

Bargellini.³ It is interesting to mention here that baicalein occurs along with Oroxylin-A in the root bark of *O. indicum* Vent.⁴

A detailed account of this investigation will shortly be published elsewhere.

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1. Mehta, *Proc. Ind. Acad. Sci.*, 1939, **9A**, 390.
2. *Acta Phytochim.*, 1923, **1**, 105. 3. *Gazzetta*, 1919,
49, ii, 47. 4. Shah, Mehta and Wheeler, *J.C.S.*, 1938,
1555.

INDIAN RHUBARB AS SUBSTITUTE FOR 'OFFICIAL' RHUBARB

Rheum officinale Baillon, *Rheum palmatum* Linné and other species and hybrids of *Rheum*, grown in China and Tibet are the recognised varieties of rhubarb in the British and the U.S. Pharmacopœias. *Rheum emodi* Wall., which grows in the Himalayas at altitudes of 4,000 to 12,000 feet, is commonly believed to be of an inferior grade to the Chinese and Tibetan drug and is not acceptable as a substitute in 'official' medicine.

On the basis of available chemical and pharmacological evidence of earlier workers, Chopra¹ suggested in 1933 that Indian rhubarb, if properly cultivated, could be accepted as an efficient substitute for foreign rhubarb. No systematic work is traceable since to support this statement.

During last year presumably on account of the difficulty of securing Chinese rhubarb, possibilities of a profitable export trade in Indian rhubarb have developed and repeated enquiries have been referred to this department with a view to utilising Indian rhubarb in official pharmacopœial preparations. A pharmacognostic, chemical and pharmacological investigation was, therefore, started with seven different varieties of Indian rhubarb obtained from localities such as Sikkim, Assam, Nepal, Kashmir, etc., and though the enquiry is still progressing, the following observations may be recorded.

1. PHARMACOGNOSTIC EXAMINATION

(a) *Comparative Anatomical Structure.*—A study of the comparative anatomical structure of *R. palmatum* Linn., *R. officinale* Baill., and *R. emodi* Wall., shows that vascular bundles, xylem vessels, medullary rays and cell contents are more or less the same in all the three varieties except with minor variation. The distinguishing characters are total absence of star spots and presence of lignified xylem vessels in *R. emodi* Wall., *R. officinale* Baill., resembles more or less *R. palmatum* Linn. in botanical characteristics.

(b) *Comparative Characteristics of Rhubarb Powder.*—

Chinese Rhubarb	European Rhubarb	Indian Rhubarb
Colour—Brownish Yellow	Bright yellow	Brownish yellow
Odour—Faint	Very faint	Fragrant
Characteristic features—Numerous calcium oxalate crystals, starch abundant, vessels non-lignified	Same as in Chinese rhubarb	Numerous calcium oxalate crystals, starch abundant, vessels lignified

2. CHEMICAL EXAMINATION

Official Rhubarb—

- (a) Alcohol (45 p.c.)—soluble extractive—
not less than 35 p.c.
(b) Other organic matter—not more than
2 p.c.
(c) Acid-insoluble ash—not more than 1 p.c.
(d) Emodin and chrysophanic acid—present.

Indian Rhubarb—

- (a) Average—35.5 p.c.
(b) Slightly more than 2 p.c.
(c) From 0.6 to 1 p.c.
(d) Present.

3. PHARMACOLOGICAL EXAMINATION

Equivalent weights of the dry powder of an official variety of rhubarb and an Indian variety of rhubarb (with more or less similar analytical data) were administered to cats by stomach tube and their purgative effects observed. The method employed was too crude to enable a comparative quantitative evaluation possible but in general it may be stated that the Indian variety showed a satisfactory purgative effect.

Further data are being gathered for a detailed report elsewhere but the evidence points to the fact that at least certain varieties of Indian rhubarb* (cultivated variety as distinguished from the wild growing species) may also be recognised in the Pharmacopœias for medicinal use provided they conform to the specifications laid down in the B.P. and/or U.S.P. The darker colour, coarser texture and minor differences in pharmacognostic characteristics of the Indian rhubarb need not necessarily mean that it is inferior in its content of therapeutically-active principles.

In this combined study, help was received from Mr. A. B. Bose (Pharmacognostic study), Messrs. G. K. Roy and R. C. Guha (Chemical study) and Dr. N. K. Dutt (Pharmacological study).

Specimens of powdered rhubarb ('official' varieties) were obtained through the courtesy of Mr. J. K. Lahiri of the Department of Chemistry, School of Tropical Medicine.

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* Two varieties of Indian Rhubarb have been found not to conform to B.P. specifications. Attempt is being made to identify these varieties.

1. Chopra, *Indigenous Drugs of India*, 1933, p. 235, Art Press, Calcutta.