----------------|----------------------------|
| Extractive Substances | 14,0 ± 0,29    | The Gravimetric one        |
| Ecdysteroids          | 6,7 ± 0,16     | The spectrophotometric one |
| Flavonoids            | 3,63 ± 0,08    | The spectrophotometric one |

So, the dry extract has been prepared for the biological activity research, on the basis of the «Ajuga

Genevensis L.» water extraction. The «Ajuga Genevensis L.» antibacterial action has been defined by the «wells» method. Thus, this method has been based on the tested substance diffusion just from «the wells» into the nutrient agar, having sowed out by the quite different test – cultures and the various test – crops [1].

At the obtained results assessment so, the growth inhibition zone diameter up to 10 mm, they have estimated, as the weakly expressed antibacterial action, but more, than 10 mm – as the expressed one. On this basis, the antibacterial action has been revealed at the «Ajuga Genevensis L.» water extract for all the suggested test – cultures and the test – crops, except the «Salmonella Gallinarum» and the «Proteus Vulgaris».

The «Ajuga Genevensis L.» antibacterial action research results

**Table 2**

| The Tested Sample                 | The Test – Culture                          |    |    |    |    |   |   |   |    |
|-----------------------------------|---|----|----|----|----|---|---|---|----|
|                                   | 1   | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9  |
|                                   | The Growth Inhibition Zones Diameters in mm |    |    |    |    |   |   |   |    |
| The «Ajuga Genevensis L.» Extract | 15  | 10 | 11 | 14 | 16 | – | – | 7 | 11 |

The symbolic representation: – the growth inhibition zone diameter is absent. The test – cultures and the test – crops: 1 – «Staphylococcus (S.) Aureus 209»; 2 – «S. Aureus» (e.g. Makarov); 3 – «S. Aureus Type»; 4 – «S. Epidermidis Wood – 46»; 5 – «Escherichia Coli 675»; 6 – «Salmonella Gallinarum»; 7 – Proteus Vulgaris; 8 – «Bacillus Subtilis L<sub>2</sub>»; 9 – «Bacillus Anthracoides – 96».

So, they have studied the «acute» toxicity of the «Ajuga Genevensis L.» herb dry extract at the «IBA» line mice. The extract dose, which was equal to 15,150,0 mg/kg at the peroral administration, had not been causing the mice death throughout the fortnight (e.g. 14 days, or 336 hours). All these animals' significant and the vital – important functions had been remaining just in the normal standard, that is, they all were not distinguished from the control mice' state. Consequently, the «Ajuga Genevensis L.» dry extract is, by its essence, the hazard IV grade substance, that is, it is, practically, safe for the human person [3].

So, the «Ajuga Genevensis L.» herb dry extract influence on the skin regeneration processes have been studied at the «Wistar» line white or albino rats. They have received the linear wounds at them, by means of the dermatotomy under the ether «Rausch – anesthesia». The «Ajuga Genevensis L.» herb dry extract, in the form of the 20% ointment, has been applied to the wounds just at once after the carried out operation, and further daily. They have practically used the comparison drug – the calendula ointment, under the similar conditions. Then, the studied ointments action obtained results have been evaluated, in comparison with each other and also with the animals' control (medically untreated) group. So, the skin recovery rate has been defined, by means of the wound's area measuring through the certain and the regular time intervals [4]. In the end, the obtained data had already been, statisti-

cally, processed, and then they was given and presented in the Table 3.

So, the reliable and the authentic significant reduction in the wounded and the traumatic surface area, at the «Ajuga Genevensis L.» ointment application has been observed on the 5-th test day, concerning to the control. In this animals' group, the wounds area has been reliably and authentically less from the 7-th day, in comparison with, as the control, well as the standard. Thus, the complete healing and the recovery of the injured and the traumatized skin areas, against the background of the studied ointment, has been observed on the 16-th test day, at the calendula ointment application – on the 18-th experiment day. So, the wounds self – healing has been registered on the 22-nd day of the research, in the mice' control group. Thus, the linear wounds medical treatment terms by the ointment, with the «Ajuga Genevensis L.» dry extract have already been shortened, in comparison with the control for 27%.

Concerning the analogue – ointment, the experimental ointment already on the 3-rd day has shortened the wounds' area for 37,6%, but the calendula ointment – for 33,3%. So, the similar picture has being observed throughout the whole tested and the experimental period. They, visually, had observed during their observations, that the wounds were quite the clean and the dry ones at the animals of the tested and the experimental groups, whereas the wounds were with the crude, twice dried up small

scabs and the small crusts, but sometimes with the purulent separations in the mice' control group. Thus, the «Ajuga Genevensis L.» herb dry extract

is being possessed of the wound – healing and the bactericidal action, and it is, quite practically, safe for the human person.

