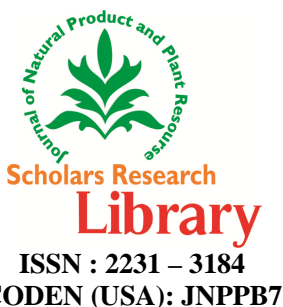




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Aromatic plants containing essential oil component-linalool, eugenol and methyl chavicol reported from North-East India

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ABSTRACT

North-Eastern region is one of the richest areas having high plant diversity in India. It is abound with large variety of plants yielding timber, medicine and other valuable products. Among all the plant resources which have potential for economic development of the region, aromatic plants have been considered as one of the major resources of the region because of the presence of some essential oil components which have high market demand for various end used industries like cosmeceuticals, health beverages, chemical terpenes, etc. The present paper deals with some naturally occurring plants reported from northeast having three essential oil components viz., linalool, eugenol and methyl chavicol.

Keywords: Aromatic plants, North-East India, essential oil

INTRODUCTION

Aromatic plants are those that possess essential oil which are volatile at room temperature. They contain monoterpene, sesquiterpene hydrocarbons and their oxygenated compounds. Some phenyl propenoids, phenolics and sulfur compounds as well as aromatic fatty acids are also present in essential oil. These compounds are produced and stored naturally in a special structure called gland that is located in different parts of plant such as leaves, flowers, fruits, buds, twigs, foliage, wood, seeds, barks and roots. Essential oils are used in food industries as flavouring agent, in the perfumery industries as fragrances and in the phyto-pharmaceutical industries for adding taste, aroma and for masking the less desirable medicated flavor of the drugs. They are highly concentrated, low volume, high value products. In general, essential oil possesses anti-microbial, anti-inflammatory and insect repellent properties. They are also used in aromatherapy to relieve stress, depression, backache, heartburn, swelling, cellulite etc. The essential oils are extracted by some physical and chemical processes like steam distillation, hydro distillation, maceration, expression, enfleurage and solvent extraction. With the advancement of industrialization the synthetic compounds that have been developed are very much similar like the natural compounds. As the natural compounds are very expensive so the synthetic compounds are used which has reduced the use of natural flavor and fragrant materials. But the synthetic compounds have various side affects, hence the industries are inclined towards the use of natural products even at much higher price.

Now a days Aromatic Plants are utilized commerce ially mostly for oil extraction. Apart from this the non-leafy parts are used as spices and the leafy parts as herbs. Commercially grown Aromatic plants are mainly used for the purpose of extraction of essential oils. Asia possesses favorable climatic conditions suitable for the growth and development of Aromatic plants hence it is known as "the land of Aromatic plants" throughout the world (Chomchalow, N. 2002). Countries like China, India, Indonesia, Nepal, Srilanka and Thailand of Asia produces essential oil on industrial basis. India has already occupied a position in the global trade and market of Medicinal and Aromatic Plants (MAP) and pharmaceutical products. However, majority of the Aromatic plants still occur naturally in the wild. Northeast India is also very rich in Aromatic plants.

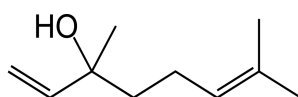
It is the richest areas of India with diverse plant resources because of its varied landscape, favourable climatic condition and the variation in ecological and geographical diversity makes it quite different from other parts of the sub-continent. This region is very rich in biodiversity and hence it is considered as one of the leading conservation agencies of the world.

AREA AND LOCATION

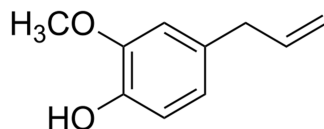
North East India comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura has a total geographical area of 262179 km² (about 8% of the total area of India) and lies between 21.34' N to 29.50'N latitude and 87.32'E to 97.52'E longitudes. Arunachal Pradesh is the largest state, having 83,743 km² areas while Sikkim is the smallest state of the region with the geographical area of 7,098 km². North eastern India stretches from the foothills of the Himalayas in the eastern range and is surrounded by Bangladesh, Bhutan, China, Nepal and Myanmar.

STRUCTURE OF LINALOOL, EUGENOL AND METHYL CHAVICOL AND THEIR IMPORTANCE:

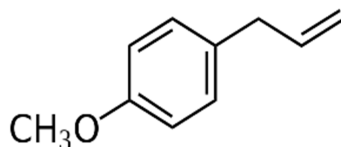
Linalool: It is an aliphatic tertiary terpene alcohol with the chemical formula C₁₀H₁₈O and exists in d- and l- forms. It occurs either free or in combined form as acetate. It is one of the most important aromatic isolates used extensively in perfumes for soaps and cosmetics and in flavours.



