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Effects of Wetting Treatment Period and Moisture Content on Water Uptake by Wheat Grain During Germination and $_{\alpha}$-amylase activity

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Abstract:

To vary the moisture content in wheat grain from 20 to 45%, various quantities of water were instilled in non-dormant grains in two varieties and one pedigree (Chihokukomugi, Horoshirikomugi and Kitakei-1354).After incubation for 24 and 72 hr, the incidence of germination andα-amylase activity were evaluated.1) Germination and activation of α-amylase were not observed in grains having a moisture content under 25%.2) Grains with moisture content from 25 to 30% showed relatively high activity in the absence of germination.3) In grains with a moisture content over 30%, the relationship between α-amylase activity and germination was affected by wetting periods.At 72 hr of wetting, almost all grains showed high α-amylase activity with germination.4) Whereas at 24 hr of wetting, some grains with a moisture content over 30% exhibited relatively low activity in spite of apparent germination.Thus in 2)and 4), correspondence between germination and activation of α-amylase was not observed.With respect to 4), grains absorbed water rapidly after wetting and immediately showed signs of germination, while α-amylase was activated slowly because de-novo synthesis needed a considerable period.Concerning2), a difference between the moisture content which activated α-amylase and that which induced germination was a probable cause.Finally α-amylase activity in Kitakei-1354 was lower than the other two varieties, which was possibly influenced by varietal differences in water uptake rate.

Keywords:

α-Amylase activity, Germination, Grain, Moisture content, Preharvest sprouting, Water uptake, Wheat.

[Full-text PDF (755K)] [References]