

SPECIALIA

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Isolation of Erysodine, Erysotrine and Hypaphorine from *Erythrina suberosa* Roxb. Seeds¹

There are signs of a continuing active interest in the *Erythrina* alkaloids².

In India *E. stricta* Roxb., *E. suberosa* Roxb. and *E. variegata* L. var. *orientalis* (L.) Merr. (*E. indica* Lam.) have been used in the indigenous system of medicine for various ailments³. Out of these only *E. variegata* var. *orientalis* (L.) Merr. (*E. indica* Lam.) has been investigated. Hypaphorine has been found to be present in the seeds⁴⁻⁸, bark⁵ and leaves⁵. The seeds have also been found to contain erythraline⁸. But for screening the comparative curare-like potencies of the seeds of *E. stricta* Roxb. and *E. suberosa* Roxb.⁹, no other work appears to have been done on these species.

We have studied the seeds of *E. suberosa* Roxb. collected from Mandi, H.P. (India). 3 alkaloids have been isolated which have been identified to be erysodine, erysotrine and hypaphorine. This is the first time that erysotrine has been found to occur naturally, although it is well known as a conversion product of other eryso-alkaloids.

The seed powder (4.8 kg) was defatted with petroleum ether and the mark extracted with ethanol in a Soxhlet unit. The residue left after evaporation of the alcohol extract was repeatedly treated with 2% sulphuric acid. The acid extract was basified and extracted with chloroform. The chloroform extract was worked up to give a residue, a benzene-soluble portion of which was resolved on an alumina column. Elution with benzene gave first a syrupy residue, and later fractions yielded a solid mass (1.50 g) which crystallized from acetone to give a base, mp 208–210°, analyzing for elemental composition $C_{18}H_{21}NO_3$. The base showed no depression on determining mixed melting point with authentic erysodine. A mixture with the latter was inseparable on thin layer chromatography and IR-spectra were identical.

The syrupy residue, obtained above, was dissolved in dry ether and treated with alcoholic hydrochloric acid. The separated solid was repeatedly crystallized from alcohol-ether mixture to give an entity, mp 206–208°, which analyzed for elemental composition $C_{19}H_{23}NO_3 \cdot HCl$, and showed UV maxima at 232 nm (ϵ 19,800) and 284 nm (ϵ 3,490). The mass spectrum of the liberated base indicated significant peaks at m/e 313 (molecular ion, M^+ ; 33%

intensity of base peak), 298 ($M^+ - CH_3$; 35%), and 282 ($M^+ - CH_3O$; base peak). The comparison of this data with that of authentic specimen established the isolated hydrochloride to be that of erysotrine.

The aqueous layer left after extraction with chloroform was acidified and treated with Dragendorff's reagent. A part of the separated precipitate was decomposed with silver carbonate and processed to obtain a crystalline material mp 250° d. This was found to be hypaphorine, $C_{14}H_{18}N_2O_2$, from the elemental analyses of this entity and its hydrochloride, and mixed mp and IR spectral comparison with authentic hypaphorine.

The entities isolated by us were compared with authentic erysodine, erysotrine and hypaphorine from Professor D. H. R. BARTON and R. B. BOAR of the Imperial College, London, to whom we are thankful.

Zusammenfassung. Das Vorkommen von Erysotrin wurde erstmals festgestellt, indem aus Samen von *Erythrina suberosa* Roxb. drei Basen isoliert und als Erysodin, Erysotrin und Hypaphorin identifiziert wurden.

Harkishan SINGH and Amrik SINGH CHAWLA

Department of Pharmacy, Panjab University,
Chandigarh 14 (India), 21 April 1969.

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