

Studies on the Stability of Carotene in Sweet Potatoes

Kôtarô NISHIDA and Collaborators

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I. Introduction

The authors have hitherto continued biochemical investigations^{1)~7)} on sweet potatoes, and among these studies, have paid especially deep concerns to the experimental results, got on the carotene-containing sweet potatoes from the standpoint of not only scientific research but also of practical utilization.

The varieties of sweet potatoes are divided in two groups from their contents of carotene, namely, those containing very much quantities, and those containing scarcely any. The sweet potato which the authors⁴⁾ picked up as the objective of research was the former kind, and to such sweet potato we proposed to give the name of "Carotene-sweet Potato". In all the experiments the authors used as the sample the "Hayato" variety of sweet potato, which was transmitted to Hayato-town Kagoshima Prefecture from U.S.A. in 1931 and is said to belong to the strain of "Porto Rico" variety.

Now, the summary of the studies on this carotene-sweet potato, carried out up to this time in our laboratory, is shown as follows:—

(1) The more inner is the layer, the higher is the carotene content, and moreover this carotene mostly consists of β -carotene, and α -isomer is contained in only small quantities. (2) Even in the case of same variety under same growing conditions, carotene content also varies depending upon the size of roots, and as regards to the roots of the

same plant, it is generally high in those over medium size. Between the roots of different plants, however, individual differences are eminent even if they are of same size. (3) According to the results of water-culture, the carotene content of sweet potato is influenced with plant nutrients. Above all, it is eminent in the case of phosphoric acid, that is, when much phosphoric acid is given the total yield of roots surely increases, nevertheless the carotene content of individual root remarkably decreases. (4) The carotene content of raw sweet potato exceedingly increases during the storage period. Young plants of sweet potato, sprouted from the same root, were water-cultured under the same conditions, and thus cropped sweet potatoes of almost equal carotene content were stored in a repository. In the consequences, the increasing ratio of carotene amounted to 50% after two months and moreover, 75% after four months. (5) At the time when sweet potato germinates, the reduction of carotene remains excessively minute. Especially when sunbeam is intercepted while germination, the reduction becomes further minute. (6) The destruction of sweet potato-carotene on account of steaming or boiling with rice is very low, and even in the case of these treatments more than 90% of carotene remains.

Knowing these facts in the previous studies, the author and his collaborators successively have continued the studies on the stability of sweet potato-carotene. The authors will report herein on the summary of the results thus obtained since.

II. Factors Influencing the Destruction of Sweet Potato-carotene

Kôtarô NISHIDA and Masakuni ICHIKI

As destroying factors against the carotene in plants, we can count up those such as heat, light, oxygen, temperature, moisture and enzyme etc. As regards to the weights of these factors, however, investigators have been fully differing in their opinions and in an extreme case even direct opposite results have been reported.

In a review by Lantz,⁸⁾ when pepper was dehydrated its carotene from 55 to 65% was destroyed, while when dried in the sun more than 90% was lost. But Sherman *et al.*⁹⁾ mentioned that there were scarcely any difference in the ratio of carotene-destruction either in the sun dried sweet potato or in the dehydrated. According to J. H. Mitchell *et al.*¹⁰⁾ though the sweet potato flour lost 89% of its carotene