NEWS, NOTES, AND REVIEWS

Elimination of Tannins from Coconut Leaves

THE inactivation of proteins and viruses by tannins is well known. Several viruses affecting plants containing high tannin content are not transmitted because the tannin in the plant combines with its virus forming aggregates (Wessel—Riemens, 1965). To remove this tannin effect, the common practice is to add an extraneous protein. This will then compete with virus and plant proteins and cause a decreased formation of non-infective virus–tannin complex Similarly the addition of an antioxidant like 2-mercaptoethanol in the grinding medium greatly helps in the protection of infectivity of unstable viruses (Paulsen and Fulton, 1968).

The root (wilt) disease of coconut is suspected to be of viral etiology. Yet attempts to get infective virus preparations have not been successful. Since coconut palm contains high tannin it is quite possible that any virus present is not being transmitted because of the tannin effect. In our work on the separation of phenolic compounds of coconut leaves and roots, we have found that tannin greatly interferes with the chromatographic separation of phenolics. This necessitated a procedure for the removal of tannin, which eventually worked out to be as follows:

Ten grams each of freshly collected identical leaf samples were macerated in a Waring blender with 100 ml of water containing any of the following: 1% gelatin; 1% egg albumin: 3% casein; 1% mercaptoethanol; 1% gelatin *plus* 1% mercaptoethanol, 1% egg albumin *plus* 1% mercaptoethanol, and 3% casein *plus* 1% mercaptoethanol. The macerate was filtered through cheese cloth. To this filtrate was added 50 ml of solvent ether to remove chlorophyll. The tannin content in the clear extract was estimated by permanganate titration as described in AOAC (1955). Protein was estimated by micro-kjeldhal method.

The ether extract does not remove any tannin, but its use is called for to remove the chlorophyll to avoid its interference with tannin estimation. It may also be mentioned that for the purification of viruses it is not necessary to use the ether extraction procedure.

Maximum efficiency in the removal of tannins was attained in gelatin *plus* mercaptoethanol followed by casein *plus* mercaptoethanol and mercaptoethanol alone (Table I). The separation of chlorophyll was adversely affected by treatment with 1% egg albumin which could be considerably overcome in the presence of mercaptoethanol.

TABLE I

Percentage removal of tannin in terms of water extract

Treatment	Percentage of tannin removed
1% Gelatin	37·2
1% Egg albumin	0
3% Casein	37·2
1% Mercaptoethanol	68·6
1% Gelatin + 1% Mercaptoethanol	90·0
1% Egg albumin + 1% Mercaptoethanol	60·8
3% Casein + 1% Mercaptoethanol	68·6

Since mercaptoethanol was the only system to which no external protein was added, an attempt was made to determine the amount of protein in the supernatant. Treatment with mercaptoethanol resulted in giving the highest amount of soluble proteins indicating that the method is indeed useful in removing tannins and preventing loss of protein.

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BOOK REVIEWS

Coconuts. *By* R. Child, 2nd edition. Tropical Agricultural Series (Editor, D. Rhind). (Longmans, London). 1974. 335 pp. Price £ 10.00.

The first edition of this book was published in 1964 with the same title and by the same author. The author Dr. Reginald Child is a former Director of Coconut Research Institute, Sri Lanka. He was in charge of the Ceylon Coconut Research Schemes (since made into the Institute) for 18 years. Since his retirement, he has also had the opportunity of visiting a number of other coconut growing countries. He is thus well qualified to write this book. The first edition of the book contained 15 chapters and 209 pages of subject-matter. This has now been expanded into 20 chapters in 325 pages. The present edition comprehensively deals with the various aspects of coconut cultivation including the history and botany of the crop, its climatic and soil requirements varieties and breeding techniques, nutritional requirements, pest and disease control, maintenance of plantations, processing and use of the different products. What makes this edition very welcome is that the author has taken note of the progress in research and technology since the appearance of the earlier edition.

The book begins with a very interesting account of the historical background of the crop and the several arguments regarding its place of origin and dissemination and the origin of the names 'coconut' and *Cocos nucifera*. The statistics in the second chapter has been revised and brought up to date. Table II (p. 30) shows that Philippines has the largest area under coconut (1·8 million ha) followed by Indonesia (1·2 mha) India (0·98 mha) and Sri Lanka (0·47 mha) out of a total of 5·9 million ha. Table III (p. 31) provides the FAO estimates of copra production of all the countries for 1965–70. The total world production is now estimated to be consistently above 3 million tonnes and shows little variation from 1965–1970. The estimate for 1952–55 (FAO) quoted in the earlier edition was 2·8 million tons and for 1934–38 the figure was 2·4 million tons. Thus, there has been only a marginal increase in the total world copra production. A person who is not familiar with the coconut palm will find a lot of useful information which is not documented as comprehensively elsewhere as in Chapter 3 where the botany and special characteristies of the palm are discussed. The earlier edition (pp. 40–43) included only very little information on varieties but the new edition devotes a whole chapter (pp. 55–71) on it. In it is summarized all the available information on varieties, cultivars, the difficulties of identifying them and the propriety of these terms. The chapter on climate and soil remains largely unchanged. Chapter 6 on selection and breeding is entirely rewritten and contains new information on hybrids, replanting programmes, and international efforts for crop improvement.