

BRIEF COMMUNICATIONS

ENZYMES OF THE AMYLOLYTIC COMPLEX IN GERMINATING WHEAT SEEDS

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We have established previously that the activity of the amylolytic enzymes of a germinating wheat grain reaches its maximum at 30°C in the course of germination for three days [1]. It appeared desirable to study the dependence of the activity of the α - and β -amylases of wheat seeds on the temperature and the time of the process of germination, using a method for their differentiated determination based on the difference in their heat stabilities at 70°C.

Wheat seeds of the variety Khar'kovskaya-10 of the 1986 harvest supplied by the seed-growing division of the V. Ya. Yur'ev Ukrainian Scientific Research Institute of Seed Growing, Selection, and Genetics were investigated. The seeds were germinated in a dark TS-80M-2 automatic thermostat at 30°C for four days, including the moistening stage. The total activity of the amylases was determined from the saccharification of starch by Bertrand's method [2], and the differentiated determination of α - and β -amylases by Petrov's method [2] (units/100 g of seeds):

Time of germination, days	Total amylase activity,	α -Amylase activity	β -Amylase activity
Dormant seeds	2137.5	0	2137.5
1	617.5	38.0	579.5
2	2280.0	63.0	2217.0
3	2375.0	143.0	2232.0
4	1225.5	9.5	1216.0

As we see, all the amylolytic activity of the dormant seeds was due to the β -amylase. α -Amylase activity appeared during the first day of germination of the seeds, reached a maximum after three days, and then fell sharply. β -Amylase activity, amounting to a considerable part of the total activity of the amylolytic enzymes during germination, increased sharply in the course of two days, reached a maximum by the end of the third day, and fell in the course of the fourth day of germination.

The results are in harmony with those of other workers who have shown that more than 98% of the α -amylase activity in germinating wheat seeds is due to the de novo synthesis of its isoenzymes [3, 4], and the increase in β -amylase activity is connected with the activation of its precursor during the germination of the grain [5].

Thus, the amylolytic activity of germinating wheat seeds is due to the presence of both β - and α -amylase, the activity of the β -amylase being predominant.

LITERATURE CITED

1. T. I. Kabachnyi, V. T. Chernobai, and T. V. Kortunova, *Farmats. Zh.*, No. 5, 69 (1987).
2. K. P. Petrov, *Methods in the Biochemistry of Plant Products* [in Russian], Vishcha Shkola, Kiev (1978), p. 97.
3. J. Daussant and R. Renard, *FEBS Lett.*, 22, No. 3, 301 (1972).
4. B. L. Dronzek, P. Hwang and W. Bushuk., *Cereal Chem.*, 49, No. 2, 232 (1972).
5. J. Daussant and P. Corvazier, *FEBS Lett.*, 7, No. 2, 191 (1970).

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