

## HYDROLATES: FROM WASTE PRODUCTS TO POTENTIAL COSMETIC ACTIVES

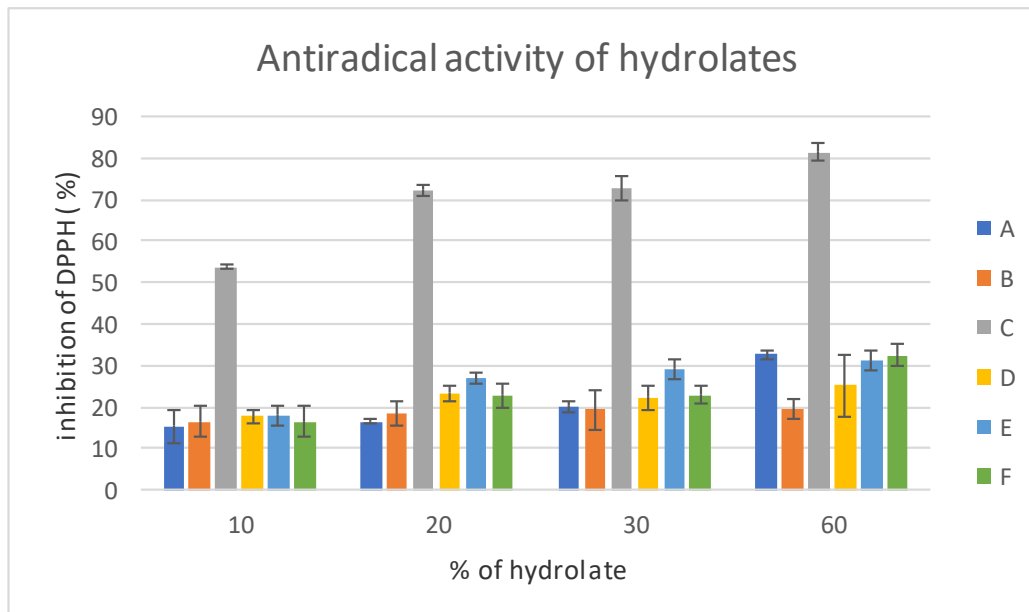
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Hydrolates, also known as hydrosols, aromatic waters, floral or distillate waters are the side products of essential oils extraction process. One other synonym is also plant aromatic waste since they are mostly considered as the waste product of industrial hydrodistillation of aromatic herbal species. As mixtures containing a variable small amount of water-soluble fraction of essential oil and in contrast to the pure essential oils, they are moderate in their biological activity. Most hydrolates are acidic liquids with pleasant to unpleasant and from similar to dissimilar odour to the corresponding essential oil (1).

To estimate potential topical application of six hydrolates (obtained after hydrodistillation of *Melissae officinalis herba* – A, *Daucus carotae semen* – B, *Thymi vulgaris herba* – C, *Lavandulae officinalis flos* – D, *Hyssopi officinalis herba* – E, and *Chamomillae romanae flos* – F) pH value and odour, *in vitro* antioxidant activity and *in vivo* safety and efficacy on human volunteers' skin (2) were quantified and compared. Bearing in mind that hydrosolates obtained in the early and in the latter parts of distillation differ in odour notes and chemical composition, all tested samples were collected in the first hour of distillation process. pH values ranged from 4.08 to 6.16. Although all hydrolates exerted radical scavenging activity against a stable free radical 1,1-diphenyl-2-picrylhydrazyl (DPPH) (3), only Thymus hydrolat (sample C) reached IC<sub>50</sub> value (concentration of sample required for scavenging 50% of the free DPPH radical) (Figure 1). *In vivo* measurements of relevant skin parameters were conducted on healthy human skin of 22 (18 female, 4 males; age 20 to 51, mean age 26.73±3.06 years) volunteers. A Multi Probe Adapter MPA® 9 was used for assessing transepidermal water loss (TEWL), skin pH and erythema index (EI). The safety of undiluted hydrolates on human skin was estimated during 24h exposure under occlusion, while efficacy was tested on artificially irritated skin (using sodium lauryl sulfate) following 5 days treatment. The results show that the hydrolates are safe for topical use (there is no significant difference between the measured parameters before and after 24h exposure) and could be beneficial on irritated skin. They all accelerated the pre-irritated skin recovery process although without statistical significance between the samples.

Although researchers interested in hydrolates investigation focus mostly on their antimicrobial activity, these „aromatic wastes” could also present promising cosmetic actives.



**Figure 1. Radical scavenging activity of hydrolates obtained by hydrodistillation of Lemon Balm herb – A, Carrot seeds – B, Thyme herb – C, Lavender flower – D, Hyssop herb – E, and Roman chamomile flower – F.**

## References

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2. Berardesca E. EEMCO guidance for the assessment of stratum corneum hydration: electrical methods. *Skin Res Technol.* 1997; 3(2):126-132.
3. Cuendet M, Hostettmann K, Potterat O. Iridoid glucosides with free radical scavenging properties from *Fagraea blumei*. *Helv Chim Acta* 1997; 80:1144-1152.

