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A NOTE ON THE EXTRACTION OF POTASSIUM FROM COCONUT LEAVES BY VARIOUS EXTRACTANTS

The potassium present in the plant is for the most part in forms readily soluble in water. This property had been made use for the quantitative extraction of potassium with cold water, even as early as 1920 by Kostytschew and Eliasberg. They reported that when plant tissue was extracted with cold water, the tissue yielded potassium-free ash and the lead acetate and tannin precipitates were also found to contain no potassium. Attoe (1948) used a solution of 2 N. NH_4OAC and 0.2 N. $\text{Mg}(\text{OAC})_2$ for the extraction of potassium and sodium directly from plant tissue and he got the same recoveries of the two elements found as by ashing the plant tissue. At present no information is available as to the comparative efficiency of the various common extractants in extracting potassium from coconut leaves. Therefore, an attempt is made, here mainly to evaluate the relative extracting capacity of the different extractants.

Twelve representative leaf samples collected from palms receiving three levels of K were used for the present study. The leaf samples were oven dried at 70°C and ground to pass a 30 mesh sieve. Seven extractants viz. cold water (pH 4.5), hot water (80°C) 0.1N HGL, 2N NH_4OAC , 0.2 N. $\text{Mg}(\text{OAC})_2$, 2 N. NH_4OAG + 0.2N. $\text{Mg}(\text{OAC})_2$ and 0.2 M EDTA were employed and the potassium extracted was compared with the recoveries from standard nitric-perchloric-sulphuric acid digestion (Jackson 1958) and also from nitric perchloric acid digestion. In all cases a 0.5 g portion of the dried tissue was extracted with 100 ml. of the extractant for one hour, unless otherwise stated, and filtered. The potassium was estimated in the filtrate using an EEL flame photometer and the results are presented in Tables 1 and 2.

The mean value of extracted potassium by various extractants do not vary appreciably and are not significantly different from one another even at 5% level of significance (Table 1). Nevertheless, a better recovery of potassium was obtained with 0.1N HGL. The mean value for this extractant is slightly higher than that obtained for either triacid or diacid digestion procedure. The efficiency of various solutions to extract the potassium from coconut leaves was found to be in the decreasing order of 0.1N.HCL > 0.02 M EDTA > 2N. NH_4OAG > 2N NH_4OAC + 0.2N $\text{Mg}(\text{OAC})_2$ > 0.2N. $\text{Mg}(\text{OAC})_2$ > hot water > cold water. Mohapatra *et al* (1971) found that shaking with hot water for one hour helped to extract potassium completely

TABLE 1
Oxidizability of polyacrylamide extracted by different extractants

S No	Triac J	Cold water	Hot water	0.1N NaCl	0.1N NH ₄ OAc	0.2N Na ₂ S ₂ O ₃	0.2N NH ₄ AC + 0.2N Mg(OAc) ₂	0.02M EDTA	D
1	8000	5800	8000	8750	8000	8258	8008	8000	8881
2	8588	8000	5500	7000	6500	8008	8008	8500	8008
3	7000	7000	4000	4500	5000	3500	5000	4508	4258
4	7000	7000	9000	11000	8000	8750	11000	1580	8881
5	8500	7508	7500	9000	9000	9000	9500	8000	8850
6	7000	6008	6500	8000	8000	7000	7500	8000	7250
7	4000	4000	1000	4500	4000	4000	4500	5000	4008
8	5000	4500	4750	6000	6000	4750	5500	6800	6800
9	7500	8000	6750	8000	7500	8500	8000	7750	6870
10	8000	6500	5000	5500	5000	5000	5000	5000	5000
11	8500	8000	6300	8000	7000	6750	7000	7500	6508
12	8250	8508	8500	9080	18008	8580	9750	10008	8250
Mean	6720	8842	8167	7354	7107	6479	7063	7013	6531

from the arecanut leaves. However, in the present study, neither cold water nor hot water proved as efficient as any other extractants tried and they gave the least mean values.

The efficiency of hydrochloric acid as extractant was confirmed when different extraction periods were compared (Table 2). As the extraction period was reduced potassium recovered also dropped accordingly (the mean value decreased from 7354 ppm for one hour shaking to 6729 ppm for 15 minutes shaking), but this decrease failed to make any statistically significant difference when mean values were compared. More over, the mean value for 15 minutes extraction comes very close to that recovered after wet oxidation. Hence it can be concluded that 15 minutes extraction with 100 ml. of decinormal HGL is as good as one hour extraction.

Table 2
Potassium extracted by 0.1N HCL different extraction periods (ppm)

Sl. No.	1 hour	30 minutes	15 minutes
1.	6750	6250	6000
2.	7000	6500	6375
3.	4500	4500	4500
4.	11000	10500	10375
5.	9000	8500	8500
6.	8000	7250	7500
7.	4500	4500	4000
8.	6000	5500	5250
9.	8000	7500	7000
10.	6500	5250	5250
11.	7000	7375	6875
12.	10000	9500	9500
Mean.	7354	6760	6729

F. ratio: 0.26 (comparison made with the recovery of potash from triacid digestion)

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