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## Compositions of the essential oils from two types of *ocimum basilicum* introduced in Bangladesh

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### Abstract

Essential oils from two types of *Ocimum basilicum* introduced in Bangladesh were analyzed by GC-MS. The major constituents found in the oil collected from Indian variety were methyl chavicol (78.2), citral (3.7%) and tau-cadinol (2.49%). Introduced variety from Thailand contains anisole, p-propenyl (93.99%) as major compound.

**Keywords:** Sweet basil; Introduced; Essential oil; GC-MS; Methyl chavicol; Anisole

### Introduction

Sweet basil (*Ocimum basilicum*) is a popular culinary herb and a source of essential oils used to flavor foods, in dental and oral products and in fragrances is native to India but is grown in several regions all over the world (Heath 1981, Guenther 1952, Simon 1990, Khatri *et al* 1995). Europeans and Asians are known with this plant for use in folklore and religious rituals (Srivastava 1982). The plant is useful in indigenous system of medicine for cephalalgia, gouty joints, throat irritation, constipation and piles (Yusuf *et al.*, 2009, Srivastava 1982).

There are many types; large and small, with a range of leaf colours from green to purple up to variegated. There are considerable variations in the contents of the major components within this species. Lawrence (1978-1998) reviewed most of the literature concerning the composition of *O. basilicum*.

### Materials and method

Thai basil was collected from the Botanical garden of Dhaka University and Indian basil from the garden of Modern Herbal at Dhemra, Dhaka.

The oils were isolated by hydro distillation method for 4 hrs using Clevenger apparatus. The oil obtained was dried over anhydrous sodium sulphate and preserved for analysis in air tight containers.

The essential oils from aerial parts of two types of *O. basilicum* were analyzed by GC-MS electron impact ionization (EI) method on GC-17A gas chromatograph (Shimadzu) coupled to a GC-MS QP 5050A Mass Spectrometer (Shimadzu); fused silica capillary column (30m x 2.5mm; 0.25 m film thickness), coated with DB-1 (J&W); column temperature 100°C (2 min) to 250°C at the rate of 3°C/min; carrier gas, helium at constant pressure of 90Kpa. Acquisition parameters full scan; scan range 40-350 amu. The compounds were identified by comparing with the NIST library data.

### Results and discussion

Chemical compositions of the essential oils of two types of *Ocimum basilicum* introduced in Bangladesh are presented in the Table I. It is found that Indian variety contains methyl chavicol (78.2) as major constituents and the other compounds are (Z)-ocimene (1.58%), citral (3.75%), 3-methoxycinnamaldehyde (1.39%), 1,8-cineole(1.17%), eugenol, methyl ether (1.82%) tau-cadinol (2.49%). Thai variety contains anisole, p-propenyl (93.99%) as major constituents followed by Bicyclo[4.4.0]dec-1 ene, 2-isopropyl-5-methyl-9-methylene (2.44%).

It is reported (Keita *et al.*, 2000) that the oil of *O. basilicum* contained linalool (69%), eugenol (10%), (E)-a-berg-

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**Table I. Composition of the Essential oils from two types of *Ocimum basilicum* introduced in Bangladesh.**

Compounds	Indian type	Thai type
$\alpha$ -Bergamotene	0.90	0.36
Limonene	0.33	-
Anisole, p-propenyl	-	93.99
Methyl eugenol -	0.38	-
(Z)-Ocimene	1.58	-
1,4,7-Cycloundecatriene,1,5,9,9-tetramethyl	-	0.62
2-Carene	0.10	-
$\delta$ -Guaiene	0.29	-
$\gamma$ -Muurolene	0.68	0.59
Camphor	0.75	0.98
1,8-Cineole	1.17	-
Bicyclo[4.4.0]dec-1 ene,2-isopropyl-5-methyl-9-methylene	-	2.44
Borneol	0.22	-
Methyl Chavicol/Estragole	78.20	-
Anisaldehyde	0.09	-
Citral	3.75	-
Acetic acid,1,7,7-trimethyl-bicyclo[2.2.1]hept-2-yl ester	0.28	-
Linalool	0.56	-
Eugenyl methyl ether	1.82	-
Caryophyllene	0.39	-
1-(3-Methylbutyl)-2,3,4,6-tetramethylbenzene	0.16	-
Caryophyllene oxide	0.28	-
$\beta$ -Farnesene	0.08	-
$\alpha$ -Caryophyllene	0.21	-
$\beta$ -Cubebene	0.08	-
Cubenol	0.32	-
$\gamma$ -Elemene	0.18	-
Geraniol	0.47	-
Germacrene D	0.57	0.69
E-11912-Cyclopropyl)dodecen-1-ol	0.12	-
Cedrene	0.08	-
Isoledene	0.11	-
3-Methoxycinnamaldehyde	1.39	-
Neryl acetate	0.18	-
Spathulenol	0.22	-
$\beta$ -Elemene	0.97	-
Selina-6-en-4-ol	0.11	-
tau-Cadinol	2.49	-
Aromadendrene oxide-(1)	0.30	-

amotene (3%) and thymol (2%). Linalool (45.7%), eugenol (13.4%), methyl eugenol (9.57%) and fenchyl alcohol (3.64%) were reported to be the main components (Akgul 1989). Khatri *et al.*, (1995) found methyl chavicol (87.3%), linalool (5.4%), methyl eugenol (1.5%),  $\beta$ -caryophyllene (2.4%).

In *O. basilicum* var *purpurascens* from India methyl chavicol (70-87%) (Gulati 1977) or methyl cinnamate (34-75%) (Singh and Bordoloi 1991, Gupta 1996) were reported as the main components. Thoppil (1996) found in numerous varieties linalool (36-41%), citronellal (20-24%), and geraniol (7-10%) in oil of var. *purpurascens*. Mondello *et al.* (2002) reported linalool (29.7%), geraniol (27.4%) and geranyl acetate (13.8%) as major constituents in an oil collected from Cox'sbazar, Bangladesh. Another type from Bandarban district of Bangladesh (Mohiuddin *et al.*, 2012) contains linalool (16.42%), methyl cinnamate (59.62%) as major compounds. There is no report yet found on content of anisole, p-propenyl in *O. basilicum* oil.

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