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NOTE

Surface Hydrocarbons from the Leaves of *Trianthema portulacastrum* Linn.

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Hydrocarbons from the surface wax of the fresh leaves of *Trianthema portulacastrum* Linn. have been isolated and characterized and their relative distribution determined through GLC studies. The considerable occurrence of branched chain hydrocarbons may be an indication of the characteristics of lower plants based on taxonomy.

Key Words: Surface wax, Hydrocarbons, Leaves, *Trianthema portulacastrum* Linn.

Trianthema portulacastrum Linn., a plant belonging to the family Aizoaceae and order Carryphyllates of the subclass Caryophyllidae and commonly known as horse purslane in English and shvetapunarnava in Sanskrit, is of great traditional reputation being used particularly by tribals all over India. The whole plant body as well as its different organs are used in the indigenous system of medicine[1]. A decoction of the herb is used as vermifuge and in rheumatism and alcoholic intoxication[2]. It is also used as a remedy for dropsy and swelling of the body caused by disorders of liver and kidney[3]. It is well known that surface wax of the leaves of a plant plays an important role in affecting transportation and leaf surface properties although its composition may vary with environmental situations and also with the age of the plant[4–6]. The universal presence of normal alkanes as constituents of leaf cuticular wax is well established and their distributions are considered as taxonomic markers[7–12]. But, this approach has not always met with unambiguous success[4, 5, 13–15]. This communication is related to the characterization and analysis of the surface hydrocarbons, mainly *n*-alkanes present in the leaves of the referred plant.

The solvents used, *e.g.*, *n*-hexane for solvent extraction, carbon tetrachloride as thin-layer chromatographic solvent and chloroform for elution purpose were all of analytical grades, obtained from E. Merck, India. The standard hydrocarbon samples were obtained from Sigma Chemical Co., USA.

The surface wax was extracted in cold hexane (45 min) from the fresh leaves (50 g) of the above species at room temperature. The solvent was removed under reduced pressure and the crude extract was fractionated through preparative thin layer chromatography using carbon tetrachloride as chromatographic solvent (mobile phase). The thin-layer chromatographic plates (thickness 0.5 mm) were prepared with silica gel-G (E. Merck, India) using Unoplan coating apparatus

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(Shandon, London). The hydrocarbon band was identified through co-TLC studies with standard hydrocarbon samples (Sigma, USA). The band was eluted with chloroform. The eluted single band showed no absorption for any detectable functional group in infrared region and the absence of alkenes was confirmed by argentometric TLC[16] indicating clearly the presence of only alkanes in it. The purified hydrocarbon fraction was then analyzed directly by a programmed GLC run (oven temperature 170–300°C at 5° min^{-1} rise, initial period 1 min and final period 15 min) in a Hewlett-Packard gas chromatograph (Model 5890 Series II) on a HP-1 capillary column 25 m long with flame ionization detector (FID) and nitrogen as carrier gas and characterized through co-GLC with authentic samples of *n*-alkanes (Sigma, USA).

The main findings from the GLC analysis of alkanes in surface wax of leaves of *T. portulacastrum* are presented in Table-1.

TABLE-1
DISTRIBUTION OF THE HYDROCARBON CONSTITUENTS OF THE LEAF WAX OF *TRIANTHEMA PORTULACASTRUM*

[Values in mol %]

n-Alkanes (Carbon number)	Relative %
C_{17}	—
C_{18}	1.01
C_{19}	1.68
C_{20}	1.91
C_{21}	1.51
C_{22}	0.49
C_{23}	1.39
C_{24}	2.40
C_{25}	0.25
C_{26}	3.76
C_{27}	29.18
C_{28}	—
C_{29}	7.05
C_{30}	2.40
C_{31}	—
C_{32}	5.35
Total *n*-alkanes	58.38
Branched chain alkanes	41.62
Composition ratio of odd members to total n- alkanes	70.33
Ratio of normal to branched hydrocarbons	1.40:1
Ratio of odd and even numbered hydrocarbons	2.37:1

This analysis revealed the presence of all the members of *n*-alkanes in the series C_{18}–C_{32} except C_{28} and C_{31} and none of these alkanes have been previously

reported to be present in the leaves of *T. portulacastrum*. The most predominant occurrence of alkane is *n*-C_{27} (29.18%) and the lowest occurrences are n-C_{22} (0.49%) and *n*-C_{25} (0.25%). It is to be noted here that *n*-alkanes are the major components in the surface hydrocarbons, the relative percentage being 58.38 where the composition ratio of odd members to total alkanes is 70.33 and the ratio of odd and even membered *n*-alkanes is 2.37 : 1 (Table-1). Moreover, the ratio of normal to branched hydrocarbons is 1.40 : 1 (Table-1). Considering all the above facts and the considerable relative occurrence of branched chain hydrocarbons in the leaves of *T. portulacastrum*, it may be concluded that these are not the characteristic feature of a higher plant[17, 18]

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