

CHEMICAL EXAMINATION OF ERYTHRINA INDICA (WHITE VARIETY)

THERE are two varieties of *Erythrina indica*, the white and the red. The former bears white flowers and yellow seeds. The latter is more common and better known. P. Suryaprakasa Rao and others¹ examined the seeds and bark of *Erythrina indica*. They did not mention whether they worked on the red or white variety. However, the author learnt from them that they examined the red one only. Hence he worked on the seeds of the white variety on precisely the same lines as the above workers.

The seeds of the white variety gave a reddish fixed oil (yield 12 per cent.) on extraction with petroleum ether and evaporation of the solvent from the extract. A comparative statement of the usual constants of the oils from both varieties is given below.

	Oil from white variety (author)	Oil from red variety (P. S. Rao & others)
Specific gravity	0.8603 at 30° C	0.8821 at 30° C
Refractive index	1.4400 at 30° C	1.4596 at 30° C
Saponification value	185.5	184.5
Iodine number	31.84	63.3
Acid number	9.5	1.24

The two oils agree in all properties except the iodine and acid numbers.

The alcohol extract of the oil-free seeds gave a white crystalline alkaloid nitrate. Analysis and study of its properties showed that it was same as hypaphorine nitrate isolated from the red seeds. The two varieties of *Erythrina indica*, therefore, contain the same alkaloid, namely, hypaphorine.

Chemistry Department,
P. R. College,
Cocanada,
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J. VIRABHADRA RAO.

1. *Proceedings of the Indian Academy of Sciences* 1938; 179-185.

A NATURAL CONCENTRATE OF VITAMIN A

RAJGOPAL¹ recently reported a very high potency of 1,90,400 I.U./G. (Carr-Price value 3735) for a Sind shark liver oil. No oil of about this potency had been so far extracted in this Presidency. Such a very highly potent oil was extracted recently from livers of very small sharks belonging to *Carcharias* spp. and measuring 1 foot to 1¾ feet and caught on the west coast. Thirty-nine pounds of these livers yielded 12 pounds of oil. Testing the whole oil in a B.D.H. pattern Lovibond Tintometer, a Carr-Price value of 3176 was obtained. Using the factor 54 for conversion of Carr-

Price value into international units, as recommended by Rajagopal,² the vitamin A potency of this oil can be expressed as 1,71,500 I.U./G.

The oil was further analysed and the following characteristics were recorded:—

Colour	Deep reddish orange
Specific gravity 35° C.	0.9229
Refractive Index 35° C.	1.4889
Saponification value	160.7
Iodine value Wijs	144.9
% un-saponifiable matter	18.4
Iodine value of the unsaponifiable matter	302.4

The very high iodine value for the unsaponifiable matter is noteworthy, but was expected from its high content of the unsaturated vitamin A.

It is further difficult to understand the object of such a natural concentrate of vitamin A in such small sharks. In elasmobranchs, perhaps, vitamin A may have some physiological role, as yet unassigned to this nutrient in human metabolism.

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Technical Research Lab.,
Government Oil Factory,
Calicut,
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ULLAL SUNDAR KINI.

1. Rajagopal, K., *Curr. Sci.*, 1942, 11, 52. 2. —, *Ind. J. Med. Res.*, 1941, 29, 575.

LOBELIA NICOTIANAEFOLIA HEYNE AS SUBSTITUTE FOR LOBELIA INFLATA LINN., B.P.

IN connection with the preparation of an 'Indian Pharmacopœial List' which is expected to serve as a Supplement to the British Pharmacopœia in India, work has been undertaken at the Biochemical Standardisation Laboratory of the Government of India to assess critically the 'replacement' value and possibilities of a number of likely Indian substitutes of well-known pharmacopœial drugs. The note given here represents investigations on *L. nicotianaefolia* Heyne as a possible substitute for *L. inflata* of the B.P., a drug fairly extensively used in asthma and similar conditions.

Datta and Bal¹ have already reported on the pharmacognostic characters of *L. nicotianaefolia* and have shown its close resemblance in this respect to *L. inflata*, the official drug. Extensive chemical and clinical trials were, however, called for before adopting the Indian *Lobelia* as a true, efficient and harmless substitute for the pharmacopœial drug. The chemical investigations carried out in this direction are given below in tabular form. The method of Lynn and Evers² was employed, for the estimation of lobeline.

