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Antifungal activity of essential oil of *Myrtus communis* against *Malassezia* spp. isolated from the skin of patients with pityriasis versicolor

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Background: The increasing incidence of fungal infections has prompted the search for novel and effective antifungal drugs and natural agents, especially for local fungal infections which do not require systemic antifungal therapy. Also, use of natural antifungal products could prevent development of resistance on antifungal drugs. Given that, we have explored the antifungal activity of essential oil (EO) *Myrtus communis* against *Malassezia* spp. isolated from the skin of patients with pityriasis versicolor (PV). We investigated also synergistic effect of *M. communis* and grapefruit oil on *Malassezia* growth.

Material/methods: This prospective case-series study was conducted in Clinical Center of Serbia, Faculty of Medicine University of Belgrade and Biomedical department, University of Sassari, Italy. The samples were collected from 4 different sites of 41 patients with clinically confirmed presence of PV, with tape-method and cultured on modified Dixon agar, Leeming–Notman agar (LNA) and Sabouraud dextrose agar (SDA) media. The EO *M. communis* was obtained from local producers (Sardinia, Italy), standards of the compounds for grapefruit essential oil were purchased from Sigma-Aldrich Chem (Steinheim, Germany). Essential oil stocks were made and susceptibility testing was performed by the microdilution minimum inhibitory concentration (MIC) method using RPMI medium.

Results: A total of 86 yeast colonies were isolated from 41 patients with PV. Seven different *Malassezia* species were identified as follows: *Malassezia furfur* (42.5%), *M. sympodialis* (23.5%), *M. slooffiae* (13.9%), *M. globosa* (7.5%), *M. obtusa* (6%), *M. japonica* (4%) and *M. restricta* (2.5%). The most and least infected sites were: back (64.5%) and forehead (11.8%), respectively. MIC and MFC of *M. communis* were 31.25 and 62.5 µg/ml, respectively, while grapefruit EO exhibited MIC and MFC values of 125 and 250 µg/ml, respectively. The highest inhibiting activity was shown on growth of *M. furfur* (96%) and *M. sympodialis* (83%). Among two tested EO, *M. communis* demonstrated higher inhibitory effect than grapefruit ($p < 0.05$), while combined application of oils exhibited the highest inhibitory effects ($p < 0.01$). The lowest MIC and MFC of *M. communis* were 31.25 and 62.5 µg/ml, respectively, while grapefruit EO exhibited the lowest MIC and MFC values of 125 and 350 µg/ml, respectively. Both, synergistic MIC and MFC values of all three EO mixtures were higher than those obtained for individual EOs.

Conclusions: This is the first study studying and demonstrating potent activity of *M. communis* on growth of *Malassezia*. The broad spectrum antimicrobial activities of *M. communis* EO and its potent inhibiting activity on *Malassezia* growth deserve further research with aim to considerate this essential oil as a candidate for topical use in treatment of skin diseases.