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Effect of Washing Techniques on Nutrient losses and Preparation of Samples in Arecanut palm

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ABSTRACT

The effect of washing or removal of surface contaminants, mineral losses and essentiality of with or without midribs were examined. Concentrations of N and P in the levels of arecanut palms were not affected markedly by the washing procedures whereas K content was affected due to leaching. However, washing is not advisable at the time of sample preparation. Leaf laminae without midribs indicated better index for the content of elements.

INTRODUCTION

The removal of surface contaminations from plant material is not a simple matter. Many investigators recommended washing the samples with distilled water (Parbery, 1935; Roach, 1944; Thorne and Wallace, 1944). This, however, is liable to cause loss of certain nutrients from the plant material; by leaching this may be particularly serious for potassium (Albercht, 1943). On the other hand, Smilde and Chapas (1963) have reported that the whole leaflets (without midribs) of oil palm can be used for plant analysis.

Further, Okoye (1968) has suggested that washing with 0·2 per cent of teepol gave better result. Nevertheless, adequate information on the sample preparation of areca palm is still lacking. Therefore, in the present studies the relative effectiveness of commonly used washing techniques, with and without midribs were investigated for drawing up a reasonable programme for the preparation of plant samples in arecanut palms.

MATERIALS AND METHODS

Arecanut palms (*Areca catechue* L.) of uniform growth, productivity, growing under identical soil and cultural practices in bulk garden of the Institute, and of age about 15 years old were selected for this investigation during the year 1970. Third leaf from the bottom were collected between the first three hours after sunrise. Samples were wrapped in plastic bags and brought to the laboratory. Eight treatments with five replicates were taken up during the collection of samples. Washing procedures adopted were (T 1) with midrib-leaves not washed; (T 2) with midrib - leaves washed with distilled water; (T 3) with midrib-leaves hand washed with 0·3 per cent v/v HCl by passing the fingers and thumb over the total surface of the leaf with the help of cotton;

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and (T 4) with midrib-rinsed as in T3 with 0·1 per cent v/v detergent solution (teepol). Same cleaning procedures were adopted in the treatments T 5, T6, T7 and T8 respectively, but the midribs were removed. After the process of drying (at 60—65°C) and grinding, the powdered material was stored in air-tight glass containers until subsequent analysis were performed. Esitmation of total nitrogen was carried out by micro - Kjeldahl method (A. O. A. C., 1960), of phosphorus by colorimetric (Kitson and Mellon, 1944) and of potassium by Flame-photometer (LE Poidevin and Robinson, 1964) and the results were presented as percentages of element contents on dry weight basis.

RESULTS AND DISCUSSION

The element contents of areca leaves under different washing factors in the presence/absence of midribs are presented in Table 1.

In the case of nitrogen the treatment differences were significant. These variations were found to be due to the presence/absence of midribs in the leaf material analysed. In the presence of midrib nitrogen content was reduced significantly. Similar results have been reported by Bould *et al.* (1960) in fruit crops and Smilde (1963) in oil palms. However, the washing of materials did not indicate significant differences on the nitrogen content of leaves. Similarly the differences due to treatments were negligible while observing the phosphorus content thereby showing the midrib and washing materials are not in any way affecting the phosphorus content. Further, it can be supported with the findings of Bhan *et al.* (1959) and Lachica (1967). But in the case of potassium content, washing materials showed significant differences, and content was maximum when the material was analysed without washing treatments. In general, the potassium content of arecanut leaves was leached by washing. A similar result was also reported by Corin *et al.* (1958) in fruit crops. Patassium content was more in the case of without midrib, but differences are not statistically significant.

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TABLE 1

Effect of differential washing techniques on nutrient losses, with or without midribs on element content of arecanut leaves

Treatments	Percentage of element content		
	Nitrogen	Phosphorus	Potassium
T 1	0.8380	0.3170	1.0050
T 2	0.7954	0.3270	0.4450
T 3	0.7768	6.2688	0.5250
T 4	0.9544	0.2906	0.7100
T 5	1.0744	0.3110	0.8420
T 6	1.0944	0.3154	0.5600
T 7	1.1480	0.2988	0.6200
T 8	1.2208	0.3334	0.7350
C. D. at 5% level	±0.2278	NS	±0.2380
Washing materials :			
No washing	0.9568	0.3140	0.9235
With distilled water	0.9448	0.3212	0.5025
With HCl	0.9624	0.2838	0.5727
With detergent solution	1.0876	0.3120	0.7225
C. D. at 5% level	NS	NS	+0.1683
Midribs :			
With midrib	0.8411	0.3009	0.6713
Without midrib	1.1134	0.3147	0.6893
C. D. at 5% level	+0.1139	NS	NS

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