

1% with the absorbance values obtained at 450 m μ by use of magnesium oxide-Celite columns.

Concerning the selection of wave length for absorbance measurement, other wave lengths and appropriate coefficients may be used to estimate the carotene with greater stoichiometric accuracy since the cis isomers have lower coefficients than the all-trans isomer at 450 m μ . Results calculated at this wave length as all-trans- β -carotene are low. Biological activities of the cis isomers relative to absorbancies are even lower than for the all-trans form (3, 5). Hence, calculation as suggested at 450 m μ may reflect the biological potency with less error than calculations at other wave lengths which indicate higher carotene content.

Literature Cited

- (1) Assoc. Offic. Agr. Chemists, "Methods of Analysis," 7th ed., 1950.
- (2) Bickoff, E. M., White, L. M., Bevenue, A., Williams, K. T., *J. Assoc. Offic. Agr. Chemists* **31**, 634 (1948).
- (3) Deuel, H. J., Jr., Sumner, E., Johnston, C., Polgar, A., Zechmeister, L., *Arch. Biochem.* **6**, 157 (1945).
- (4) Johnson, R. M., Baumann, C. A., *J. Biol. Chem.* **169**, 85 (1947).
- (5) Kemmerer, A. R., Fraps, G. S., *Ibid.*, **161**, 305 (1945).

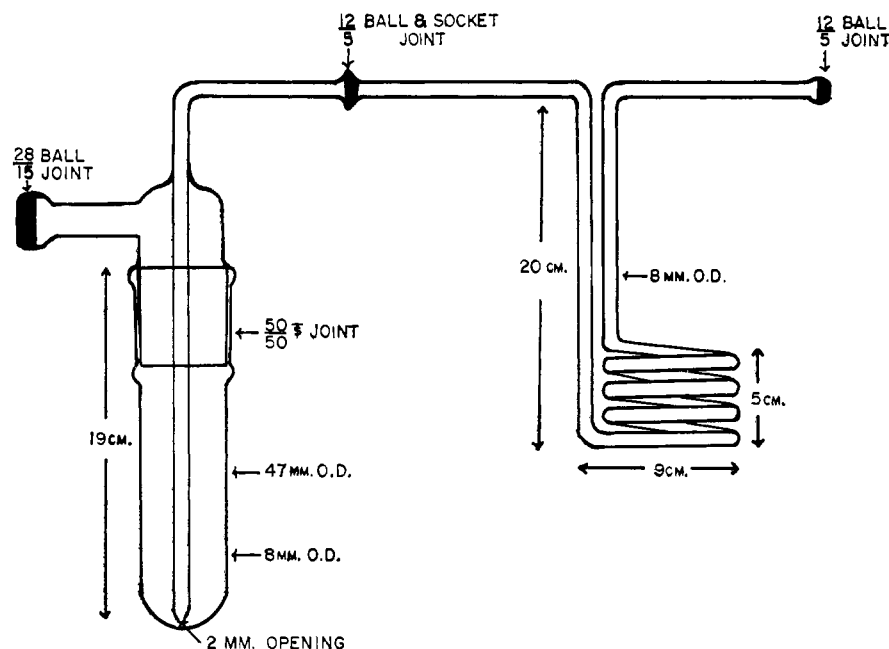
- (6) Moore, L. A., and Ely, Ray, *Ind. Eng. Chem., Anal. Ed.* **13**, 600 (1941).
- (7) Pepkowitz, L. P., *J. Biol. Chem.* **155**, 219 (1944).
- (8) Wiseman, H. G., Stone, S. S., Savage, H. L., Moore, L. A., *Anal. Chem.* **24**, 681 (1952).
- (9) Zscheile, F. P., Whitmore, R. A., *Ibid.*, **19**, 170 (1947).

Received for review March 17, 1956. Accepted June 12, 1956.

Determination of Antioxidants in Edible Fats—Correction

Figure 4 was omitted from the article on Determination of Antioxidants in Edible Fats [Constance Anglin, J. H. Mahon, and R. A. Chapman, *J. Agr. Food Chem.* **4**, 1018 (1956)]. It is printed below.

▼ Figure 4. Distilling flask and super-heater coil



NUTRITIVE VALUE OF BEANS

Nutrients in Central American Beans

OU DH B. TANDON, RICARDO BRES-SANI, and NEVIN S. SCRIMSHAW

Institute of Nutrition of Central America and Panama,
and

FRANCIS LE BEAU

Servicio Cooperativo Interamericano de Agricultura and Instituto Agropecuario Nacional, Guatemala, Central America

Because of the special nutritional importance of beans in Central America and Panama, the factors influencing protein, methionine, lysine, and tryptophan content of 25 varieties were studied. Niacin, thiamine, and riboflavin were also determined. Over-all differences in nitrogen and tryptophan content among varieties and between localities were highly significant. The fertility of the land significantly alters the yield and riboflavin content of the kidney bean, but the content of nitrogen, methionine, lysine, tryptophan, niacin, and thiamine is not detectably affected by fertility differences.

THE KIDNEY BEAN, *Phaseolus vulgaris*, is second only to maize in importance in the diets of the people throughout most of Central America. It is not unusual for these beans to account for 20 to 30% of the protein in the diet (3, 5, 20). Under these circumstances the quality of their protein becomes of

crucial importance. However, data on the variations in nutritive value of the kidney bean, especially in essential amino acids, are surprisingly limited. The most complete report is that of Jaffé (16), who described the chemical composition, digestibility, protein efficiency, and limiting essential amino acids

in a group of bean samples from Venezuela.

Large differences in thiamine and riboflavin content of beans grown at different locations have been reported by Eheart and associates (4). Guyer, Kramer, and Ide (10) observed that as harvest was delayed the yield increased but the