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ANTI-INFLAMMATORY ACTIVITY OF PLANTS POTENTILLA SPECIOSA VILLD AND POTENTILLA TOMMASINIANA FW. SCHULTZ., ROSACEAE

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Abstract

Anti-inflammatory activity of acetone extract of plant root sorts *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz, Rosaceae* was examined. The examined material was picked up in autumn in the surroundings of Sarajevo, dried in thin layer and pulverized immediately before the experiment. Swiss albino mice were used as experimental animals. The examinations were performed on mouse ear in groups as presented in the Table 1. As comparing substance 1% hydrocortisone cream was used. The other ear of the same animal was used as control one. It is found that acetone does not influence the process of inflammation. The achieved results are presented by changes in ear appearance after three days from the moment of examined extracts application. The treated ear looked significantly better than untreated ear. The examined mice groups and used substances are presented in Table 1.

This method of local anti-inflammatory activity examination on mouse ear is very suitable for examination because it gives data even for small sample quantities.

Examined acetone extracts of plant sorts *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz, Rosaceae* showed to possess anti-inflammatory activity, and the achieved results can be objectively shown by photographs of the examined samples. Comparing the achieved results we can come to the conclusion that acetone extract of the plant root *Potentilla speciosa Villd.* Showed stronger anti-inflammatory activity than the extract of plant root *Potentilla tommasiniana FW.Schultz, Rosaceae.*

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Introduction

Potentilla plant species are numerous. Over five hundred species of *Potentilla* are known (1), from which 20 are listed in one or more pharmacopoeia (2). Having in mind the necessity of clinical examinations of pharmacological drug and herbal medical products activity, as well as constantly growing consumption of drugs of plant origin, we performed preliminary examinations of the root activities in plant species *Potentilla speciosa Villd. and Potentilla tommasiniana FW. Schultz* on the model of a mouse ear. We hope the results of these preliminary examinations will justify further researches in this direction not only for these two plants but of other plant species as well.

We performed these examinations on Swiss albino mice; inflammation was induced by 3% acetone solution Oleum crotonis using slight changes in legation to the quoted literature (3).

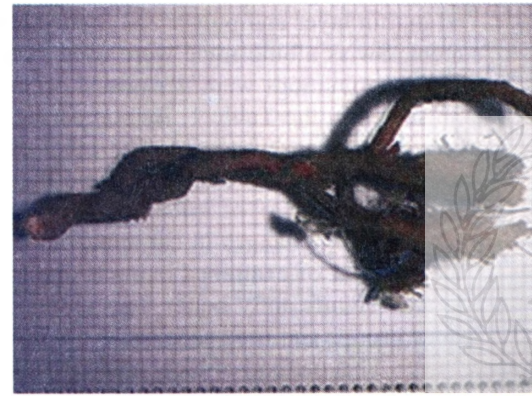


Figure 1: *Potentilla speciosa* Villd.

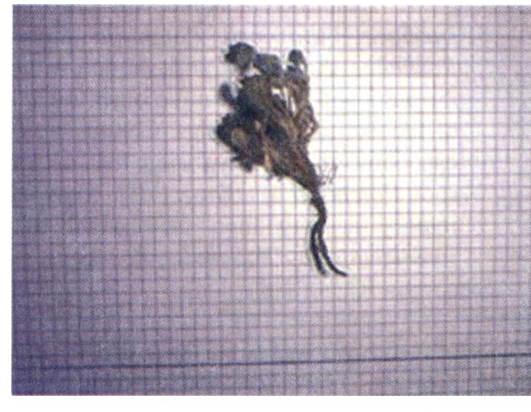


Figure 2: *Potentilla tommasiniana* FW. Schultz

Material and methods

Newly gathered material – root was cleaned, washed cut and dried. Drying was done in thin layer protected from direct sunlight. Immediately before examinations the root was pulverized and sieved through the sieve of 0,75 mm. The acetone extract was prepared from pulverized drugs (1:1). Extraction was done at room temperature in the course of 24 hours, mixing every 2 hours. Swiss albino mice were used for the examination, brood from the Pharmacology Institute of the Faculty of Medicine in Sarajevo, mass 28±3 grams. In order to induce local inflammation, both mouse ears were smeared by 3% Oleum crotonis solution in acetone, quantity of 10 μL (3, 4 and 5).

