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RESEARCH NOTE

Comparative study of Phosphorylase activity as an index of the nutritive value of some improved cultivars of maize *(Zea mays* L.)

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Abstract

The phosphorylase activity in seeds of five improved cultivars of maize (Zea mays L.) was evaluated as an index of the P–nutrition status of the malted seeds. The procedure used involved colorimetric measurement of the liberated inorganic phosphate.

The maize cultivar Farz–25 was found to have the highest phosphorylase-I activity among the five and hence the one with the best nutrition status. This variety is, therefore, recommended to breeders and agronomists, to exploit its nutritional quality.

Introduction

Several varieties and cultivars of maize are grown in Nigeria. Some of these varieties, such as Western Yellow, are known to be highly nutritive because of their high lysine content. However most of the maize cultivars recently introduced by breeders were introduced for their desirable agronomic traits without consideration for the nutritional quality. This study was designed to determine the nutritive quality of some recently introduced lines of improved maize cultivars by studying their phosphorylase activity.

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Methodology

Various species of maize obtaine in NCRI (National Cereals Research Institute), Ibadan, were harvested in December, 1984. They were allowed to germinate under laboratory conditions, for a period of five days and the activity of the enzyme phosporylase – 1 monitoried during this period, using the method of Lee (1960). The trial were replicated thrice.

Results

Five varietie sof maize were tested namely FARZ 23, 25, 26, 27 and 34. Table 1 shows that the amount of phosphate produced was statistically greater in FARZ – 25 than any other cultivar. FARZ – 23 and Farz – 26 showed poor phosphorylase activity.

Table 1: AVERAGE AMOUNT OF PHOSPHATE PRODUCTION OVER 5 DAYS OF SEED GERMINATION

Sample Nos	*0 - 5 days* (% increase)			
Code Nos	*Rep I*	*Rep II*	*Rep III*	*Mean*
FARZ – 23	2.03	2.09	2.06	2.06 a
FARZ – 25	2.59	2.65	2.67	2.63 c
FARZ – 26	2.2 0	2.22	2.25	2.22 ab
FARZ – 27	2.37	2.37	2.34	2.36 b
FARZ – 34	2.27	2.27	2.30	2.28 b

Discussion

Tsai and Nelson, (1968) have demonstrated that phosphorylase-I is active throughout the developing stage of maize endosperm. Therefore, phosphorylase I activity was assayed in these trials.

Among the maize cultivars studied, Farz-25 showed the highest increase of inorganic phosphate during germination, therefore suggesting the maximum activity of phosphorylase enzyme in this cultivar. According to Irvine (1974), the degree of enzyme activity is a measure of the nutritive value of the different cultival seeds. The result of this study seems to indicate that the nutritive qualities of the maize cultivars studied are in the order:

FARZ 25 > FARZ 27 > FARZ 34 = FARZ 23 > FARZ 26.

More similar work needs to be done in evaluating the nutritive values of other varieties/cultivars of maize developed in the country.

References

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