Eugenol: It is a clear pale yellow oily liquid with a pleasant, spicy clove-like odour with the chemical formula C₁₀H₁₂O₂. It has a warm, powerful spicy odour and taste. It is used in medicine as a local antiseptic and anesthetic, in perfumes for soaps and cosmetics and as a flavouring agent in all kinds of food, meat, sausages and sauces. Combining with ZnO₂ it is used in dentistry as a temporary filling. It also has antibacterial properties.



Methyl chavicol: It is also known by the name **estragole** which is a phenylpropene, a natural organic compound. It has the chemical formula C₁₀H₁₂O. It is a colourless liquid but impure samples are yellow in colour. It is a component of various herbs and is used in preparation of fragrances. It is also used as a food additive for flavor.

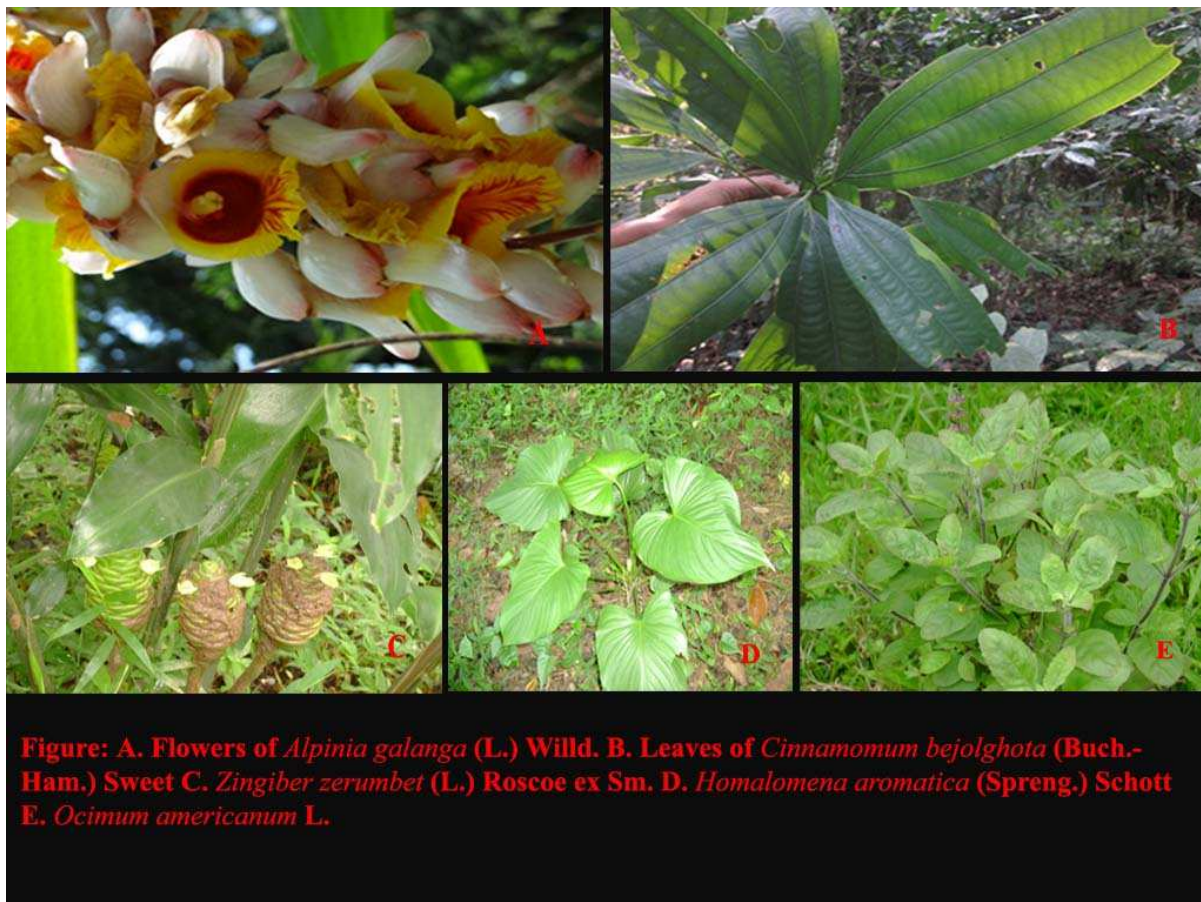


METHOD AND METHODOLOGY

The present work is based on review of literature as well as on first hand information gathered through field studies conducted among the ethnic groups and communities of north-east India. Voucher specimens have been prepared following standard methods (Jain and Rao 1977).