Drug extract in quantity of 10 μL was applied only on one ear once (cured L) 2 hours after the beginning of inflammation, while the other ear was used as a control sample (uncured N). 1% hydrocortisone cream was used as comparative substance and it was applied in the quantity of 10 mg (group 2).

Used substances

Acetone BP 1988 Se 64 355 01 Lex Potroroz
Croton oil Sigma C 6719
Hydrocortisone 1% cream (Hydroderm) Splabo, Heist Belgium Se 000 11 OZ/10 200H
Standard extracts prepared in ratio 1:1 acetone solution of dried pulverized plant root sort *Potentilla speciosa and Potentilla tommasiniana*

Identification of anti-inflammatory activity

Mice were divided into groups of three experimental animals and for each mouse in a group 10nL 3% solution Oleum crotonis was applied on the outer side of both ears. After two hours drug extracts were applied once on one (cured) ear (L) in the quantity of 10 μL, then hydrocortisone cream on the ear of comparative group. One group of mice was treated only with acetone on one ear while the other ear was not treated at all in order to examine the influence at the solvent to inflammation process.

There were four groups of mice examined all together, and examinations were repeated.

Identification of anti-inflammatory activity effect was performed by observing changes on mouse ear in the course of seven days (6) and by comparing L and N of the ear. The degree of inflammation is expressed in scores from 0 to 14.

Results

Table 1: *Survey of substances application on examined mice groups**

Group No.	Mouse mark	Mass	L ear 2 hours after Oleum crotonis application
1	1	27 g	Acetonum
	2	28 g	Acetonum
	3	30	Acetonum
2	1	31 g	Hydrocortisone cream 1%
	2	31 g	Hydrocortisone cream 1%
	3	28 g	Hydrocortisone cream 1%
3	1	25 g	Extract Potentilla speciosa
	2	28g	*Extract Potentilla speciosa*
	3	26 g	*Extract Potentilla speciosa*
4	1	27 g	*Extract Potentilla tommasiniana*
	2	26 g	*Extract Potentilla tommasiniana*
	3	29 g	*Extract Potentilla tommasiniana*

*On both ears 10 μL 3% acetone Oleum crotonis solution was applied

Antiinflammatory activity of examined substances

Table 2: *Numerical expressions of mouse ear reaction in the observed period*

Group / Mouse sign	After 24 h		After 48 h		After 72 h		After 7 days	
	L	**N**	**L**	**N**	**L**	**N**	**L**	**N**
1/1	10	10	12	12	12	14	14	14
1/2	12	10	12	12	14	14	14	14
1/3	12	12	12	12	14	14	14	14
2/1	8	12	8	14	8	14	10	14
2/2	6	10	8	14	8	14	10	14
2/3	8	10	8	14	10	14	10	14
3/1	8	10	8	12	8	12	10	14
3/2	6	12	8	14	10	14	10	14
3/3	8	10	10	12	10	14	12	14
4/1	8	10	10	12	10	14	10	14
4/2	8	10	10	12	10	14	12	14
4/3	8	12	8	14	10	14	12	14

Group 1

Picture 3: *ear appearance 24 hours after croton oil application*

Group 2

Picture 4: *24 hours after hydrocortizone*

Picture 5: *ear appearance 7 days application after hydrocortizone application*

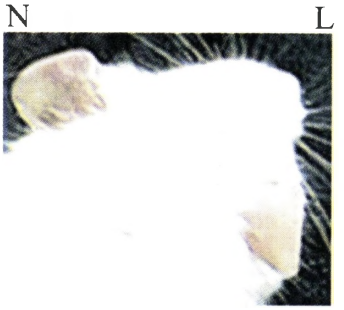
Group 3

Picture 6: *24 hours after application*

Picture 7: *4 hours after extact application*

Picture 8: *7 days after extact application*

Group 4



Picture 9: *24 hours after application*

Picture 10: *7 days after application*

Pictures are shot by Agfa CL 64

Results discusion

Examinations performed after 4, 24, 48 and 72 hours show that the changes on the ear treated by root extract of *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz., Rosaceae* are clearly shown for its prevention of inflammation.

