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EXTRACTION OF LECANORIC ACID FROM *PARMELIA ANDINA* MULL. ARG. AND ITS EFFECT ON MITOSIS IN *ALLIUM CEPA* L. ROOT TIPS

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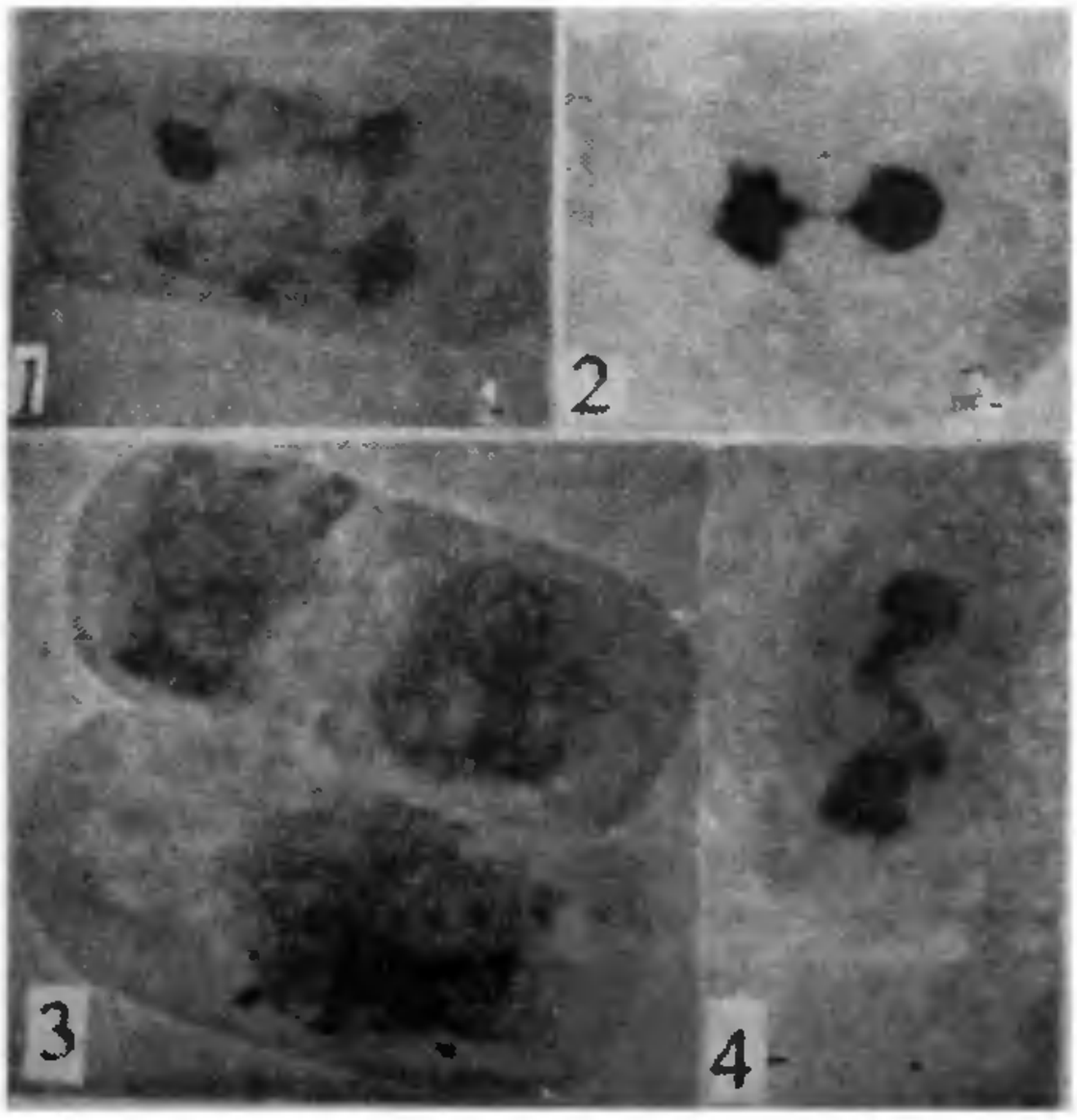
DATA on lichen flora of Andhra Pradesh in particular and South India in general are meagre. Recently *Parmelia andina* was collected[1] on the bark of *Mangifera indica* Linn. from Anantagiri forest, Andhra Pradesh (12° 40′ and 19° 50′ N latitude and 76° 45′ and 84° 40′ E longitude).

