Technical Papers

The High Ascorbic Acid Content of the West Indian Cherry

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The West Indian cherry (*Malpighia punicifolia* L.), commonly called "acerola" in Spanish, is a small tree native to tropical and subtropical America. Its fruit is fleshy and drupaceous, bright red in color when ripe, and possessing an agreeably acid taste. Each of the cherries weighs about 5 grams; nearly 80 per cent of their weight is edible.

As far as we have been able to find out, the three richest natural sources of ascorbic acid known to date are the rose hips (*Rosa* sp.) (*4*), the "mirobalán" (*Phylanthus emblica* L.) (*3*), and the guava (*Psidium guajava* L.) (*5*). They contain about 1,700, 800, and 300 mg., respectively, of ascorbic acid per 100 grams of edible matter.

Utilizing the assay method of Bessey and King (*2*) (2,6-dichlorophenol indophenol titration), we found that the West Indian cherry contained within the high limits of 1,000–3,300 mg. of ascorbic acid per 100 grams of edible matter. The variation in its ascorbic acid content seems due principally to its degree of ripeness, the content being highest in the green fruit and lowest in the ripe.

TABLE 1

Degree of ripeness and color of fruit	No. of samples*	pH of juice	Range mg. ascorbic acid per 100 gram of edible matter	Average mg. ascorbic acid per 100 gram of edible matter
Unripe—green ...	4	3.35	2,516–3,309	2,963
Medium ripe—yellow green with red spots	3	3.35	2,481–3.048	2,787
Fully ripe—red ..	4	3.35	1,030–2,700	1,707

* Each sample consisted of at least 15 cherries.

To confirm fully the presence of ascorbic acid in the West Indian cherry, the acid was isolated from the juice by a method not materially different from that utilized by Banga and Szent-Gyorgyi (*1*) in their study of peppers. Briefly, it is as follows: The ascorbic acid is precipitated from the juice in the form of the lead salt on the addition of neutral lead acetate, followed by enough ammonium hydroxide to bring the pH to 8.3–8.5. The lead salt thus obtained is decomposed with concentrated HCl, the supernatant acid mixture then concentrated *in vacuo*, and the ascorbic acid, present therein, extracted with acetone. The acetone extracts are mixed wih *n*-butyl alcohol, and the acetone is evaporated *in vacuo*. Ascorbic acid remains in the *n*-butyl alcohol and crystallizes out of it, after standing at a temperature of 0° C. for three days.

A gram and a half of pure crystals was obtained out of 275 ml. of the juice. These crystals had a melting point of 191–192° C.; a mix melting point with synthetic *l*-ascorbic acid, 189–191° C. Equal weights of the synthetic and natural product decolorized, to the same extent, equal volumes of indophenol reagent. The specific rotation in water of the synthetic and the natural substances was also similar. It is quite apparent that the substance obtained from these cherries is pure *l*-ascorbic acid.

It would seem that the West Indian cherry is one of the richest, if not *the* richest, edible fruit source of ascorbic acid so far described in the literature.

References

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Motherless Males From Irradiated Eggs[1]

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"Androgenesis" (*6*) was first demonstrated by Hertwig (*3*), who found that, when amphibian eggs are heavily irradiated and then fertilized by untreated sperm, abnormality in development is *inversely* proportional to intensity of treatment. Embryos from such eggs have nuclei smaller than normal, and these nuclei were thought to be haploid and descendants of the sperm nucleus. Packard (*4*) irradiated Chaetopterus eggs in first meiotic metaphase and obtained clear cytological proof that the untreated sperm nucleus in such eggs can form the first cleavage figure and its successors. Dalcq (*1*) checked Hertwig's results and added cytological proof of androgenesis in Amphibia.

It is uncertain whether androgenetic larvae in any of these experiments would develop into adults. As

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