Group 1 is the group in which one ear was examined for the solvent influence to inflammatory process; the influence of the solvent to inflammation was not noticed.

Group 2 in which 1% hydrocortisone cream was used. The treated ear showed significant difference in observed appearance parameters, so that the treated ear is less red, transparent, without dark edge, with regular ear rims.

Group 3 the treated ear is apparently thinner, smaller in size, transparent, blood vessels poorly expressed, ear edge pale, while untreated ear has visible suffusions, ear rims darker, 1/3 of ear missing after 7 days. The edge has torn rims, markedly damaged with present bloody dried layer.

Group 4 the ear treated by the extract *Potentilla tommasiniana* has clear blood vessels, the ear remains transparent, and the edge complete. Untreated ear is visibly thicker, turbid with bloody suffusions, and after 7 days big erosions of ear can be noticed.

It can be seen from the above listed facts that this method can be acceptable in the cases when the quantity of examined material in experiments is small. The achieved results are reproducible and the pictures represent objective documentation.

Conclusion

Methods of inflammation and irritation with 3% Oleum crotonis in acetone on mouse ear are simple, quick and reproducible method. The development of the inflammation by 3% acetone solution Oleum crotonis, of mouse ear ranges from 1 hour to 3 days and can be visually followed.

The best application time of anti-inflammatory substance of examined root extracts of *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz, Rosaceae* is between 1 and 6 hours after application of solution Oleum crotonis that the inflammation was provoked by.

Very small sample quantities are sufficient for such examination, from 5 to 10 μL of solvent; Acetone extracts of the plant root *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz, Rosaceae* visibly reduced inflammation during activity of 24 hours for 30-50% compared with the control ear.

Based on the achieved results we can make a conclusion that acetone extracts of plant roots of *Potentilla speciosa Villd.* and *Potentilla tommasiniana FW.Schultz, Rosaceae* have anti-inflammatory activity. According to observed parameters acetone extract *Potentilla speciosa Villd.* has more expressed anti-inflammatory activity in relation to acetone extract of plant root *Potentilla tommasiniana FW.Schultz, Rosaceae.*

The advantage of this examination method on experimental animals is also shown in the fact that experimental animals don't need to be sacrificed in the process of examination.

Apstrakt

Ispitivana je antiinflamatorna aktivnost acetonskog ekstrakta korijena biljnih vrsta *Potentilla speciosa Villd.* i Potentilla *tommasiniana FW.Schultz..*, *Rosaceae*. Ispitivani biljni materijal ubiran je u jesen u okolini Sarajeva, osušen u tankom sloji i pulveriziran neposredno prije eksperimenta. Kao ogledne životinje korišteni su švajcarski odrasli albino miševi. Ispitivanja su vršena na uhu miša u grupama kako je prikazano u tabeli 1. Kao uporedna supstanca korištena je 1% hidrokortizonska krema. Drugo uho iste životinje korišteno je kao kontrolno. Utvrđeno je da aceton ne utječe na proces inflamacije. Dobiveni rezultati predstavljeni su promjenama u izgledu uha, nakon tri dana od momenta aplikacije ispitivanih ekstrakata. Liječeno uho je izgledalo znatno bolje od neliječenog. Ispitivane grupe miševa i korištene supstance predstavljene su u tabeli 1. Ova metoda ispitivanja lokalnog antiinflamatornog djelovanja na uhu miša je vrlo pogodna za ispitivanje, jer daje podatke i za male količina uzorka.

Ispitivani acetonski ekstrakti biljnih vrsta *Potentilla speciosa Villd.* i *Potentilla tommasiniana FW.Schultz.*, *Rosaceae* pokazali su da posjeduju antiinflamatorno djelovanje, a dobiveni rezultati mogu biti objektivno prikazati i fotografskim snimcima ispitivanih uzoraka. Uporedenjem dobivenih rezultata može se zaključiti da je acetonski ekstrakt korijena biljke *Potentilla speciosa Villd.* pokazao jače antiinflamatorno djelovanje od ekstrakta korjena biljke *Potentilla tommasiniana FW.Schultz.*

Ključne riječi: *Potentilla, protuupalno djelovanje, ekstrakt, uho miaa*

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