

fluorescing in ultra-violet light and of forming coloured derivatives on spraying with 1 per cent alcoholic ferric chloride or diazotized *p*-nitraniline⁴ were utilized. The colours recorded in Table 1 were those produced immediately on spraying. In certain cases the colours first formed underwent further change on standing. These changes provided a further criterion for the identification of substances of similar *R_F* values.

L. A. GRIFFITHS

Imperial College of Tropical Agriculture,
Trinidad, British West Indies.
April 11.

¹ Bate-Smith, E. C., *Chem. and Indust.*, 1457 (1954).

² Bate-Smith, E. C., and Swain, T., *Proc. Roy. Dub. Soc.*, 27, 165 (1955).

³ Geissman, T. A., "Moderne Methoden der Pflanzenanalyse", 3, 450 (Berlin, 1955).

⁴ Swain, T., *Biochem. J.*, 53, 200 (1953).

Ascorbic Acid Content of Baobab Fruit

THE Hausa-speaking farmers and Fulani cattle owners who live in the savannah regions of Northern Nigeria make free use of the leaves and fruit of the baobab tree (*Adansonia digitata* Linn.). The leaves, either fresh or dried and pulverized, are used in the soup which is poured over the dish of porridge made from guineacorn (sorghum) or millet (pennisetum and eleusine) flour. During the season while the fruit of the tree is ripe, from February to April depending on the latitude, the pulp is removed from the fibres and seeds by kneading in cold water and then passing the emulsion through a sieve. The resulting white or whitish-yellow fluid (Hausa—*gubdi*) is used by the farmers to dilute the thick guineacorn dough (*fura*) to a thin gruel (*kunnu*), which is the traditional morning or midday meal. The cattle-owning Fulani use the emulsion to adulterate milk. This milk and baobab fruit juice mixture is a popular drink with the Hausa farmer, and is available, if he has money to buy it, at a hot time of the year when new farms are being cleared, or hoeing of old farms is taking place, preparatory to sowing. The kernels of the seeds are used to make into a cake for flavouring soup.

Dalziel¹ says that the pulp of the baobab fruit "apparently contains free tartaric acid, potassium acid tartarate, with pectin, glucose and mucilaginous matter". Carr² has concluded, from the results of analyses using both the dichlorophenolindophenol and dinitrophenylhydrazine methods to estimate ascorbic acid, dehydroascorbic acid and diketogulonic acid, that the pulp contains large quantities of ascorbic acid; that this is present mainly in the reduced form, and that no appreciable amounts of substances which interfere with the dichlorophenolindophenol method of assay are present. The diets of the Hausa-speaking peoples throughout the rest of the year provide them with only small amounts of ascorbic acid, and it was considered to be of importance to determine whether Nigerian baobab fruit also contains good quantities of the vitamin.

The Hausa-speaking natives of Bunga-Ningi, in Bauchi province (11° N., 9-30° E.), were observed to consume quite large quantities of baobab fruit juice either in sour milk or in their morning gruel, the juice being stirred into the flour after it has been cooked. One of the farmers was asked to bring six fruits at the correct stage of ripeness for making the juice. The average composition of the fruits found is given in Table 1.

Table 1

	Mean weight (gm.)	Range (gm.)
Whole fruit	462	554-341
Capsule	203	249-156
Seeds and fibres (dry)	165	210-114
Ratio of pulp to weight of fruit	0.21	0.22-0.19

The dry pulp was scraped from the seeds, ground to a fine powder, and the moisture content estimated in a Carter-Simon oven, the average of three estimations on each of the six pulps being 20.8 per cent (range 18.1-23.1). The ascorbic acid content of the dry pulp was estimated by the 2:6-dichlorophenol-indophenol method³, the average of three estimations on each of the six samples being 373 mgm./100 gm., (range 302-445 mgm./100 gm.). These are higher figures than those given by Carr for Rhodesian baobab fruit.

It was found that an average-sized baobab fruit made about one litre of juice, using native methods of preparation, and that the ascorbic acid concentration in it was 75 mgm./100 gm. (range 54-106). It is apparent that a destruction of ascorbic acid takes place during the preparation of the juice.

The consumption of baobab fruit juice by the Hausa-speaking people of Bunga-Ningi was measured over a period of a week in late February 1957 and was found to vary from 130 gm. (adult males) to 27 gm. (children 4-6 years of age). Using the figures given above this would provide 98 mgm. and 20 mgm. of ascorbic acid. At other times of the year the intakes of ascorbic acid had been found to be 17 mgm. and 16 mgm. respectively. The length of the baobab fruit season is estimated by the population of Bunga to be about two months, and it is therefore an important source of ascorbic acid in the local diets.

BRUCE M. NICOL

Nutrition Unit,
Federal Medical Department,
Kaduna, Nigeria.
April 16.

¹ Dalziel, J. M., "The Useful Plants of West Tropical Africa" (Crown Agents for the Colonies, London, 1948).

² Carr, W. R., *Nature*, 176, 1273 (1933).

³ Bessey, O. A., and King, C. G., *J. Biol. Chem.*, 103, 678 (1933).

Nucleic Acid Derivatives in Soils

DURING investigations into the nature of soil organic phosphates, purine and pyrimidine bases have been identified in preparations from three representative mineral soils from north-eastern Scotland. They were found mainly in the humic acid fractions of the organic matter, that is, that portion of the organic matter which is precipitated when an alkaline soil extract is acidified, and were clearly not in the free state, but were released by perchloric acid hydrolysis. Afterwards they were separated from the bulk of the hydrolysate by adsorption on a cation exchange column (IR-120), from which they were eluted with 5 *N* hydrochloric acid and identified by paper partition chromatography with solvents butanol/ammonium hydroxide¹, and isopropanol/hydrochloric acid/water². The bases so far identified are guanine, adenine, cytosine and thymine, which appear to be present in similar amounts, and smaller quantities of uracil. There is organic phosphate present in the humic acid fractions, equivalent to