No.	Species of <i>Lobelia</i>	Source	Coll. time	Parts used	Tot. alk. as Lobeline	Acid-insol. ash
1	<i>L. nicotianæfolia</i>	(a) Poona area	Oct.-Nov.	Stems & flowering tops	1.18 %	0.23 %
		(b) Do.	Do.	Do.	1.16 %	0.21 %
2	"	(a) Tellichery Madras	Sept.	Flowering tops	1.04 %	1.3 %
3	"	(b) Madras	June-July (during rains)	Aerial parts with flowering tops	0.32 %	0.26 %
4	"	Not known (recd. through Herbal Herald & Co., Ltd.)	Not known	Do.	0.168%	0.3 %
5	<i>L. nicot.</i> (?) (possibly <i>V. thapsus</i>).	Not known (recd. through a Cal. firm.	Rainy season	Leaves chiefly	0.105%	0.26 %
6	<i>L. nicot.</i> (?) (identified as <i>V. thapsus</i>)	South India (recd. through Sepulchre & Co., Cal.)	Not known	Leaves & a few slender twigs	0.117%	0.20 %
7	<i>L. inflata</i> (official species)	New York, U.S.A.	Not known	Stems, flowering tops, leaf powder	0.32 %	2.38 %

The table shows conclusively that Indian lobelia, provided it is collected during October-November from suitable areas, is a better substitute than the official B.P. or U.S.P. drug. In a good sample (No. 1a, 1b), the lobeline content, which is acknowledged to be the chief active ingredient of the drug, is almost four times as high (1.18 per cent.) as an authentic official sample of *L. inflata* obtained from New York through the courtesy of Mr. S. N. Bal, Officer-in-charge of the Industrial Section of the Indian Museum. Samples collected during the rainy season are poorer in alkaloidal content but the lobeline content is still on a par with (0.32 per cent.) the average alkaloidal content of *L. inflata*. In certain samples, the lobeline content was found to be as low as 0.117 per cent. Doubt was, therefore, expressed as to whether this sample represented true *L. nicotianæfolia*. Pharmacognostic examination by Indian Museum, Botanical Survey of India, revealed that this sample was from *V. thapsus*, a common adulterant of true lobelia.

From the different parts of the plants (flowering tops, stems, leaves, whole plants, etc.), forwarded to the Laboratory for examination, it appeared that the collectors have hardly any idea as to the part or parts of the plant to be used for pharmaceutical and medicinal purposes. The B.P. 1932 recommends the use of 'dried aerial parts which should not consist of more than 60 per cent. stems'. From differential assay of the various aerial parts of the plant, the following average results were obtained on duplicate analyses of two specimens:

- (1) Leaves only—0.64 per cent. lobeline.
- (2) Stems only (thin hollow stems, 1-3 cm. diameter)—0.43 per cent. lobeline.
- (3) Thick bottom stems—0.21 per cent. lobeline.
- (4) Flowering tops only—1.41 per cent. lobeline.

A good sample of Indian lobelia, therefore, should contain chiefly flowering tops and slender top stems and leaves. The thick portion of the stems near the ground (though it

is included within the description of 'aerial parts') should be discarded.

For clinical trial, an ethereal tincture was prepared from *L. nicotianæfolia* in the same way as prescribed in the B.P. 1932. By admixture in suitable proportions of Lobelia having higher or lower alkaloidal content or by the addition of exhausted Lobelia, the tincture was adjusted to a lobeline content of 0.3 per cent., more or less the same lobeline content as was obtained from the New York sample of *L. inflata*. This tincture was freely used in 5-15 minim. dosage in simple asthma mixture containing Potassium Iodide and Tincture Belladonna and was found to be quite efficacious and without any untoward effects. A mixture with only Tinct. Lobelia Etheris (from Indian Lobelia) was also used, but this did not prove as effective. This is only to be expected as Tinct. Lobelia acts best as an anti-spasmodic in a synergistic combination with other parasympathetic depressants of the bronchial musculature.

We are, therefore, in a position to recommend the extended use of *L. nicotianæfolia* in place of *L. inflata*, wherever this drug is indicated. *L. nicotianæfolia* should preferably be collected in winter months (October-November) and its thin top stems, leaves and flowering tops should be used as the crude material from which tinctures should be prepared. The liquid preparation should be adjusted to have a lobeline content of 0.3 per cent., and may then be administered in the same dosage as recommended for the 'official' drug in the B.P., 1932.

Biochemical Standardisation Lab.,
Government of India,
110, Chittaranjan Avenue,
Calcutta,
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B. MUKERJI.
S. K. GHOSH.

1. Datta and Bal, *Science & Culture*, 1944-45, 10, 260.
2. Lynn and Evers, *Analyst*, 1939, 64, 381.
3. B. P. 1932, Constable & Co., London, 275.