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Тимофеев Н.П. Изменчивость содержания экидистерона в листьях *Rhaponticum carthamoides* во время сезона вегетации / Возобновляемые лесные и растительные ресурсы: Химия, технология, фармакология, медицина. Мат-лы междунар. конференции. СПб, Государственная Лесотехническая Академия (СПбГЛТА), 2011. – С. 228-229.

## **VARIABILITY OF CONTENT ECDYSTERONE IN LEAVES RHAPONTICUM CARTHAMOIDES DURING SEASON OF VEGETATION**

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**Introduction.** *Rhaponticum carthamoides* (Willd.) Iljin (*Leuzea carthamoides* DC.) – perennial, frugostable species from family Asteraceae. *R. carthamoides* and drugs on its basis were included in the State pharmacopoeia and the Register of medications of many states. The species is alien from high-mountainous region an alpestrine girdle (1200-2700 m above sea-level); it is characterized by duration of life cycle, indiscriminateness to conditions of soil fertility. Specificity of the secondary metabolism is accompanied by biosynthesis phytoecdysteroids, being the basic which major a component is ecdysterone (over 90 % of individual share).

Problem of the production technology of vegetative medicinal raw materials from ecdysteroid synthesising plants is extreme unevenness of distribution ecdysterone on various organs (Dinan et al., 2001; Phytoecdysteroids, 2003). It was caused by that producing of organic substance (ecdysteroids) and accumulation of the secondary metabolites is rather difficult depended from growth processes (Shain, 2005). Proceeding from necessity of standardizing of medicinal raw materials *R. carthamoides* for active substances, we studied accumulation and variability content of the ecdysterone during the season of vegetation.

**Object and methods of researches.** The district of researches is located in the southeast of the Arkhangelsk region of Russia, in the European-West-Siberian taiga-timber bioclimatic range. Dynamics of the content ecdysterone studied at adults generative plants of 6-10th year of life.

Various fractions of leaves organs, based on the terms of regrowth and development phases served as objects of studying. Samples selected from 20-25 plants (on 2 sheets from each plant). Concentration ecdysterone in the exsiccate was researched with a method of high-performance liquid chromatography ( $\lambda=242$  nm), with computer data processing according a method of the intrinsic standard (Punegov and Savinovskaya, 2002).

**Results.** 1. The beginning of vegetation of plants started in some days after slope of the snow cover (in the end of April-beginning of May) and proceeds before transferring of daily average temperature in the autumn through 0 °C (in late October). Appearance of new young growing leaves, their growing and necrosis is not timed for certain phases of development, they function during all vegetation period, replacing each other in time. Development and formation of leaves germs occurring at different times from different propagules leads up to simultaneous accumulation in above-ground sphere of fractions of the growing, young, adult, old and died off leaves.

2. Dynamic of the content ecdysterone in separate elements and phytomass fractions is combined with process of formation of propagules at which there is a redistribution biologically active substances – from old and dying in favor of growing and developing organs. Therefore the maximum concentration ecdysterone as a part of vegetative propagules are characteristic for the youngest on physiological age fractions.

3. Values of variability of concentration ecdysterone during vegetation in young leaves organs compound 2 times - 0.55-0.28%. In adult leaves of vegetative propagules, in 10 days after the regrowth beginning, the content ecdysterone is makes 0.38%. In 30 days of vegetation, during intensive growth of propagules, concentration ecdysterone drops to 0.27 %, and in 60 days - to 0.17 %. Fall to the minimum values (0.11-0.12 %) in July-August coincides with droughty environmental conditions, in the autumn season concentration increases slightly and in September compounds 0.14-0.15 %.

4. Generally the concentration of ecdysterone in adult leaves during active vegetation variate in 3 times (0.38-0.12 %). In old leaves level fall ecdysterone is practically rectilinear, also does not depend neither on a development phase, nor from calendar terms of development of plants - it decreasing consistently during a growing period in 7-8 times - from 0.15 % to 0.02 %. Absolute levels of ecdysterone in leaves *R. carthamoides* vary as 0.70-0.01 %.

### **RESEARCHES ON MANAGED BIOLOGICAL SYNTHESIS ECDYSTEROIDS AND BIOTECHNOLOGICAL PROCESS OF MANUFACTURE OF MEDICINAL RAW MATERIALS FROM LEUZEA CARTHAMOIDES AND SERRATULA CORONATA**

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The medicinal raw materials of plants *Rhaponticum carthamoides* and *Serratula coronata*, containing phytoecdysteroids, were used in medicine for the decision of a wide range of problems for conservation of health of the person, including for treatment and preventive maintenance of cardiovascular and oncological diseases, increase of acclimatization of an organism to action of unfavorable and harmful factors of inhabitancy.

Proceeding from necessity of revealing of factors, growth-regulating, development and the maximum efficiency ecdysteroids synthesising (Es) plants with the enriched content of target materials and high biological activity in medicinal raw materials, the wide complex of scientific researches in following directions is actual:

1. Studying of laws of ability to live of Es-plants in ontogenesis, features of formation by them endomyccorhiza; topology, growth and development of symbiotic structures in annual cycle, them is also a microanatomic structure.

2. Dynamic communications between development endomyccorhiza in an annual cycle and growth of above-ground members of Es-plants during vegetation were investigated.

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