Lecanoric acid has been extracted following the method described earlier[2]. The compound was found identical in all respects with an authentic sample of lecanoric acid ($C_{16}H_{14}O_7$) isolated earlier[2] from another lichen *Cycloplaca almorensis*. This is first report of its occurrence in *Parmelia andina*.

The extracts of lichens are known to exhibit antibiotic[3], fungistatic[4] and mitotic inhibitory[5-7] properties. The mitostatic action of lecanoric acid was not tested previously although its effects in aqueous solution on mitotic divisions in *Allium sativum* have been noticed[6,7]. In the present work an attempt has been made to study the mitostatic and chromatoclasic effects[8] of lecanoric acid in alkaline medium (the compound has been found insoluble in water) on mitosis in roots of *Allium cepa*. In the squash preparations, the authors have noticed some chromosomal abnormalities and strong mitostatic action of the lecanoric acid.

Germinating bulbs of *A. cepa* with their roots, 2–3 cm long were kept in 0.1%, 0.2% and 0.3% of lecanoric acid in 10% aqueous $NaHCO_3$ for 4 hr at 28° ± 2° C. Controls in 10% sodium bicarbonate solution were studied simultaneously. The root tips after treatment were fixed in a mixture of absolute alcohol and acetic acid (3 : 1), hydrolysed in N HCl at 60° C for 5 min and squashed in haematoxylin. Three microscopic fields were scanned for qualitative and quantitative data. The number of cells with or without division were also noted. The mitotic index was calculated on the basis of the number of dividing cells per 100 observed.

The mitotic abnormalities produced by the lecanoric acid are shown in figures 1–4.



Figures 1–4. Mitotic abnormalities induced by Lecanoric acid in *A. cepa* root tips. **1.** Tetrapolar nuclei. **2.** Thinning of chromosomal matrix. **3.** Vacuolated interphase nuclei. **4.** Telophase bridge. (All × 675).

The effect of lecanoric acid on cell division can be recognised by way of reduction in mitotic index (MI) and the total inhibition of anaphase. The steep decline in MI is directly proportional to the increase in the concentration of the lecanoric acid (MI values: control—9.4, $NaHCO_3$—8.3, 0.1, lecanoric acid—4.6, 0.2–3.1 and 0.3–1.3). The proportion of cells belonging to various phases were analysed and this could suggest that with an increase in concentration, the frequency of cells belonging to anaphase decreased (Anaphase index values: Control—1.9, $NaHCO_3$—1.1 and 0.1, lecanoric acid—0.3, 0.2 0.1 and 0.3 0) whereas all other mitotic stages were found comparatively less affected.

In the present study clumping, tripolar and tetrapolar nuclei, vacuolated interphase nuclei and thinning of chromosomal matrix were noticed besides the bridges, lagging of chromosomes binucleate cells and

others (figures 1-4). The onion root tips treated with pure sodium 10% bicarbonate solution showed very few aberrations. However the total percentage of aberrations have varied in relation to the concentration of lecanoric acid (Control—nil, $NaHCO_3$—0.93, 0.1%, lecanoric acid 2.87, 0.2%–4.73 and 0.3%–0.47).

The C-metaphase activity of the lecanoric acid has also been noticed in the present study and its high incidence has been observed particularly at 0.2% concentration. The changes noted above are due to the effect of lecanoric acid dissolved in 10% sodium bicarbonate solution.

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GAS CHROMATOGRAPHIC DETERMINATION OF TRACES OF 2-NAPHTHYLAMINE IN 1-NAPHTHYLAMINE

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NAPHTHYLAMINES are used in the manufacture of dyes which are in turn used as food colours; 2-naphthylamine has been reported to be toxic[1] and hence its determination in trace levels in various species such as food colours[2] and food additives[3] has gained importance.

Methods reported for the determination of 2-naphthylamine in 1-naphthylamine include both chromatographic as well as non chromatographic techniques. Various titrimetric[4], spectrophotometric[3] and conductometric[5] methods have also been investigated. Chromatographic methods reported include paper[6] and thin layer[7], high performance liquid[8] and gas chromatography techniques. The gas chromatographic methods reported either involve conversion of the amines to a suitable derivative[9,10] or direct injection onto a column packed with specialised liquid crystals[11].

The present paper describes a sensitive, rapid and accurate gas chromatographic method making use of a glass column pretreated with alkali and packed with a mixture of FFAP and KOH on a silanized solid support. The main advantage of the method is direct injection of the sample without derivatization resulting in a resolution factor of 1.55; 2-naphthylamine in levels less than 0.1% in 1-naphthylamine or in levels lower than 5 ng has been determined.