

CONTRIBUTIONS TO *RHODIOLA ROSEA* L. BIOCHEMICAL MATRIX OF SOLUBLE PROTEINS IDENTIFICATION

OVIDIU TOMA ^{1*}

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Abstract : The results of biochemical matrix of soluble proteins identification in *Rhodiola rosea* L. - as important medicinal plant species growing in Rodnei Mountains (Oriental Carpathians) - are presented for 3 consecutive years of investigation (2006,2007,2008).

INTRODUCTION

Rhodiola rosea L. is a perennial species, habitual prevalent in alpine meadow between 1500-2270 m altitudes. This species growing up on detritus and rocks is a mezohygrophil and chyonophil species. In Rodnei Mountains (Ineu, Pietrosu), belonging to Oriental Carpathians, *Rhodiola rosea* L. enters in composition of the phytocoenoses belong to vegetal association - *Saxifraga carpaticae* - *Oxirietum digynae* . The most important ecological characteristics are substratum and humidity; between the two characteristics there is a moderate positive association (1).

In the general context of the evaluation of the soluble protein content of *the Rhodiola rosea* harvested in “Pietrosul Rodnei” Mountain, our investigations were based upon the same 3 vegetal tissue samples in the view to compare them after the complete set of 3 years of investigations , in the period 2006-2008, corresponding to different vegetative organs : stalk, leaves, fruit.

MATERIAL AND METHODS

The study materials originated from the Rodnei Mountains, being collected in the summer of 2006, 2007 and 2008.

For soluble proteins (albumins) dosing, we used the Lowry method (Lowry et al., 1951), which is the most common colorimetric assays performed in biochemistry and molecular biology. This procedure is particularly sensitive and it relies on two different reactions. The first is the formation of a copper ion complex with amide bonds, forming reduced copper in alkaline solutions (“Biuret” chromophore). The second is the reduction of Folin-Ciocalteu reagent (phosphomolybdate and phosphotungstate) by tyrosine and tryptophan residues. The reduced Folin-Ciocalteu reagent is blue and thus detectable with a spectrophotometer (Jenway UV-VIS) in the range of 500-750 nm. The Biuret reaction itself is not all that sensitive , but using the Folin-Ciocalteu reagent to detect reduced copper makes the assay nearly 100 times more sensitive than the Biuret reaction alone (2-6).

RESULTS AND DISCUSSIONS

The medium values of the soluble proteins from the samples analyzed were transformed in masses concentration (g soluble proteins / 100 g vegetal tissue).

As a result of the analyze of the *Rhodiola rosea* samples at 500 nm and the ulterior identification of the soluble proteins (albumins) concentration there were obtained the following medium values (corresponding to those 3 consecutive investigations) of quantities (g soluble proteins / 100 grams vegetal tissues) at the 3 vegetal organs level (stalk, leaves and fruit) compared to the control ones (Table 1/2006, Table 2/2007, Table 3/2008).

Table 1. The variation of soluble proteins (albumins) at *Rhodiola rosea* L. (specific genotype / “Rodnei” Mountains, Oriental Carpathians, Moldavia region, Romania, 2006)

Research material / Vegetative organs of <i>Rhodiola rosea</i>	Soluble proteins (albumins) concentration values g soluble proteins / 100 g vegetal tissue			
	investigation 1	investigation 2	investigation 3	medium value
Stalk	0,146	0,144	0,148	0,146
Leaves	0,198	0,193	0,203	0,198
Fruit	0,232	0,238	0,232	0,234

Table 2. The variation of soluble proteins (albumins) at *Rhodiola rosea* L. (specific genotype / "Rodnei" Mountains, Oriental Carpathians, Moldavia region, Romania, harvested in the 2-nd consecutive year of investigations , 2007)

Research material / Vegetative organs of <i>Rhodiola rosea</i>	Soluble proteins (albumins) concentration values g soluble proteins / 100 g vegetal tissue			
	investigation 1	investigation 2	investigation 3	medium value
Stalk	0,144	0,142	0,146	0,144
Leaves	0,188	0,189	0,193	0,190
Fruit	0,230	0,230	0,227	0,229

Table 3. The variation of soluble proteins (albumins) at *Rhodiola rosea* L. (specific genotype / "Rodnei" Mountains, Oriental Carpathians, Moldavia region, Romania, harvested in the 3-th consecutive year of investigations , 2008)

Research material / Vegetative organs of <i>Rhodiola rosea</i>	Soluble proteins (albumins) concentration values g soluble proteins / 100 g vegetal tissue			
	investigation 1	investigation 2	investigation 3	medium value
Stalk	0,149	0,145	0,144	0,146
Leaves	0,196	0,192	0,200	0,196
Fruit	0,231	0,236	0,232	0,233

As results of the 3 years (2006-2007-2008) analyze of the *Rhodiola rosea* samples at 500 nm and the ulterior identification of the soluble proteins (albumins) concentration there were obtained the following medium values (corresponding to those 3 consecutive years of investigations) of quantities (g soluble proteins / 100 grams vegetal tissues) at the 3 vegetal organs level (stalk, leaves and fruit) compared to the control ones (Table 4).

Table 4. The variation of soluble proteins (albumins) at *Rhodiola rosea* L. . (specific genotype / "Rodnei" Mountains, Oriental Carpathians, Moldavia region, Romania, harvested in 3 consecutive years of investigations : 2006, 2007, 2008)

Research material / Vegetative organs of <i>Rhodiola rosea</i>	Soluble proteins (albumins) concentration values g soluble proteins / 100 g vegetal tissue			
	2006	2007	2008	medium value
Stalk	0,146	0,144	0,146	0,1453
Leaves	0,198	0,190	0,196	0,1946
Fruit	0,234	0,229	0,233	0,2320

CONCLUSIONS

The results have shown, in 2006, differences between soluble proteins (albumins) concentration in an increased pattern : stalk (0,146 g -), leaves (0,198 g -) and fruit (0,234 g - soluble proteins / 100 g vegetal tissue)

Next year, the results have shown differences between soluble proteins (albumins) concentration in an increased pattern: stalk (0,144 g -), leaves (0,190 g -) and fruit (0,229 g - soluble proteins / 100 g vegetal tissue) just like in 2006, but with insignificants decreased values in 2007 comparing to 2006

In 2008, the results have shown, , differences between soluble proteins (albumins) concentration in an increased constant pattern: stalk (0,146 g -), leaves (0,196 g -) and fruit

(0,233 g - soluble proteins / 100 g vegetal tissue) just like in 2006 and 2007, but with insignificant increased values in 2008 comparing to 2007 and more similar identified values in 2008 comparing with those obtained in 2006.

For all the 3 consecutive years (2006, 2007, 2008), the same increased constant pattern was identified : stalk (0,1453 g -), leaves (0,1946 g -) and fruit (0,2320 g - soluble proteins / 100 g vegetal tissue).

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1 „Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, 20 A Bd. Carol I, Iasi, Romania

* otoma@uaic.ro

