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POTENT *IN VITRO* ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS AND HYDROSOL EXTRACT FROM *daphne gnidium* L. GROWING IN ALGERIA

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INTRODUCTION:

Many plants have been used to treat several diseases in human therapy and veterinary, in food, and countless other areas. During the last period, there has been a growing interest in scientific studies on medicinal plants and their derived compounds. Otherwise, extensive uses of antimicrobials have caused the emergence of multidrug-resistant strains. Therefore, in order to control infectious diseases and their financial burden impact on the health care system, great effort has been expended to search and develop new antibacterial agents. Indeed, EOs as a source of bioactive compounds with antimicrobial potential, are receiving growing attention.

MATERIAL AND METHODS :

Seven microorganism strains were selected to assess the antimicrobial activity of essential oils and hydrosol from *D. gnidium* including Gram-positive and Gram-negative. The antibacterial activities were carried out using the agar disc diffusion method and the second determination of minimum inhibition concentration (MIC)

RESULTS AND DISCUSSION

Table 1. Antimicrobial activities of *D. gnidium* essential oil and hydrosol extract expressed by the diameter inhibition zones and MIC values (µL/mL)

Strains	Essential oil		Hydrosol		Standard antibiotics		
	DD	MIC	DD	MIC	CN	CIP	TOB
Gram-positive bacteria							
Staphylococcus aureus	30±00	<0.24	11±00	31.25±0.02	16	30	16
Enterococcusfeacalis	14±0.01	3.90±0.01	9±0.02	62.5±0.01	-	14	-
Bacillus cereus	27±0.06	0.97±0.01	11±00	15.62±0.03	24	27	12
Bacillus subtilis	28±00	0.48±00	14±0.01	3.90±00	-	25	16
Gram-negativebacteria							
Escherichia coli	36±0.01	<0.24	13±00	7.81±0.01	21	33	-
Pseudomonas aeruginosa	31±00	<0.24	12±0.01	7.81±0.01	19	33	18
Klebsiellapneumoniae	25±0.02	1.95±00	8±0.02	15.62±00	21	28	15

DD: Diameter of inhibition zone (mm) including disc diameter of 6 mm, -: not active.
MIC: Minimal inhibitory concentration (µL/mL).
CN: Gentamicin (10 µg/disc) CIP: Ciprofloxacin (5mcg/disc) TOB:Tobramycin (10 mcg/disc)

Figure 1. Examples of the most important zones of inhibition of *D.gnidium* extract

Figure 2. Method for determining the MIC in a liquid medium of *D.gnidium* extract

➢The results showed that the studied extracts have contributed to the inhibition of all tested strains to varying degrees (Table 1).

➢Essential oil has a very interesting antibacterial activity against the tested bacteria while hydrosol extract showed a moderate one.

➢the presence of the EO, E. coli , *P. aeruginosa* and *S. aureus* were the most sensitive microorganisms with important inhibition diameters of respectively 36, 31 and 30 mm.

➢The MICs values of Eos against the three bacteria E. coli, P. aeruginosa and S. aureus mentioned above were < 0.24 µL/mL.

➢EO containing spathulenol as a major compound were shown to exhibit antimicrobial activities against a variety of bacteria, Otherwise, it was also reported that the antimicrobial activity may not rely exclusively on the major compounds, but it is due to a possible synergistic effect between the different constituents of the oil.

CONCLUSION

- **The present findings show that D. gnidium aerial parts EO and hydrosol extract contains biologically potent therapeutic phytochemical with very strong antibacterial activities.**
- **The interesting activities of D. gnidium reflect its capacity to be used as a natural preservative in food, pharmaceutical industry and cosmetics.**