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## HIDROLATI: OD OTPADNIH PROIZVODA DO POTENCIJALNO KOZMETIČKI AKTIVNIH SUPSTANCI

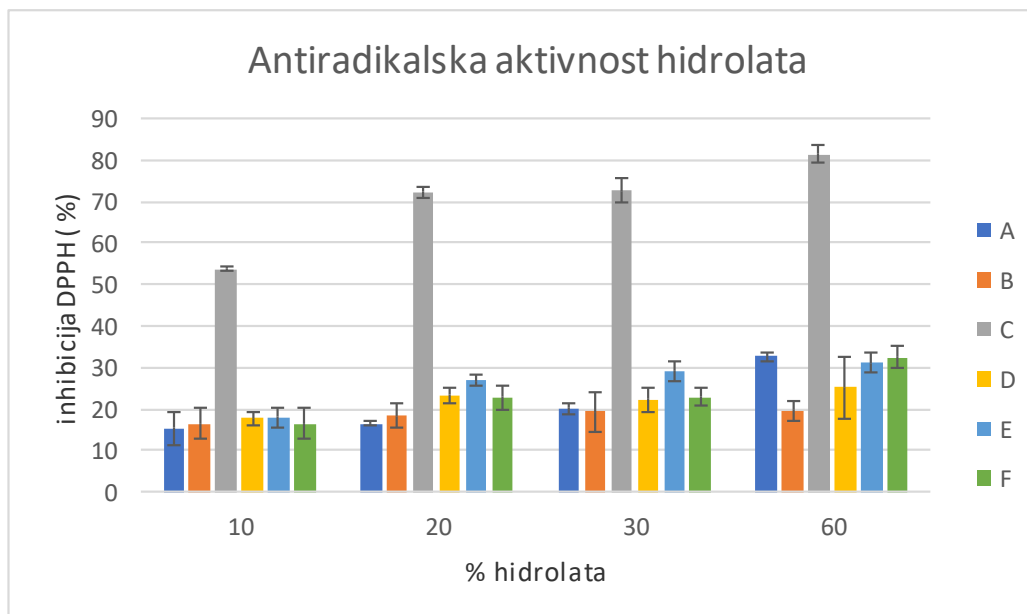
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Hidrolati, poznati i kao hidrosoli, aromatične vode, cvetne ili destilatne vode su sporedni proizvodi u procesu izolovanja etarskog ulja. Još jedan njihov sinonim je aromatični biljni otpad, pošto se uglavnom smatraju otpadnim proizvodom koji se dobija prilikom hidrodestilacije aromatičnih biljnih vrsta. Kao smeše koje sadrže malu varijabilnu količinu hidrosolubilne frakcije etarskih ulja i nasuprot samim etarskim uljima imaju umerene biološke aktivnosti. Većina hidrolata su kisele tečnosti prijatnog ili neprijatnog mirisa, koji je sličan ili različit od mirisa odgovarajućeg etarskog ulja (1).

U cilju procene mogućnosti za lokalnu primenu šest hidrolata (dobijenih nakon hidrodestilacije *Melissae officinalis herba* – A, *Daucus carotae semen* – B, *Thymi vulgaris herba* – C, *Lavandulae officinalis flos* – D, *Hyssopi officinalis herba* – E, and *Chamomillae romanae flos* – F) pH vrednost, miris, *in vitro* antioksidanta aktivnost i *in vivo* bezbednost i efikasnost na koži dobrovoljaca (2) su određene i upoređene. S obzirom da se hidrolati dobijeni tokom početne i kasnije faze destilacije razlikuju po mirisu i hemijskom sastavu, svi testirani uzorci su sakupljeni tokom prvog sata procesa destilacije. pH vrednosti uzoraka su bile u opsegu 4,08 – 6,16. Iako su svi hidrolati ispoljili sposobnost uklanjanja stabilnog slobodnog 1,1-difenil-2-pikrilhidrazil radikala (DPPH) (3), samo je hidrolat timjana (uzorak C) dosegao IC50 vrednost (koncentraciju uzorka potrebnu da ukloni 50% slobodnog DPPH radikala) (Slika 1). *In vivo* merenja relevantnih parametara kože su sprovedena na zdravoj koži 22 dobrovoljca (18 žena i 4 muškarca; starosti od 20 do 51, prosek 26,73±3,06 godina). Multi Probe Adapter MPA® 9 je korišćen za merenje transepidermalnog gubitka vode (TEWL), pH kože i eritema indeksa (EI). Bezbednost primene nerazblaženih hidrolata na humanu kožu je procenjivana tokom 24 h izloženosti pod okluzijom, dok je efikasnost testirana na veštački iritiranoj koži (korišćenjem natrijum lauril sulfata) tokom petodnevnog tretmana. Rezultati ukazuju na bezbednost lokalne primene (nema razlike u izmerenim parametrima pre i nakon 24 h izloženosti) kao i na pozitivan uticaj primene hidrolata na iritiranu kožu. Svi uzorci su, bez međusobne statistički značajne razlike, ubrzavali proces oporavka prethodno iritirane kože.

Iako se istraživači zainteresovani za ispitivanje hidrolata fokusiraju uglavnom na njihovu antimikrobnu aktivnost, ovaj „aromatični otpad“ je i obećavajuća kozmetički aktivna supstanca.



**Slika 1.** Aktivnost uklanjanja slobodnih radikala hidrolata dobijenih destilacijom herbe matičnjaka – A, semena šargarepe – B, herbe timjana – C, cveta lavande – D, herbe izopa – E i cveta rimske kamilice – F.

## Literatura

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