Table 3

The «Ajuga Genevensis L.» herb dry extract wound – healing activity study results,  $M \pm m$ , p

| Observations days | Control     | Calendula ointment       | «Ajuga» ointment          |
|-------------------|-------------|--------------------------|---------------------------|
| 1                 | 4,44 ± 0,52 | 4,58 ± 0,41              | 4,63 ± 0,26               |
| 3                 | 3,87 ± 0,54 | 3,53 ± 0,45              | 2,89 ± 0,05               |
| 5                 | 3,08 ± 0,29 | 2,71 ± 0,31              | 2,09 ± 0,20 <sup>x</sup>  |
| 7                 | 2,49 ± 0,26 | 2,17 ± 0,23              | 1,51 ± 0,16 <sup>#x</sup> |
| 11                | 1,83 ± 0,18 | 1,34 ± 0,18 <sup>x</sup> | 0,81 ± 0,13 <sup>#x</sup> |
| 14                | 1,26 ± 0,16 | 0,69 ± 0,12 <sup>x</sup> | 0,29 ± 0,04 <sup>#x</sup> |
| 16                | 0,92 ± 0,12 | 0,24 ± 0,06 <sup>x</sup> | 0 ± 0                     |
| 18                | 0,51 ± 0,09 | 0 ± 0                    |                           |
| 20                | 0,28 ± 0,03 |                          |                           |
| 22                | 0 ± 0       |                          |                           |

The notes:

x – the changes are reliable and the authentic, concerning the control,  $p \leq 0,05$ ;

# – the changes are reliable and the authentic, concerning the calendula ointment,  $p \leq 0,05$ .

In conclusion, it is necessary to be mentioned, that the «Ajuga Genevensis L.» herb phytochemical composition study is quite the perspective direction, in the search of the BAS natural raw material sources for the creation the medical herbal remedies and the therapeutic herbal agents on their basis.

#### References

1. The State Pharmacopoeia of the USSR, the XI – th issue. – M.: The Medicine, 1989. – Vol. 2. – P. 400.
2. Butenko L.E., Kuleshova S.A., Shemberova A.P. The Chemical Basis of the «Serratula Quinquefolia» Some Pharmacological Qualities, «The Collection of the Scientific Papers.» / Pyatigorsk. SPHA, – Pyatigorsk, 2006. – The Issue 61. – P. 166–167.
3. Berezovskaya E.V. The Chemical Substances Classification on the Residual Toxicity Parametes at the Parenteral Methods of the Introduction // The Chemical – Pharmaceutical Journal. – 2003. – № 3.
4. The Diseases Reproduction at the Animals for the Therapeutic – Experimentally Researches / Under the Editorship of E.V. Lazarev. – L.: The Medicine, 1954. – P. 393.

The work was submitted to international scientific conference «Fundamental and applied research in medicine», France (Paris), 15–22 October 2011, came to the editorial office on 05.09.2011.

#### THE «BRASSICA NAPUS L. SCHROT» CHEMICAL COMPOSITION AND THE BIOLOGICAL ACTIVITY RESEARCH

Butenko L.E., Kuleshova S.A., Postnikova N.V.,  
Kunak E.Y.

STM ALPA The Pyatigorsk State Pharmaceutical  
Academy, Pyatigorsk town,  
e-mail: Polechka2802@eandex.ru

The polysaccharides and the amino acids quantitative content in the rapeseed oil production and its industrial wastes has already been defined. The

«Brassica Napus L. Schrot» acute toxicity, the wound – healing, the antimicrobial and the antibacterial action have already been fixed up.

At present, the great and the enormous interest is presented the vegetable and the plant wastes utilization challenge, which are being left in the large numbers and in the large quantities at the medicinal plant and the medicinal vegetative raw materials, the agricultural and the farming production processing in the wood and the timber working, the timber and the forest, and the food industries. So, the constantly accumulating plant and the medicinal vegetative raw materials are being created the great ecological challenge, though, quite often, they are the different and the various biologically active substances (BAS) main sources, and they are quite may be used, as the raw materials for the new medicinal products, the drugs, the pharmaceuticals, the medications, and the biologically active additives (BAA) and the biologically active food supplements (BAFS) receiving and their further production.

The «Brassica Napus L.» is one from the most perspective oil – bearing crops and the oil – yielding cultures in the world – wide plant and the vegetable oils production. The «Brassica Napus L.» seeds' world – wide production – is about 43 mln. tons, that is being made up 12–14% from the main oil – bearing crops and the oil – yielding cultures total volume. So, the «Brassica Napus L.» is being assigned the significant role, not only how the main source of the edible plant and the vegetable oil, but and, as the raw materials for a number of the technical products getting, in particular, for the methyl and the ethyl ethers production of the rapeseed (e.g. «Brassica Napus L.» oil fatty acids (or the bio fuel).

So, the numbers and the quantities wastes are being made up many hundreds of the tons, just after the «Brassica Napus L.» raw materials processing.