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## Essential Oil Compositions of *Cymbopogon parkeri* STAPF from Iran

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**Abstract:** Aerial parts of aromatic grass, *Cymbopogon parkeri* STAPF, were collected at flowering stage from Kerman province of Iran. The essential oil of air dried samples obtained by hydro-distillation method. The compositions of the essential oil were determined by the use of GC and GC-MS. Nineteen (98.7%) constituents were identified. The main constituents were piperitone (80.8%), germacrene-D (5.1%), santolinyl acetate (2.1%) and  $\alpha$ -eudesmol (2.1%).

**Key words:** *Cymbopogon parkeri* STAPF, essential oil, piperitone, Iran

### INTRODUCTION

The genus *Cymbopogon* is one of the most important aromatic plants belongs to the Poaceae family. Various species of this genus such as citronella, lemongrass and palmarosa, are important sources of essential oil components such as citral, citronellal, citronellol, geraniol, etc., that are used extensively in the perfumery, cosmetics and pharmaceutical industries (Ramesh and Mallarapu, 1992; Weiss, 1997; Kumar, 2000).

Two species of this genus, *C. olivieri* (Boiss). Bor and *C. parkeri* STAPF are widely distributed in southern parts of Iran (Rechinger, 1982; Ghahraman, 1995). Aerial parts of these species have been used as antiseptic and stomachic (Amin, 1993). The essential oil compositions of *C. olivieri* from Iran was previously identified as piperitone (53.3%),  $\gamma$ -terpinene (13.6%), elemol (7.7%),  $\beta$ -eudesmol (4.4%), torreyol (3.3%), limonene (2.9%) and  $\gamma$ -cadinol (2.1%) were the major components (Norouzi-Arasi *et al.*, 2002). Essential oil of *Cymbopogon parkeri* STAPF was not studied previously. The present study was undertaken to study the chemical composition of the essential oil of this species.

### MATERIALS AND METHODS

**Plant materials and oils isolation procedure:** Aerial parts of *Cymbopogon parkeri* were collected from Kerman province of Iran, Delfard, at flowering stage in 30 April 2004. Voucher specimen was deposited in the herbarium of Faculty of Natural Resources, Islamic Azad University, Baft-Kerman. Collected sample was air dried at ambient

temperature in the shade and essential oils were isolated (50 g 3 times) using a Clevenger-type apparatus for 3 h. The oils were dried over anhydrous sodium sulphate and stored at 4-6°C.

**Oil analysis:** GC analyses were performed using a Shimadzu GC-9A gas chromatograph equipped with a DB-5 fused silica column (30 m  $\times$  0.25 mm i.d., film thickness 0.25  $\mu$ m). Oven temperature was held at 50°C for 5 min and then programmed to 250°C at a rate of 3°C min<sup>-1</sup>. Injector and detector (FID) temperature were 260°C; helium was used as the carrier gas at a linear velocity of 32 cm s<sup>-1</sup>.

GC-MS analyses were carried out on a Varian 3400 GC-MS system equipped with a DB-5 fused silica column (30 m  $\times$  0.25 mm i.d.); oven temperature, was 40°C to 240°C at a rate of 4°C min<sup>-1</sup>; transfer line temperature, 260°C; carrier gas, helium at a linear velocity of 31.5 cm s<sup>-1</sup>; split ratio, 1/60; ionization energy, 70 eV; scan time, 1 s; mass range, 40-300 amu. The percentages of compounds were calculated by the area normalization method, without considering response factors. The components of the oil were identified by comparison of their mass spectra with those of a computer library or with authentic compounds and confirmed by comparison of their retention indices either with those of authentic compounds or with data published in the literature (Adams, 1995).

### RESULTS AND DISCUSSION

The essential oil obtained by hydro-distillation of the aerial parts of *C. parkeri* was found to be a yellow liquid

Table 1: Percentage composition of essential oils of *Cymbopogon parkeri* from Iran

Compound	RI	(%)
$\alpha$ -pinene	931	1.1
sabinene	977	1.1
3-octanol	993	t
$\delta$ -3-carene	1011	1.0
1,8-cineole	1034	0.3
$\gamma$ -terpinene	1060	0.1
$\beta$ -thujone	1113	t
cis-pinene hydrate	1121	0.6
trans-pinene hydrate	1140	0.3
menthone	1154	0.8
borneol	1163	0.3
santoliryl acetate	1172	2.1
piperitone	1252	80.8
germacrene-D	1479	5.1
$\delta$ -Cadinene	1522	0.5
elemol	1549	1.4
caryophyllene oxide	1580	0.2
$\beta$ -eudesmol	1648	0.9
$\alpha$ -eudesmol	1652	2.1
Total		98.7

RI: Retention Index

at a yield of 2.5% (w/w). Nineteen compounds were identified in the essential oil of *C. parkeri*, representing more than 98.7% of the oil, of which the major components were found to be piperitone (80.8%), germacrene-D (5.1%), santoliryl acetate (2.1%) and  $\alpha$ -eudesmol (2.1%). The chemical composition of the *C. parkeri* oil can be shown in Table 1. The components are listed in order of their elution on the DB-5 column. Comparison of these results with that of other *Cymbopogon* species showed that the oil composition of *C. parkeri* is like that of *C. olivieri* (Norouzi-Arasi *et al.*, 2002). Rizka *et al.* (1995) reported that geraniol is the major component of oil of *C. parkeri* from Qatar. Other species of this genus are different in their compositions and different chemotypes such as geraniol, limonene, citronellal, citronellol etc., which have been found previously, are used in different industry but the oil of *C. parkeri* is not like them in its components (Weiss, 1997; Kumar, 2000).

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