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Influence of Cultivar and Plant Age on Cyanide and Protein Contents in Thai Cassava (*Manihot esculenta* Crantz) Leaves

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Introduction

- Cassava leaves are a considerable waste from tropical agriculture, yet are substantially nutritious.
- Utilisation of cassava leaves as a vegetable in Thailand is rare due to the toxic content of cyanide.
- In this study, the influence of cultivar and plant age on cyanide and protein contents in cassava leaves was studied for enhancing the use of this agricultural by-product and promoting cassava leaves as added source of protein in human nutrition.

Material and Methods

- Four Thai cultivars were surveyed: *Hanatee* and *Rayong 2* as 'sweet' types and *Rayong 5* and *Kasetsart 50* as 'bitter' types (*Fig. 1*).
- Leaves were collected from cassava plants in the field at 6 and 12 months after planting. Samples were harvested from the seventh to ninth nodes from the top of the plant.
- Samples were subjected to standard lab analyses.

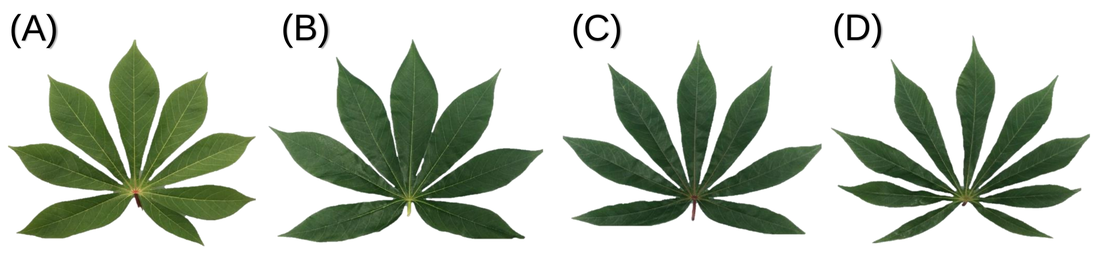

Fig. 1 *Cassava leaves samples from four cultivars: sweet (A) Hanatee, (B) Rayong 2 and bitter (C) Rayong 5, (D) Kasetsart 50* types.

- Total cyanide content of the samples was analysed using picrate paper kits *(Fig. 2)*.

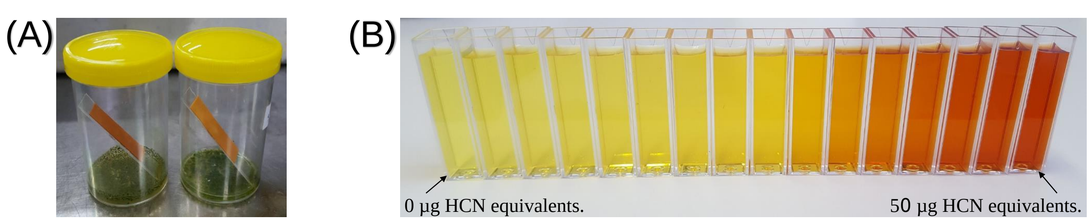

Fig. 2 *(A) Picrate paper kits, (B) Standards from 0 to 50 µg HCN equivalents.*

- Crude protein was analysed using the Kjeldahl method.

Results

- Leave samples of the bitter types showed higher cyanide contents (1214 - 2210 ppm DM for *Kasetsart 50* and *Rayong 5*) than the sweet types (869 - 1272 ppm DM for *Hanatee* and *Rayong 2*). Cyanide contents in leaves at 6 months were not significantly different from 12 months.

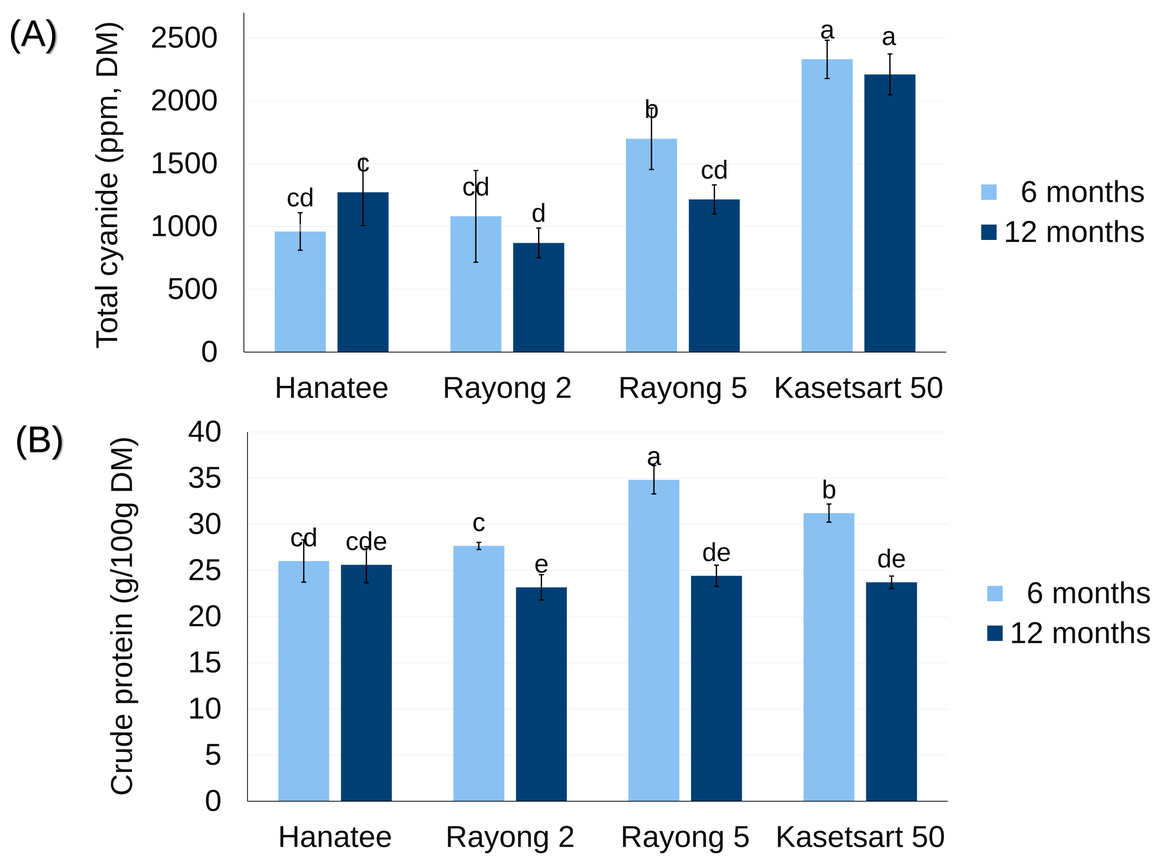

Fig. 3 *(A) Total cyanide content in cassava leaves and (B) crude protein content in cassava leaves. Different letters indicate significant difference (P≤0.05) in the same graph.*

- Leaf samples of bitter types *Rayong 5* and *Kasetsart 50* contained higher crude protein (34.82 and 31.21 g/100g) at 6 months than at 12 months. This effect was not clearly observed in sweet types *Hanatee* and *Rayong 2*.

Conclusions

- Leaf samples from sweet and bitter cassava cultivars showed varying levels of cyanide and crude protein.
- Leaf age did not significantly affect cyanide content but reduced crude protein content in bitter types.
- The impact of cultivar and age on the contents of other nutrients in the leaves such as vitamin C and carotenoids is being investigated.

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