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CHEMICAL COMPOSITION OF LEAF ESSENTIAL OIL OF *LANTANA CAMARA* L. FROM BANGLADESH

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Abstract

Essential oil of fresh matured leaves of *Lantana camara* L. growing in Bangladesh were analyzed by GC-MS technique. Sixty two compounds were identified in the oil. The major constituents identified include caryophyllene (13.57%), α-caryophyllene (11.76%), germacrene D (10.88%), isocaryo-phyllene (9.59%), γ-muurolene (6.85%) and γ-elemene (5.65%).

Lantana camara L. (Fam. Verbenaceae) a native of tropical America, was introduced in Bangladesh as a hedge and an ornamental shrub and now has become an aggressive weed. The leaves are used in the treatment of tumors, tetanus, rheumatism, malaria and reported to possess diaphoretic, carminative, antiseptic properties, and are main source of phosphorous and potassium when used as green mulch (Raju 2000). The plant has also been shown to have fungitoxic activity (Saksena and Tripathi1985), to be autotoxic (Arora and Kahli 1993), and to be poisonous to grazing animals (Motion 1994) and antioxidant (Romero and Saavedra 2005). The oil is reported to possess insecticidal (Patil *et al*. 1997), and repellent activities towards bees, mosquitoes and cattle flies (Attri and Singh 1978). The leaf oil of *L. camara* exhibits ovipositional (Adebayo and Gbolade 1994), and antimicrobial activities (Saxena and Sharma 1999). Khan *et al*. (2002) also reported germacene D (20.5%), 3-elemene (10.3%), β-caryophyllene (9.4%), β-elemene (7.3%), α-copane (5.0%) and α-cadinene (3.3%) as main constituents in oil of Indian *Lantana*.

The leaves of *L. camara* were collected from the wild sources of Chittagong during September 2006 and the oils were extracted by hydro distillation method for 4 hrs using Clevenger apparatus. The oil obtained was dried over anhydrous sodium sulphate.

The essential oil from leaves of *L. camara* was 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 × 2.5mm; 0.25 μm 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 90 Kpa. Acquisition parameters full scan; scan range 40-350 amu. The compounds were identified by comparing with the NIST library data.

GC-MS analysis resulted in the identification of a total of 62 constituents from the leaf oil of *L. camara*. Analysis of the oil showed that the oil was a complex mixture of numerous compounds; many of which were present in trace amounts. The identified compounds accounted for more than 95% of the total oils. The major components were caryophyllene (13.57%), α-caryophyllene (11.76%), germacrene D (10.88%), isocaryophillene (9.59%), γ-muurolene (6.85%), γ-elemene (5.65%). In addition there were δ-cadinene (4%), γ-terpinene (3.97%), copaene (3.14%), eucalyptol (2.76%), 3-carene (1.96%), β-pinene (1.43%), sabinene (1.18%), limonene (1.18%), o-cymene (1.11%), borneol (1.13%), germacrene D-4-ol (1.10%). It is worth mentioning here that there is great variation in the chemical composition of *L. camara* oils reported up to now from the different parts of the world (Rana *et al*. 2005, Pino *et al*. 2004, Oyedeji *et al*. 2003). It is clear that in different geographical regions the chemical composition of

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the oil varies considerably. Caryophyllene groups were observed as the only versatile common component present in all the *Lantana* oils analyzed so far (Singh *et al*. 1991, Ngassoum *et al*. 1999, Sefidkon. 2002, Khan *et al*. 2002, Sundufu and Shoushan 2003, Oyedeji *et al*. 2003, Pino *et al*. 2004, Rana *et al*. 2005). Another important common component germcrene D was also present in some of the *Lantana* oils analyzed (Silva *et al*. 1999, Khan *et al*. 2002, Sundufu *et al*. 2003, Oyedeji *et al*. 2003, Rana *et al*. 2005). On the basis of above fact it appears that *L. camara*, growing widely in Bangladesh, may be utilized as a source for the isolation of natural caryophyllene. Its bioactive properties can also be evaluated for therapeutic use if any.

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