

## A PRELIMINARY NOTE ON XANTHOXYLUM BUDRANGA FRUITS

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(Received April 27, 1959)

*Xanthoxylum Budranga* or bazna fruit has been examined. It yields an essential oil baznin from the calyx and a fixed oil from the fruit. The fixed oil has a consistency that is suitable as a raw material for soap, and consists of partly oleic acid and partly palmitic and stearic acids. Some amount of carbohydrate and protein are also available from the kernel powder.

### Introduction

*Xanthoxylum Budranga*, locally known as Bazna, is a large thorny tree growing wild in certain parts of East Bengal, particularly in the districts of Mymensingh, Dacca, Sylhet and Tippera. It belongs to the family of *Rutaceae* and bears fruit in bunches during the rainy season. The fruits about 4 mm. in diameter are globular in shape and rather dark in colour when ripe. On drying, the upper skin of the fruit bursts into halves and the seeds tend to come out of the skin. These are reported<sup>1</sup> to contain about 17% of oil, which has been said to be consumed by the local people sometime as a substitute for mustard oil.

Through the courtesy of the Divisional Forest Officer, Mymensingh, we received some of these fruits last year, and these have now been examined. The fruits can be divided into two parts—calyx which covers the upper region of the dark coloured globular mass, consisting of the seed as an external cover. On examination, the calyx was found to give out a strong aroma, reminiscent of oil bergamot, indicating the presence of some essential oils. This was accordingly separated and the essential oil from it isolated, when a liquid product, consisting of about 1.2% of the weight of air-dried calyx was obtained. The oil has not yet been described by any one and we name it 'baznin'. It possesses a very characteristic pleasant odour, is optically active and shows a strong laevorotation. The quantity of baznin we have at the moment is small, but a more detailed study of its constitution is now underway.

Dry fruits after separation from the calyx were found to have an outer black shining coating under which a fluid material existed. On superficial examination when this skinny coating of the seed was broken, the fluid proved to be an oily substance, which was mistaken by earlier workers as watery fluid. On soaking the fruits in petroleum ether, the oil comes out into the solvent. Taking advantage of this dialytic process the seeds were steeped in petroleum ether at the ordinary temperature for

some time, when practically the whole of the fluid from within the seed coat was removed and was found to consist of about one-seventh of the weight of the seeds.

Next, the seeds were powdered and extracted with fresh quantities of petroleum ether when all the oil content of the kernel was extracted and this amounted to about one-sixth of the weight of the kernel.

After treatment of the kernel with petroleum ether, the residual powder was extracted with rectified spirit when about 2.5% of a semi-solid mixture was obtained.

The residue left was examined for protein and was found to contain some 11.08% of the same. It is expected that during the next season more of the fruit will be available to enable us to carry on the work towards completion.

### Experimental

*Isolation of the Essential Oil Baznin.*—The dry calyx (15 g.) separated from the whole fruit was distilled in steam for about 2 hours. The distillate was saturated with common salt and extracted with ether. The extracts were dried with anhydrous sodium sulphate, filtered and distilled. Twenty such experiments were performed and a total of 36 g. of the essential oil could be collected, which represented 1.2% of the weight of the dry material employed. The oil thus obtained was fractionally distilled under reduced pressure. The first fraction boiling between 65-75°C. at 30 mm. or 40-41°C. at 8 mm. has  $d_{28.5}^{20}$ , 0.8294;  $n_D^{29}$ , 1.4692; and  $[\alpha]_D^{26}$ , -48.75°.

Calculated for  $C_{14}H_{22}O$ : C, 81.55; H, 10.68.  
Found: C, 81.11; H, 11.00.

The second fraction was collected at 100-120°C. and 24 mm. pressure, and the third fraction was collected at 120-180°C. and 19 mm. pressure. These are now under a more detailed examination.

*Fixed Oil in the Bazna Fruit.*—(a) Whole dry fruits (500 g.) were kept immersed under petroleum ether (b.p. 40-60°C.) at the room temperature for 24 hours. The solution was then filtered and the solvent removed from it by distillation. Finally the oil was heated on a boiling water bath to remove the last traces of the solvent. By ten such extractions, a total of 647.5 g. of the oil was collected, which represented 12.95% of the lot of the fruit employed. This oil partially solidifies at the room temperature (33°C.) and has saponification value of 190.91-191.3, iodine value of 60.2, R.M. value of 0.66 and contained 0.83% unsaponifiable matter. The oil consisted of the glycerides of several fatty acids described later.

(b) Next the kernel (500 g.) was finely powdered and extracted with fresh quantities of petroleum ether (40-60°C.) by cold percolation. The extracts were filtered, the solvent was distilled off and finally the residue was heated on a water bath to remove the last traces of the solvent. By ten such extractions, a total of 801 g. of oil was collected, which represented 16.02% of the material employed. This oil begins to solidify at about 20°C., and has saponification value of 181.91-183.4, iodine value of 113.9, R.M. value of 0.187 and contained 0.523% unsaponifiable matter.

*Characterisation of the Fixed Oils.*—(a) The oil from seed coat (31.3 g.) yielded 28.2 g. or 90.09% of mixed fatty acids on saponification with alcoholic caustic potash. These fatty acids have iodine value of 59.7 and neutralisation value of 209.3.

Fatty acid mixture (20 g.) was separated by lead salt method<sup>2</sup> into 6 g. or 30% of solid and 13.2 g. or 66% of a liquid acid mixture. The solid acids melted at 57.5-59.5°C., which appears to be a mixture of stearic and palmitic acids. The liquid acid has iodine value of 86.3.

(b) The oil from powdered kernel (30 g.) gave 25.6 g. or 85.3% yield of mixed fatty acids on saponification. These acids have iodine value of 115.3 and neutralisation value of 206.

These acids (20.3 g.) on separation as in other case gave 5.3 g. or 26.10% of a solid and 14.3 g. or 70.44% of a liquid acid mixture. The solid acid melted at 58-59.5°C. and has iodine value of 1.2, neutralisation value of 202.3, while the liquid acid has iodine value of 86.7 and neutralisation value of 177.5.

The solid acids on several crystallisations melted at 61-63°C. The molecular weight of these acids by silver salt method was found to be 271, which suggested it to be a mixture of 53% palmitic acid and 47% stearic acid. More detailed examination of the acids is in progress.

The residual pulp (1840 g.) on being extracted with rectified spirit gave 46.15 g. of a mixture of some crystalline solid and syrupy residue. This appears to be a mixture of carbohydrates and its detailed examination is in progress.

The rest of the pulp consisted of some protein (11.08%) along with some other products.

#### Acknowledgement

Our thanks are due to Dr. S. Siddiqui for his keen interest in the progress of the work, and to Mr. Safurul Haq and Mr. Manzurul Hossain for their help in analytical experiments.

#### References

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