Agri. Biol. Res. 7 (2) 142-144 (1991)

SHORT COMMUNICATION

CHARACTERISTICS OF STARCH GRAINS IN THREE *CANAVALIA* SPECIES

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(Received, 6 May 1991; Accepted 26 Aug. 1991.)

Starch represents the chief source of dietary carbohydrates and energy in human diet. It is one of the ubiquitous and abundant component of plants, where it is laid down in distinct sub-cellular bodies, the starch grains, which have a characteristic appearance for each species.

Microscopic examination of starch grains under the polarized light is more informative than under ordinary light because the double reflecting surfaces of starch grains reveal the structure of their particles under polarized light.

The purpose of the present investigation was to isolate the starch from three *Canavalia* species and to study the starch grains with respect to morphology, dimensions, gelatinizations, temperature and Iodine absorption spectra.

Seeds of the three species undertaken for the study were collected from various sources. Starch was isolated from the seeds according to the method described by Schoch and Maywald, (1968).

Starch grains were mounted in 5% glycerine and were observed under light and polarized microscope. Polarization equipment consists of filter polarizer, compensators (G Red I and G 1/4), attenation and conversion filters, PK 12,5 eyepiece with graticule. Eccentricity proportion was measured by locating the position of the hilum on the longitudinal (vertical) axis of the starch grain. In each case, 500 starch grains were analysed. Gelatinization temperatures of starch grains in all the three species was determined by the method of Mcmasters. (1964). Iodine absorption spectra was determined by the method of Colonna *et al*, (1981).

The study under the light microscope revealed that in all the three species majority of the starch grains were oval in shape, while distinct size variation was observed. Striation marks arranged eccentrically about the hilum were also clearly visible.

Under polarizing filter and compensator G 1/4, the grains exhibited a characteristic sharp birefringence between 45°-60°

