

CHEMICAL EXAMINATION OF *BRAGANTIA WALLICHII* (LOUR.).

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The fatty oil from the roots of *Bragantia Wallachii* (Lour.) contains palmitic, lignoceric, oleic and linolic acids.

The yellow substance which separated from the different extracts was identical with isoaristolochic acid isolated from *Aristolochia indica*. The isolation of isoaristolochic acid from both *Aristolochia indica* and *Bragantia wallichii* is of some phytochemical significance as both the plants belong to the same family

Bragantia wallichii, Lour. (in Sanskrit Chakrani) belongs to the family of *Aristolochiaceae* and grows on the Western Ghats. The roots in the form of a paste are used in cases of cholera and diarrhoea. Mr. Parthanasarayan Pundit of Shimoga informed the authors that about 4 g. of the roots made into a paste with 14 c.c. of lemon juice given orally every fifteen minutes till the acute symptoms disappeared had very beneficial effects. A reference to literature showed that no work had been done on these roots and the roots used in this investigation were collected in Shimoga district, Mysore State.

EXPERIMENTAL.

In order to ascertain the general character of the constituents of the roots, 50 g. of the finely powdered roots were extracted successively with the following solvents in a Soxhlet and the residues from the extracts were dried at 100°.

Solvent.	Percentage of extract.
Petroleum ether (B.p. 50-60°)	0.48%
Ether	0.78
Chloroform	0.49
Ethyl acetate	0.48
Absolute alcohol	3.70

The constituents volatile in steam amounted to 0.05% and an assay showed that the alkaloidal content was 0.03%.

For detailed examination about 50 kg. of the roots were crushed in a disintegrator and were extracted exhaustively with hot alcohol in a big extraction apparatus. The solvent was distilled off and the concentrated extract was subjected to steam distillation. The resulting semi-solid residue was separated from the aqueous layer by decanting off the latter.

The aqueous layer was then treated with lead acetate. There was a small amount of precipitate. It was filtered and the filtrate treated with basic lead acetate. The small amount of precipitate which separated was removed by filtration and the filtrate was freed from lead by passing in hydrogen sulphide. The filtrate obtained after removing the lead sulphide was treated with ammonia and extracted with chloroform. The aqueous solution was then concentrated to a small bulk. No solid separated from this on standing and it could not be crystallised from absolute alcohol. It consisted mainly of reducing sugars.

The chloroform layer was extracted with dilute hydrochloric acid. This (A) was later worked with the acid extracts of ether and chloroform extracts described later.

The semi-solid residue left after steam distillation was dissolved in sufficient alcohol and the alcoholic solution was dried over 1 kg. of the extracted roots. It was then thoroughly extracted in a small copper Soxhlet with solvents in the order mentioned above.

The Petroleum Ether Extract.—This extract consisted of a dark brown oil (450 g.).

The oil was examined according to the usual methods of analysis. The solid acids consisted of palmitic acid (m.p. 62°; M.W., 256; m.p. of *p*-phenylphenacyl derivative, 93.5°) and a small amount of crude lignoceric acid (m.p. 75°; M.W., 370; m.p. of *p*-phenylphenacyl derivative, 101°). The liquid acids were found to consist of oleic acid (dihydroxystearic acid, m.p. 131°; M.W., 315) and linolic acid [tetrahydroxystearic acid m.p. 163°; M.W., 352; tetrabromostearic acid, m.p. 114°; M.W., 595]. The unsaponifiable matter consisted of a thick brown resinous material and glycerol was identified among the products of saponification.

The Ether Extract.—As the extraction proceeded a yellow substance separated out from the solvent. The ether solution was successively extracted with 5% hydrochloric acid, 5% potassium bicarbonate, 5% potassium carbonate and 5% potassium hydroxide. The hydrochloric acid extract was worked later with the hydrochloric acid extract of the chloroform extract.

The same yellow substance also separated out on acidifying the bicarbonate and the carbonate extracts. No pure substance could be isolated from the alkali extract and from the neutral residue in ether.

The Chloroform Extract.—The chloroform solution was extracted thoroughly with 1% hydrochloric acid. This extract was combined with the hydrochloric acid extracts of the ether extract and the acid extract (A). The acid extract gave positive tests with alkaloidal

reagents. On the addition of excess of dilute ammonia a brownish slimy precipitate was obtained and it was extracted with chloroform. The basic material was then taken up by hydrochloric acid and re-extracted with chloroform and the solution dried over anhydrous sodium sulphate. When the solvent was evaporated off under reduced pressure the residue (0.5 g.) was very easily oxidised on exposure to air and all attempts to obtain it in a pure condition proved fruitless.

The original chloroform extract was then extracted successively with 5% potassium bicarbonate, 5% potassium carbonate and 5% potassium hydroxide. Some more of the yellow material separated on acidifying the bicarbonate and the carbonate extracts, but no pure compound could be obtained from the alkali extract and the neutral residue.

The Ethyl Acetate Extract.—The only pure material that could be isolated from this extract also consisted of the yellow material already mentioned.

The Alcoholic Extract.—The final alcoholic extract did not yield any definite substance.

Isolation of isoAristolochic Acid.

The yellow material from the ether, chloroform and ethyl acetate extracts was a single compound. It was first crystallised from glacial acetic acid and then from 96% alcohol (charcoal) when it was obtained in the form of yellow rectangular plates, m.p. 278° (decomp.). The substance did not depress the m.p. of pure *isoaristolochic acid* (Manjunath, Venkata Rao and Krishnaswamy, *J. Indian Chem. Soc.*, 1935, 12, 482). It was intensely bitter and dissolved in alkali forming a red solution. The composition of the substance corresponded to the formula $C_{17}H_{11}O_7N$. (Found : C, 60.08; H, 3.6; N, 4.26; M.W. in nitrobenzene by boiling point method, 357.6. $C_{17}H_{11}O_7N$ requires C, 59.8; H, 3.3; N, 4.11 per cent. M.W., 347.0).

The methyl derivative of the substance was prepared by heating it with methyl sulphate and alkali. It crystallised from ethyl benzoate in yellow silky needles (m.p. 269°) and did not depress the m.p. of the methyl derivative of *isoaristolochic acid*. Unlike the acid the methyl derivative was quite tasteless.

The work described above formed part of the thesis submitted by one of us (M.S.S.) for the degree of Master of Science in the Mysore University. We are grateful to the University for permission to publish the same.