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The Mechanism of Antimicrobial Activity and Antioxidant Effects of the Essential Oil and the Methanolic Extract of Carum montanum (Coss. et Dur.) Benth. Et Hook. Aerial Parts from Algeria

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Abstract : The methanolic extract (ME) of C. montanum obtained by a hydo-alcoholic maceration and its polyphenol content was evaluated by Folin-Ciocalteu method. This extract and C. montanum essential oil were screened for antimicrobial activity against 21 microbial strains by agar diffusion method. MICs of the EO were determined by the broth micro dilution method. The mechanism of action of the EO was determined on the susceptible strains by the time kill assay and the lysis experience. Antioxidant properties were studied by both free DPPH radical scavenging and reducing power techniques. The TPC in the ME showed a high level of 101.50 ± 5.33 mg GAE /mg. B. cereus was the most sensitive strain with MIC of 55.5 µg/ml , then K. pneumoniae (111 µg/ml). A remarkable decrease in a survival rate as well as in the absorbance at 260 nm were recorded, which suggest that the cytoplasm membrane is one of the targets of the EO. Antioxidant effects were concentration dependent and IC50 values were 1.09 ± 0.37 µg/ml for the EO and 65.04 ± 0.00 µg/ml for the ME by DPPH method and a reducing power dose-dependent. In conclusion, C. montanum extracts showed potent which could be exploited in the food industry for food preservation.

Keywords : C. montanum, Apiaceae, essential oils, antimicrobial activity, antioxidant activity, reducing power
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