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SHORT COMMUNICATION

Estimation of canavanine in the seeds of three *Canavalia* species

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Abstract *Canavanine has been estimated in the dry seeds of three* Canavalia *species:* C. ensiformis *(L.) DC. (Jackbean),* C. gladiata *(Jacq.) DC. (Swordbean) and* C. virosa *(Roxb.) Wight et Arn. The study indicates that the commercial exploitation of* Canavalia *species as sources of canavanine would be best carried out on* C. ensiformis *since this has the highest content of the metabolite.*

Keywords: *Canavalia ensiformis, Canavalia gladiata, Canavalia virosa,* canavanine.

Introduction

Canavanine (α-amino-δ-guanidinoxybutyric acid) is known to occur only in the family Leguminosae, subfamily Papilionoideae, occurring in 60% of the approximately 540 species examined and 35% of the 150 genera (Turner and Harborne 1967).

Earlier studies indicate that canavanine is an important metabolite in those seeds in which it occurs. It is sometimes present at high concentrations in seeds, and circumstantial evidence points strongly to its role in nitrogen transport and storage (Tschiersch 1959).

The present investigation was carried out to estimate canavanine in the three *Canavalia* species. Among these species, *C. ensiformis* and *C. gladiata* are cultivated, whereas *C. virosa* is found growing wild.

Materials and methods

Seeds from mature pods of the three *Canavalia* species were collected from plants growing in the SP Chowgule College botanical garden. Canavanine was estimated by the method of Fearon and Bell (1955).

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Table 1. Concentration of canavanine in the seeds of three *Canavalia* species

Plant species	Total canavanine content (% dry weight)
C. ensiformis	3·47 (0·31)
C. gladiata	3·06 (0·28)
C. virosa	2·86 (0·23)

Values in parentheses are SD

Results and discussion

C. ensiformis contained 3·47% canavanine in the seeds whereas *C. gladiata* and *C. virosa* had 3·06% and 2·86% respectively (Table 1). According to Kitagawa (1937), canavanine constitutes about 2·5% of the dry matter of the Jackbean. Damodaran and Narayanan (1939) detected canavanine in the seeds of *Canavalia obtusifolia* and found that it accounts for more than 2% of the fat-free seed meal. Fearon and Bell (1955) reported 4·7% and 3·3% of canavanine on a dry-weight basis in the seeds of *Colutea arborescens* and *Canavalia ensiformis* respectively, but none was detected in soybean seeds. The occurrence of this rare amino acid in high concentrations in the seeds of *Canavalia* species probably suggests its function as a nitrogen-storage product; it may also provide an adaptive advantage to the plants by rendering them less susceptible to attack by various animals and lower plants. Indeed, the capacity of canavanine to inhibit bacterial growth (Volcani and Snell 1948) and yeast and algal development (Walker 1955) lends credence to this concept.

In conclusion, the present study reveals that all three *Canavalia* species tested have an appreciably high amount of canavanine and can be commercially exploited for its extraction.

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