IN THE LABORATORY

The Assay of New Rich Natural Sources of Ascorbic Acid

JULES TUBA, GEORGE HUNTER, and JOHN A. OSBORNE

University of Alberta, Edmonton, Canada

Plant materials which are reported as containing very high concentrations of ascorbic acid include the hips of wild Alberta roses, *Rosa* sp. (1,300–3,500 mg./100 grams of flesh) (*5*); hips of a cultivated rose, *Rosa laxa* (3,000–5,000 mg./100 grams of flesh) (*5, 6*); green English walnuts, *Juglans regia* (2,000–3,000 mg./100 grams) (*8*); a gooseberry found in India and West China, *Phyllanthus Emblica* (920 mg./100 ml. juice) (*2*); and recently there has been reported the finding of 1,000–3,300 mg. of ascorbic acid/100 grams of edible matter in the West Indian cherry, *Malpighia punicifolia* (*1*).

It is well recognized that there exist in some fresh plant materials, notably green walnuts, certain non-vitamin C substances that reduce the dye, 2:6-dichlorophenolindophenol, on titration with which most published values for ascorbic acid in food materials depend. Means for differentiating true vitamin C from such non-vitamin C reductants are also well established (*3, 4, 9*).

We have shown, in the case of rose hips that non-vitamin C reductants, if present at all, are negligible in amount and that the dye titration provides an accurate index of their true ascorbic acid content (*6*). For English walnuts, which, through the kindness of J. R. van Haarlem, of the Horticultural Experiment Station, Vineland, Ontario, we had the opportunity of examining, the case is quite different, as our results in Table 1 show. The values shown for non-vitamin C reductants are based upon the method of Levy (*3*).

TABLE 1

VITAMIN C AND NON-VITAMIN C DYE REDUCTANTS IN GREEN WALNUTS (*Juglans regia*)

Tissue assayed	Weight in grams	Total dye reduction (mg. vitamin C/100 grams tissue)	True ascorbic acid (mg./100 grams tissue)	Non-vitamin C reductants (mg./100 grams tissue)	Non-vitamin C reductants (% of total dye reductants)
Whole nut.....	8.5	1,622	1,232	390	24
Whole nut.....	4.2	1,027	638	389	38
Mesocarp.....	6.1	2,114	1,830	284	13
Epicarp.....	6.7	1,312	576	736	56
Mesocarp.....	4.3	1,055	942	113	11
Mesocarp*.....	1.37	2,065	1,931	134	7
Epicarp*.....	2.13	956	578	378	39

* Tissues from the same nut.

Our assays show that the mesocarp contains more ascorbic acid than the epicarp and has a smaller proportion of non-vitamin C reductants. These findings are in accordance with the results of Wokes, *et al.* (*8*). It may also be observed that the percentage of non-vitamin C reductants varies from approximately 5 to 60 per cent of the total titration in the two tissues, and up to nearly 40 per cent in the whole green nut. The highest concentration of vitamin C in the mesocarp is nearly 2,000 mg./100 grams.

The work of Wokes, *et al.* (*7*) would suggest that the proportion of non-vitamin C reductants present in green walnuts decreases with increased maturity.

In view of such circumstances it would seem that values depending solely on the dye titration, reported for ascorbic acid in new food materials, should be accepted with much reservation.

References

1. ASENJO, C. F., and DE GÚZMAN, A. F. F. *Science*, 1946, **103**, 219.
2. CHEN, HO, HSIEH, and SHEN. Ref. in *Nutr. Rev.*, 1944, **2**, 287.
3. LEVY, L. F. *Biochem. J.*, 1944, **37**, 714.
4. MAPSON, L. W. *J. Soc. Chem. Ind.*, 1943, **62**, 223.
5. TUBA, J., HUNTER, G., HUTCHINSON, M. J., and KENNEDY, L. L. *Canad. J. Res.*, 1943, **21**, 363.
6. TUBA, J., HUNTER, G., and STEELE, H. R. *Canad. J. Res.*, 1946, **24**, 37.
7. WOKES, F., MELVILLE, R., ORGAN, J. G., and JAMES, E. M. *Biochem. J.*, 1945, **39**, xxv.
8. WOKES, F., ORGAN, J. G., DUNCAN, J., and JACOBY, F. C. *Biochem. J.*, 1943, **37**, 695.
9. WOKES, F., ORGAN, J. G., and JACOBY, F. C. *J. Soc. Chem. Ind.*, 1943, **62**, 232.

Autolyzed Brain Tissue as a Means of Facilitating Transmission of Experimental Poliomyelitis[1]

ALBERT MILZER and CHESTER L. BYRD, JR.

Serum Center, Michael Reese Research Foundation, Chicago

Most attempts to infect various animals with poliomyelitis monkey-passage strains or infected human tissues failed until Armstrong (*1*) was able to adapt the Lansing strain from monkeys to cotton rats and from the latter to white mice. Since then many unsuccessful attempts to establish other monkey-passage strains in various rodents have been made, although the spreading factor of Duran-Reynals (*2*) and a variety of technics, such as rapid passage, brain trauma, hyperpyrexia, chilling, and use of immature animals, have been employed (*5*). Successful adaptation of a few other monkey-passage strains in cotton rats has been reported by Toomey and Takacs (*8*) and Jungeblut and Sanders (*4*).

In harvesting brains and cords from CFW (Carworth) Swiss mice paralyzed following intracerebral injection with the Lansing strain of poliomyelitis virus for the preparation of stock virus suspensions, we observed that autolyzed brain tissue removed from mice left in their cages for 7 or 8 hours after death appeared to accelerate the incubation period of

[1] Aided by a grant from the National Foundation for Infantile Paralysis, Inc.