LIST OF AROMATIC PLANTS RECORDED FROM N.E. INDIA WITH PARTS AND PERCENTAGE: NS: NOT SPECIFIED

Sl No	Name of the plant	Parts used	Linalool (%)	Eugenol (%)	Methyl chavicol (%)	Reference
1.	<i>Zingiber officinale</i> Roscoe (Moran land race)	Rhizome	55.44µg/mL	–	–	Das <i>et al.</i> , 2013
2.	<i>Cinnamomum verum</i> Presl	Leaf Bark	–	92.70 42.0	–	Baruah <i>et al.</i> , 2010 Kumar A.,2009
3.	<i>C. bejolghota</i> (Buch.- Ham.) Sweet	Bark Leaf Panicle	19.9-20.0 57.4 62.82	–	–	Choudhury <i>et al.</i> , 1998 Baruah <i>et al.</i> , 1997
4.	<i>Clausena heptaphylla</i> W&A	Leaf Fruit oil	–	–	57.5 86.2	Nath <i>et al.</i> , 1992
5.	<i>Ocimum basilicum</i> L.	Aerial parts	14.3	–	74.7	Saikia and Nath, 2003
6.	<i>O. canum</i> Sims.	Whole plant	18	–	77	Kalita <i>et al.</i> , 2013
7.	<i>O. gratissimum</i> L.	Whole plant	–	74.4	–	Kalita <i>et al.</i> , 2013
8.	<i>O. sanctum</i> L.	Whole plant	–	71	–	Kalita <i>et al.</i> , 2013
9.	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Bark, leaves, seeds	NS	–	–	Ahmed <i>et al.</i> ,2000
10.	<i>Litsea cubeba</i> Pers.	Leaf	78.3	–	–	Nath <i>et al.</i> ,1996
11.	<i>Cymbopogon flexuosus</i> (Nees ex Steud.) Wats	Inflorescence	0.7-1.4	–	–	Sarma <i>et al.</i> , 2011.
12.	<i>Cymbopogon microstachys</i> (Hook.f.) Soenarko	NS	–	56.4-60.7	–	Rout <i>et al.</i> ,2005
13.	<i>Illicium griffithii</i> Hook.f.& Thorns	Mature fruit	19.06	–	–	Dutta <i>et al.</i> ,1997
14.	<i>Cinnamomum tamala</i> L.	Leaf Leaf Leaf Stem bark	15 1.20 24.45 75.53	91.4-41.8 80-85 68.10 56.56 5.56	–	Rana <i>et al.</i> ,2012
15.	<i>Alpinia galanga</i> (L.) Willd.	NS	–	3.3	–	Raina <i>et al.</i> ,2013
16.	<i>Lindera neesiana</i> Benth.	Leaf	–	–	83.76	Singh <i>et al.</i> ,1995
17.	<i>Zanthoxylum nitidum</i> (Roxb.)DC	Fruit	23.3	–	–	Bhattacharya <i>et al.</i> ,2009
18.	<i>Homalomena aromatica</i> (Spreng.) Schott	Root	58.3	–	–	Rana <i>et al.</i> ,2009
19.	<i>Cinnamomum sulphuratum</i> Nees.	Leaf	92.66	–	–	Baruah <i>et al.</i> , 2002
20.	<i>Cinnamomum verum</i> J.Presl Syn. <i>Cinnamomum zeylanicum</i> Breyn.	Leaf Stem bark	10.81 3.42	–	0.63 0.13	Nath <i>et al.</i> , 1996
21.	<i>Cinnamomum pauciflorum</i> Nees.	Leaf	2.3	0.40	–	Baruah and Nath., 2006
22.	<i>Amomum linguiforme</i> Benth.	Rhizome	–	–	93.2	Hazarika <i>et al.</i> , 2011
23.	<i>Ocimum basilicum</i> L. Syn. <i>O. basilicum</i> L. var. <i>purpurascens</i> Benth.	Stem Leaf Flower	9.97 13.47 18.54	–	–	Singh <i>et al.</i> , 1986
24.	<i>Cinnamomum champokianum</i> Baruah & S.C. Nath	Stem bark	14.40	1.50	–	Baruah and Nath, 2007



CONCLUSION

It can be concluded from the above study that aromatic plants have high commercial demand because of the presence of three essential oil components *viz.* linalool, eugenol and methyl chavicol. Among these components, linalool is found in majority of the plants. Percentage of linalool is highest in the leaf of *Cinnamomum sulphuratum* (92.66%), followed by the stem of *Cinnamomum tamala* (75.53%). Percentage of eugenol is highest in the leaf of *Cinnamomum verum* (92.7%), followed by the leaf of *Cinnamomum tamala* (91.4%). Highest content of methyl chavicol is found in the rhizome of *Amomum linguiforme* (93.2%) followed by the fruit of *Clausena heptaphylla* (86.2%).

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