

VITAMINS, MINERALS, CARBO- HYDRATES AND PROTEINS IN FRUITS—II

THE amount of minerals such as calcium and phosphorus and of vitamins that take part in human metabolism are not large. Therefore one may look for a supply of these essentials in fruits though in small quantities, but in the soluble form. In the investigation presented here we have analysed ten fruits for protein, sugars, calcium, phosphorus, vitamin B₁ and in some, vitamin C. Water and trichloroacetic acid extracts and ash of the fruits were examined for soluble and insoluble constituents.

Detailed estimations of carbohydrates are published elsewhere.¹ Brigg's colorimetric method for phosphorus, McCrudden's volumetric method for calcium and Kjeldhal's method for protein were adopted. For vitamins C and B₁ the water extract of fruit was taken. For the estimation of vitamin C dichlorophenol-indophenol method² was adopted. In the case of vitamin B₁ the quantity of water used for extraction was kept large. The extract was clarified with the minimum quantity of basic lead acetate and sulphuric acid and was then treated with norite. Pure vitamin was retained by norite which was later on released by acidulated water and estimated by using thiochrome method by H. Tauber.³ Details will be published elsewhere.

All fruits contain sugars and some have starch in addition. Sugars present are mainly glucose and fructose. The concentration of phosphorus from water and acid extracts and from ash is same and is in ortho condition. Same is true with calcium except in sapota.

Analysis of 100 gm. of Fruit

Common Name	Botanical Name	Proteins gm.	Sugars gm.	Phosphorus gm.	Calcium gm.	Vitamin B ₁ mgm.	Vitamin C mgm.
1. Chiku	<i>Sapota zapotilla</i>	0.938	9.21	0.012	0.019	0.078	
2. Orange	<i>Citrus aurantium</i>	0.628	8.31	0.013	0.013	0.108	53.5
3. Figs	<i>Ficus carica</i>	1.114	9.07	0.024	0.052	0.042	
4. Guava	<i>Psidium guajava</i>	1.39	9.44	0.028	0.109	0.045	
5. Plantain—Velchi ..	<i>Musa sapientum</i>	1.15	18.23	0.02	0.003	0.138	0.82
6. Plantain—Green Skin	" "	1.07	17.83	0.039	0.003	0.132	
7. Plantain—Rasbali .	" "	1.11	18.07	0.027	0.006	0.126	
8. Apple Red ..	<i>Pyrus malus</i>	0.25	10.48	0.022	0.007	0.099	1.08
9. Apple—Yellow green	" "	0.242	10.50	0.022	0.007	0.090	1.24
10. Grapes—Yellow ..	<i>Vitis vinifera</i>	0.54	14.69	0.016	0.24	0.036	

which has 30 per cent. water-insoluble (acid-soluble) when analysed with skin on, the rest being water-soluble. The amounts of vitamins present are fairly high especially B₁ in plantain, apple and sapota.

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1. Rege and Devadatta, *J. Univ. Bomb.*, 1941, **10**, 3, B, 74. 2. *Nature*, 1933, **15**, 132. 3. Tauber, H., *Mikrochem. Acta*, 1938, 108.