WOUND HEALING ACTIVITY OF *HELICHRYSUM ITALICUM* ESSENTIAL OIL-BASED OINTMENT IN DIABETIC RAT MODEL

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Helichrysum italicum is a typical Mediterranean plant belonging to the Asteraceae family. *H. italicum* essential oil, obtained by hydrodistillation from aerial flowering parts has been used traditionally for wound and burns treatment, but there is no scientific evidence that supports the traditional claim. The aim of our study was to estimate the antioxidant activity of commercial sample of *H. italicum* essential oil and investigate the wound healing effects of this essential oil-based ointment in diabetic rat. The antioxidant activity of essential oil was appraised by employing five *in vitro* test systems: 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay, hydroxyl ion (OH•), nitric oxide (NO•), lipid peroxidation (LP) and ferric reduction antioxidant potential (FRAP) test. Thirty-two diabetic rats with the induced excision wound were used to evaluate *in vivo* wound healing effects of ointment (1). The animals were randomly divided into four groups: untreated, topically treated with either a 1% silver sulfadiazine, the Eucerin base, or 0.5% essential oil ointment. The response to the treatment was assessed by macroscopic and biochemical analysis. Essential oil exhibited scavenging of DPPH· and ·OH• radicals with IC50 values of 4.45±0.44 and 13.33±1.11 μg/mL, respectively. Furthermore, essential oil inhibited LP with IC50 = 10.48±1.22 mg/mL. Topical application of the *H. italicum* ointment showed the highest wound contraction from day 7 to day 21 with the highest content of hydroxyproline in comparison to the all examined groups. Our findings revealed that the *H. italicum* ointment approach might serve as a promising and innovative tool for wound healing.

References

1. Thangavel P, Pathak P, Kuttalam I, Lonchin S. Effect of ethanolic extract of *Melia dubia* leaves on full-thickness cutaneous wounds in Wistar rats. Dermatol Ther. 2019 Nov;32(6):e13077. doi: 10.1111/dth.13077.

EFIKASNOST MASTI NA BAZI ETARSKOG ULJA *HELICHRYSUM ITALICUM* U TRETMANU RANA NA MODELU DIJABETIČNIH PACOVA

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Smilje, *Helichrysum italicum* je tipična mediteranska biljka iz porodice Asteraceae. Etarsko ulje *H. italicum, koje se dobija hidrodestilacijom biljke u cvetu (herba)* se tradicionalno koristi za lečenje rana i opekotina, ali naučni dokazi koji opravdavaju njegovu tradicionalnu upotrebu ne postoje. Stoga je cilj našeg istraživanja da se proceni antioksidativna aktivnost komercijalnog uzorka etarskog ulja *H. italicum* i da se ispita efekat masti na bazi ovog etarskog ulja u tretmanu zarastanja rana na modelu dijabetičnih pacova. Antioksidativna aktivnost etarskog ulja je procenjena primenom pet *in vitro* testova: testovi neutralisanja 2,2-difenil-1-pikrilhidrazil (DPPH), hidroksil (OH•) i azot-oksid (NO•) radikala, test inhibicije lipidne peroksidacije (LP) i test antioksidativnog potencijala redukcije gvožđa (FRAP). Za ispitivanje *in vivo* efekata masti na bazi etarskog ulja korišćeni su pacovi sa prethodno indukovanim dijabetesom, kojima su nakon toga rane izazvane metodom ekscizije (1). Životinje su nasumično podeljene u četiri grupe: netretirane, i grupe kojima su lokalno aplikovane: 1% srebro sulfadiazin, eucerin podloga ili 0,5% mast na bazi etarskog ulja. Makroskopske i biohemijske analize su korišćene u cilju poređenja efekata različitih preparata. Etarsko ulje je neutralisalo DPPH i OH• radikal sa IC_{50} vrednostima 4,45±0,44 i 13,33±1,11 mg/mL. Dodatno, etarsko ulje inhibiralo je LP sa IC_{50}=10,48±1,22 mg/mL. Lokalna primena masti pokazala je najveću kontrakciju rane od 7. do 21. dana sa najvećim sadržajem hidroksiprolina u poređenju sa svim ispitivanim grupama. Naši nalazi su otkrili da bi primena masti na bazi etarskog ulja *H. italicum* mogla poslužiti kao obećavajuće i inovativno sredstvo za zarastanje rana.

Literatura

1. Thangavel P, Pathak P, Kuttalam I, Lonchin S. Effect of ethanolic extract of Melia dubia leaves on full-thickness cutaneous wounds in Wistar rats. Dermatol Ther. 2019 Nov;32(6):e13077. doi: 10.1111/dth.13077.