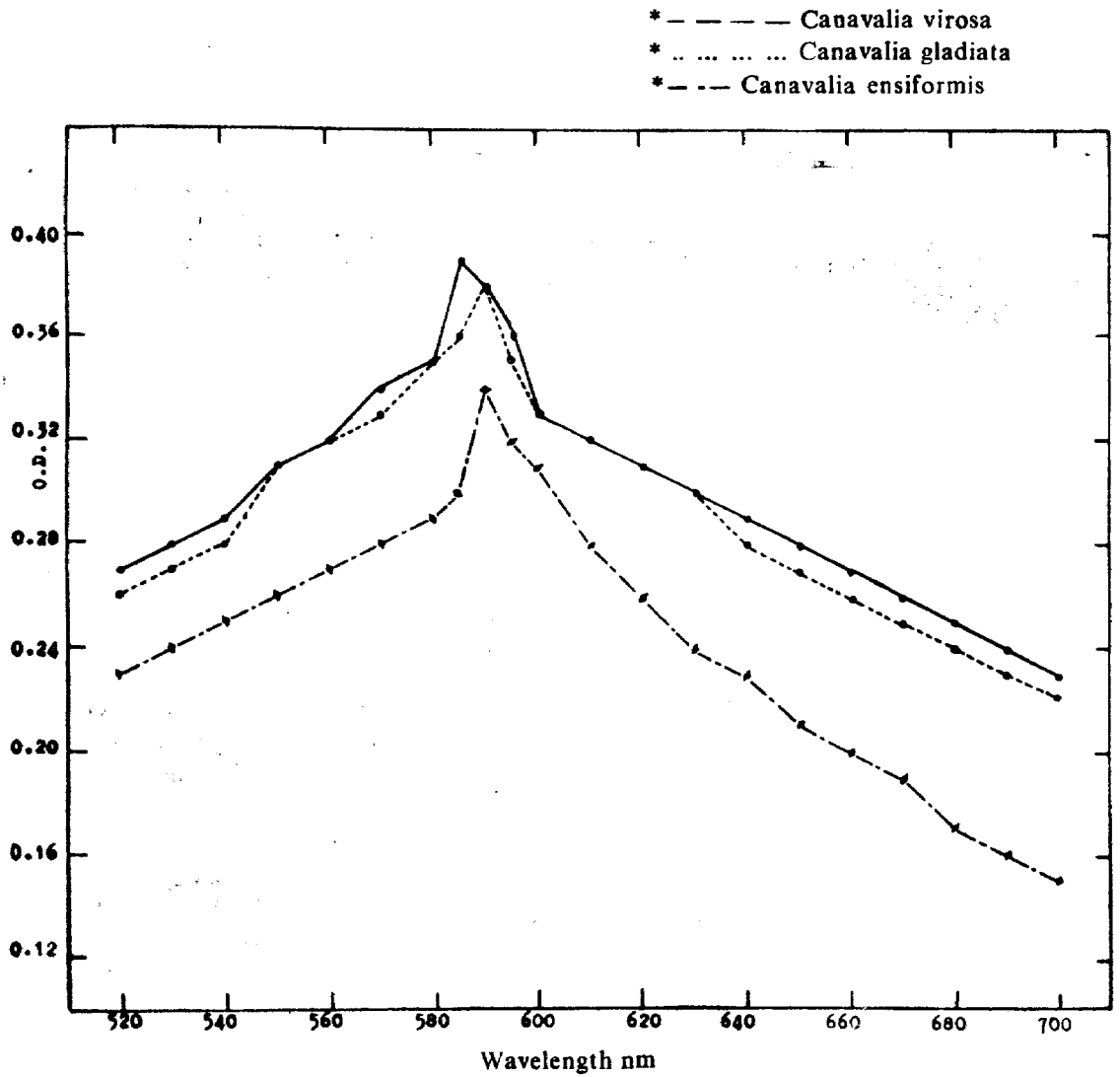

Fig. 1. Iodine absorption spectra of starches in three *Canavalia* species.

passing through the hilum and the layers of amylose and amylopectin. This was specific for all the three species.

Under selenium filter (compensator G Red I) the starch grains showed a beautiful play of colours. When the attenuation filter and the compensator G Red I were at O, one of the quadrants towards broad end and the other on the opposite side of the starch grain were of a colour between canary and butter-cup yellow and the remaining two quadrants were of the colour between turquois and ming green. The background of the preparation was faint corn flower blue. As the filter G Red I

Table 1 : Showing dimensions, gelatinization temperatures and eccentricity proportion of the starch grains in three *Canavalia* species.

Species	Length of starch grain in μ	Breadth of starch grain in μ	Gelatinization temperature	Eccentricity proportion
C. ensiformis	5.87—39.20	5.10—31.20	70°—80°	1 : 1.1
C. gladiata	5 56—58.09	5.81—37·76	65°—75°	1 : 1 09
C virosa	7 26—37.76	5 81—29.04	75°—85°	1 : 1 15

moves in the upward direction the colour starts fading in all the three quadrants resulting into a colourless starch grain at 45° and with fern green background. The colour of the quadrants reappear but in the opposite sequence as the filter (G Red I) moves 15°—0° to There is no significant difference in the birefringence cross and play of colours in individual starch grains of a species

Polarizatian cross on eccentricity proportion was studied in the three species and was found to be 1 : 1.1, 1 : 1.09 and 1 : 1.15 in *C. ensiformis, C. gladiata* and *C. virosa* respectively.

Gelatinization temperature of the three species was found to spread over a range of temperature of 10°c, which is in conformity with that of McMasters, (1964). The granules lose their birefringence cross beyond this temperature range. The gelatinization temperature range for all the three species have been depictec in Table 1. These results confirm the earlier findings of Schoch and Maywald, (1968) who stated that smaller the size of starch granules. higher the gelatinization temperature.

The wavelength of maximum absorption (λmax) of the Iodine-starch complex for both *C. ensiformis* and *C. gladiata* was 590 nm, while for *C. virosa* it was 585 nm (Fig. 1).

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