

COMPARATIVE ANTIBACTERIAL ACTIVITIES OF THE ESSENTIAL OILS OF STEMS AND SEEDS OF *Pituranthos scoparius* FROM ALGERIAN SEPTENTRIONAL SAHARA

N. Boutaghane,¹ A. Nacer,¹ Z. Kabouche,¹ and B. Ait-Kaki²

UDC 547.913

Pituranthos scoparius (Coss. & Dur.) Schinz (*Umbelliferae*) is a saharian species [1] used in traditional medicine for the treatment of asthma and rheumatism [2–3], Touareg people also use it in food as aroma for meal and bread [3]. The GC and GC/MS analysis of the essential oils of *Pituranthos scoparius* stems and seeds, collected from Ghardaia [4] (septentrional Sahara) during spring, allowed us to identify the respective components with relative percentages which appeared to be different from those reported from the species collected during winter at Ain Diss [5] (presaharian). The comparative percentages of the major components (more than 3%) of the stem and seed oils for each specimen (saharian and presaharian) are given in Table 1.

The species *Pituranthos scoparius* has not been the subject of biological studies. We report here the comparative antibacterial activities of the essential oils of stems and seeds of the species collected at Ghardaia, using the disk diffusion method. The MIC (minimum inhibitory concentration) values are given in Table 2–3. Both of the essential oils inhibited the growth of the tested strains, but the stems oils inhibited remarkably the growth of the microorganisms namely *Pseudomonas aeruginosa* ATCC 27853, *Proteus mirabilis*, and *Klebsiella pneumoniae* at the respective concentration levels 1 mg/ml, 2 mg/ml, and 16 mg/ml with 32 mm, 30 mm, and 28 mm inhibition zone diameters while the seed essential oil showed lowest MIC values with *Proteus mirabilis*, *Pseudomonas aeruginosa* ATCC 27853, and *Staphylococcus aureus* ATCC 25923 at 0.156 mg/ml, 1.25 mg/ml, and 20 mg/ml with 30 mm, 28 mm, and 28 mm inhibition zone diameters, respectively.

TABLE 1. The Major Components of Essential Oils of the Seeds and Stems of *Pituranthos scoparius* Growing in Ghardaia [4] and Ain Diss [5]

Compound	Seeds	Stems	Compound	Seeds	Stems
	%, [4]			%, [5]	
α -Pinene	8.2	6.8	α -Pinene	11.0	34.0
β -Pinene	4.6	3.8	<i>p</i> -Cymene	1.6	3.3
α -Phellandrene	4.0	7.1	Bornylacetate	21.0	0.2
<i>p</i> -Cymene	7.5	4.2	<i>trans</i> -Verbenol	0.2	3.6
Limonene	11.2	9.8	Apiol	52.8	15.0
Thymol	5.9	0.1			
Methyleugenol	1.6	5.9			
Germacrene D	1.0	12.7			
Myristine	11.1	7.2			
Spathulenol	2.5	4.5			
Dill apiol	12.2	1.1			

1) Laboratoire d'Obtention de Substances Therapeutiques (LOST), Faculte des Sciences, Universite Mentouri-Constantine, Campus Chaabet Ersas, 25000 Constantine, Algerie, fax: (21331) 63 53 52, e-mail: zkabouche@hotmail.com ;2) Centre Hospitalo-universitaire Benbadis-Constantine, Service de bacteriologie, 25000 Constantine, Algerie. Published in Khimiya Prirodnikh Soedinenii, No. 6, p. 498, November-December, 2004. Original article submitted June 28, 2004.

TABLE 2. Antibacterial Activity of Essential Oil of Stems of *Pituranthos scoparius* from Ghardaia

Microorganism	MIC, mg/ml	Inhibition zone diameters, mm			
		Dilution			
		1	1/2	1/4	1/8
<i>Enterobacter</i>	256	22	20	16	14
<i>Escherichia coli</i> ATCC 25922	256	26	22	20	20
<i>Klebsiella pneumoniae</i>	16	28	22	18	16
<i>Proteus mirabilis</i>	2	30	24	22	18
<i>Pseudomonas aeruginosa</i> ATCC 27853	1	32	30	26	22
<i>Salmonella thiphymurium</i>	128	22	18	16	16
<i>Staphylococcus aureus</i>	256	26	22	18	14

TABLE 3. Antibacterial Activity of Essential Oil of Seeds of *Pituranthos scoparius* from Ghardaia

Microorganism	MIC, mg/ml	Inhibition zone diameters, mm			
		Dilution			
		1	1/2	1/4	1/8
<i>Enterobacter</i>	40	30	24	20	20
<i>Escherichia coli</i> ATCC 25922	40	24	20	18	14
<i>Klebsiella pneumoniae</i>	160	24	22	20	18
<i>Proteus mirabilis</i>	0.156	30	26	22	20
<i>Pseudomonas aeruginosa</i> ATCC 27853	1.25	28	26	22	20
<i>Salmonella thiphymurium</i>	320	24	22	20	18
<i>Staphylococcus aureus</i>	20	28	24	22	20

REFERENCES

1. P. Quezel and S. Santa, *Nouvelle flore de l'Algerie et des regions desertiques meridionales*, Editions du Centre National de la Recherche Scientifique, Paris, 1963.
2. M. K. Boukef, *Les plantes dans la medecine traditionnelle tunisienne*, Agence de Cooperation Culturelle et Technique, 1986, pp. 228–230.
3. A. C. Benchelah, H. Bouziane, M. Maka, and C. Ouahes, *Fleurs du Sahara*, Ibis Press, Paris, 2000.
4. P. Verite, A. Nacer, Z. Kabouche, and E. Seguin, *Flavour. Fragr. J.*, **19** (6), 562 (2004).
5. G. Vernin, C. Lageot, C. Ghiglione, M. Dahia, and C. Parkanyi, *J. Essent. Oil Res.*, **11**, 673 (1999).