

**Studies in Medicinal Plants: Part I—
Chemical Constituents of
Berberis asiatica Roxb.***

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From the roots of *Berberis asiatica* Roxb., berberine, palmitine, jatrorrhizine, columbamine, tetrahydropalmitine, berbamine, oxyberberine and oxyacanthine have been isolated. Berberine and palmitine occur as chlorides.

ABOUT thirteen difficultly distinguishable species of *Berberis*¹ occur in India mostly in the Himalayan region. During a programme for the search for anticancer agents from plant sources, a number of *Berberis* species were collected and screened for this activity. Cytotoxic activity has been confirmed in KB system in *Berberis asiatica* Roxb. In view of this fact a systematic study of the plant was undertaken.

Chopra *et al.*² had earlier reported the isolation of berberine and oxyacanthine from this plant. Subsequently, Chatterjee and coworkers³ isolated berberine and berbamine and identified palmitine and jatrorrhizine as their tetrahydro derivatives.

In the present investigation, apart from these five alkaloids, three more bases were isolated and identified.

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The first alkaloid, C₂₀H₁₇NO₅ (mol. wt 351 by mass spectrum), had m.p. 199-200°. TLC, mixed m.p., infrared spectrum and mass spectrum which gave *m/e* peaks at 351 (M⁺), 336, 322, 308, 292, 280, 178 and 175.5 (M²⁺) fully confirmed its identity as oxyberberine.

The second alkaloid, isolated from the non-phenolic fraction of the crude base mixture by chromatography on neutral alumina and elution with benzene-chloroform (3:1) gave a colourless compound, m.p. 145°. This was identified as tetrahydropalmitine by TLC, mixed m.p. and infrared spectrum.

The last base was characterized as columbamine, isolated as the iodide, m.p. 223-5°. Reduction of the iodide with sodium borohydride furnished, DL-tetrahydrocolumbamine identical with an authentic sample.

In addition, two amorphous bases were obtained in very small amounts. The molecular ion peaks in the mass spectra of these were found at *m/e* 327 and 341 respectively. The appearance of the base peak at *m/e* 192 in the former and at *m/e* 206 in the latter suggests that these bases are benzyloisoquinoline derivatives. These two compounds are under study.

The identified alkaloids as well as other fractions from this plant are being examined for anticancer activity.

References

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3. CHATTERJEE, R., BANERJEE, A., BARUA, A. K. & DAS GUPTA, A. K., *J. Indian chem. Soc.*, **31** (1954), 89.