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Chemical composition of three varieties of banana pseudo stem (*Musa spp.*) and the use of cellulose in the preparation of carboxymethylcellulose

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Banana pseudo stem is a potential commercial raw material for the production of cellulose based food additives. A study was conducted to compare the chemical composition of three varieties of banana (*Musa* spp.) pseudo stem namely, Ambul, Ambun and Kolikuttu. The possibility of the preparation carboxymethylcellulose (CMC) was investigated using cellulose obtained from pseudo stem of Ambul variety of banana.

Three varieties of pseudo stem harvested from a banana plantation in Embilipitiya, Sri Lanka, were used in the study. The stem was cut in to small pieces of 2 cm cubes and air dried for 2 days. Dried material was milled and its chemical composition was determined. For determination of the percentage extractives and lignin, material that passed through a particle size of 60 to 80 mesh size was used. The extractive percentage was determined as % loss in weight, after soxhlet extraction with ethyl alcohol- benzene mixture (1:2 V/V). The residue was hydrolysed with 72 % Sulphuric acid and the insoluble fraction, was washed with distilled water, until neutralization and dried at 105 ^{0} C for 4 h., and acid-insoluble lignin content was quantified. Pectin content in the dried material was determined by extracting in 0.1 M HCl for 2 hr. The soluble fraction was recovered by precipitation with 96 % ethyl alcohol. Cellulose was extracted sequentially in 1 M and 4 M KOH. The insoluble material was washed in acidified ethyl alcohol and air –dried. All experiments were carried out in triplicate. In the preparation of CMC, cellulose prepared previously from banana stem *Ambul* variety, was bleached and left to react with 1 % sodium monochloroacetate for 12 h. The CMC obtained was confirmed by FTIR spectra and compared with commercial CMC. The length and colour was determined using SEM and a chromatometer, respectively.

The results show that the moisture content of the pseudo stem ranged between 92 - 95 %. The chemical composition was as follows (% range): Extractives: 4.3-6.7, pectin: 1.8-3.3, cellulose: 21.5-32.5, lignin: 11.4 -13.0. The chemical composition of the three banana pseudo-stems, were significantly different ($p<0.01$) among the three varieties of banana as determined by paired T-test. An 87 % yield of CMC was obtained from cellulose. The product was similar in length (70 - 80 µm) and colour (L value- 63.41 and 63.92) when compared with the commercial product.

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