Isolation of \( d \)-Mannitol from \textit{Pavetta indica} L.

The root-bark of \textit{Pavetta indica} Linn. (Fam. Rubiaceae) is bitter, and according to Kirtikar and Basu\(^1\), possesses aperient qualities and is commonly prescribed in visceral obstruction and dropsy.

An attempt was made to isolate the bitter principle. For this purpose the dried and powdered root-bark was extracted with absolute alcohol and the extract was concentrated to a small volume, and kept in the cold. A crystalline precipitate (yield 1.1\%) was obtained. Purified by repeated crystallisations from alcohol (charcoal), it formed colourless needles, m.p. 166\(^\circ\)C (Found: C, 39.45; H, 7.4\%). The substance did not depress the melting point of an authentic sample of \( d \)-mannitol.

The identity of the substance was further proved by preparing the hexa-acetyl and tribenzal derivatives (m.p. 121\(^\circ\)C and 204\(^\circ\)C respectively) and comparing them with the corresponding derivatives of \( d \)-mannitol.

The presence of a crystalline bitter principle, m.p. 120\(^\circ\)C, had been reported by Dymock, Warden and Hooper\(^2\) but we could not isolate it following their method or by modifying it. Tests for alkaloid were negative.

The authors wish to express their thanks to Dr. D. M. Bose, Director of the Institute, and to Dr. P. K. Bose for their interest in this investigation.

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SUBSIDIARY THESIS

Part II : Studies on the foetid principle of Paederia foetida Linn.
X. Chemical Investigation of *Paederia foetida* Linn.

By P. K. Bose, Ajit Kumar Banerjee and Chandrachur Ghosh
X. CHEMICAL INVESTIGATION OF *PAEDERIA FOETIDA* LINN.

By P. K. Bose, Ajit Kumar Banerjee and Chandrachur Ghosh.

This creeper, belonging to the family Rubiaceae, is widely distributed in India. In Bengali it is known as *Gandhal*, and is used as a popular remedy against disorders of the stomach. According to Kirtikar and Basu, the plant is bitter; indigestible, aphrodisiac; cures vata and kapha, inflammations, piles, fever; good for diseases of the eye and sight blindness; laxative. The plant when bruised gives off a most offensive smell.

Dymock, Warden and Hooper obtained evidence for the presence of at least two alkaloids in the plant, which they named α- and β-paederine. Basu, Ray and De estimated carotene and ascorbic acid contents of *P. foetida*. No work seems to have been done on the alkaloids reported by Dymock *et al.*, or on the foetid principle.

We could not isolate any alkaloid from fresh plants nor could we detect its presence. The disagreeable volatile principle is neither indole (or its simple derivative) nor carbon bisulphide, for, specific tests for these compounds showed their absence. The volatile constituent, which is responsible for the unpleasant odour, could be expelled from the plant by means of steam, heat, or a current of air. It responded to nitroprusside and satun colour tests which are specific for hydrogen sulphide and alkyl mercaptans. The absence of hydrogen sulphide was proved by treatment with lead acetate, a solution of which turned yellow—but not black—in contact with the volatile product. It formed a compound, m.p. 172-3°C., by interaction with alcoholic mercer cyanide. This mercury compound was identified as (CH₃S)₂Hg by direct comparison with a synthetic sample which had the same m.p. and mixed m.p.

Although methyl mercaptan is formed during putrefaction of proteins, its occurrence in living plants is uncommon. It is reported to occur in fresh roots of *Raphanus sativus* and in the leaves of *Lasianthus* species. It is not known in what form the mercaptan occurs in these plants.

**Experimental**

*Absence of alkaloids.*—The semi-dried leaves of *P. foetida* were soaked in 10% acetic acid for 24 hours. The filtered extract was concentrated on a water-bath to a thin syrup and treated with dilute sulphuric acid. The acid extract did not give any precipitate with Meyer’s or Dragendorff’s reagents. Fresh plant, cut into very small pieces, was shaken for several hours with a mixture of ether and ammonia. The ether extract was concentrated, acidified and treated with alkaloidal reagents, but no precipitate was noticed.

*Absence of indole.*—Fresh leaves were cut into small pieces and steeped in ether for 2 days. The ether extract was concentrated. It did not give the pine-chip reaction.

*Absence of carbon bisulphide.*—Fresh leaves were distilled in steam, and the vapours were first passed through aqueous lead acetate solution and then through cold alcoholic potash. The lead acetate solution soon deposited a voluminous yellow precipitate of lead mercaptide. The alcoholic potash solution was neutralized with acetic acid and treated with a few drops of copper sulphate solution. No yellow precipitate of copper xanthate was formed.

*Presence of alkyl mercaptan.*—Fresh and finely cut leaves were warmed on a water-bath in a current of carbon dioxide. The gases were passed into an alkaline solution of...
sodium nitroprusside when a pink-violet colour developed. Further, a very dilute isatis solution in concentrated sulphuric acid turned deep green in contact with the vapours.

Identification of methyl mercaptan—A slow current of air was passed through 20 gms. of fresh leaves kept in a flask. The air was then led into a saturated alcoholic solution of mercury cyanide (15 c.c.). The precipitate which slowly formed was filtered, washed with cold alcohol, and crystallized from hot acetone. The pearly crystals, on drying, melted at 172-3°C. The same compound was obtained on passing methyl mercaptan through mercury cyanide solution under similar conditions. It had the same m.p. as a mixed m.p.

SUMMARY

The foetid principle of *Paederea foetida* L. is methyl mercaptan. Alkaloids are absent.

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