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Compositional Variation in Volatile Constituents and Some Activities of Thyme Essential Oils Harvested from Saudi Arabia

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SUMMARY. **This study evaluates variations in the yield, chemical composition and biological effects of hydro-distilled thyme essential oils (TEOs) linked to variable agro-climatic conditions of fourharvesting regions. The antioxidant activity of TEOs was evaluated by measuring total phenolics content using Folin Ciocalteu reagent based colorimetric assay and DPPH radical scavenging capacity. TEOs along with principal component (durenol) were also evaluated for antimicrobial activity against selected strains of bacteria and fungus by disc diffusion method. The tested TEOs were evaluated for thrombolytic potential based on the clot lysis measurement using streptokinase as standard. The cytotoxicity of TEOs was identified against human RBCs using Triton X-100 and phosphate buffer saline as positive and negative control by taking absorbance at 576 nm. GC-Ms analysis of the tested TEOs was investigated to detect phytochemical components in oil fraction with potent biological activities. Overall, 40 chemical components, representing 98.17-99.56% of oil, were detected by GC-MS/GC-FID analysis with durenol (41.21%) as a principal component. TEOs exhibited good DPPH radical scavenging activity (68.80-94.00%) along with considerable antibacterial, antifungal and sizable thrombolytic activity (clot lysis 4.20-72.60%) with slight cytotoxicity (0.42-5.30%). TEOs contained oxygenated monoterpenes as a major class while durenol was found as the main component with its highest amount in Abha ecotype. The tested thyme chemotype can be explored as a good source for durenol rich essential oils with valuable antioxidant and antimicrobial properties having promising nutraceutical application with appreciable thrombolytic activity and negligible cytotoxicity.**

RESUMEN. Este estudio evalúa las variaciones en el rendimiento, la composición química y los efectos biológicos de los aceites esenciales de tomillo hidro-destilados (TEO) vinculados a condiciones agroclimáticas variables de cuatro regiones de cosecha. La actividad antioxidante de los TEO se evaluó midiendo el contenido total de fenoles utilizando el ensayo colorimétrico basado en el reactivo de Folin Ciocalteu y la capacidad de captación de radicales DPPH. Los TEO junto con el componente principal (durenol) también se evaluaron para determinar la actividad antimicrobiana contra cepas seleccionadas de bacterias y hongos mediante el método de difusión de disco. Se evaluó el potencial trombolítico de los TEO probados en función de la medición de la lisis del coágulo utilizando estreptoquinasa como estándar. La citotoxicidad de los TEO se identificó contra los glóbulos rojos humanos utilizando Triton X-100 y solución salina tamponada con fosfato como control positivo y negativo tomando absorbancia a 576 nm. El análisis GC-M de los TEO probados se investigó para detectar componentes fitoquímicos en la fracción de aceite con potentes actividades biológicas. En total, se detectaron 40 componentes químicos, que representan el 98.17-99.56% del aceite, mediante análisis GC-MS/GC-FID con durenol (41.21%) como componente principal. Los TEO exhibieron una buena actividad de eliminación de radicales DPPH (68.80-94.00%) junto con una considerable actividad trombolítica antibacteriana, antifúngica y considerable (lisis de coágulos 4.20-72.60%) con citotoxicidad leve (0.42-5.30%). Los TEO contenían monoterpenos oxigenados como una clase principal, mientras que el durenol se encontró como el componente principal con su mayor cantidad en el ecotipo Abha. El quimiotipo de tomillo probado puede explorarse como una buena fuente de aceites esenciales ricos en durenol con valiosas propiedades antioxidantes y antimicrobianas que tienen una prometedora aplicación nutracéutica con una actividad trombolítica apreciable y una citotoxicidad insignificante.

KEY WORDS: agro-climatic regions, antimicrobial, antioxidant, chemical composition, cytotoxicity, GC-MS, thrombolytic, thyme essential oil,

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