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A Rapid and Convenient Method for α -Amylase Analysis of Wheat by an Auto-Analyzer and its Application to Estimation of Maximum Amylograph Viscosity

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Abstract:

In order to estimate the maximum amylograph viscosity of wheat, an automatic method for the measurement of α -amylase activity was developed using a commercial blocked *p*-nitrophenyl maltoheptaoside as a suitable substrate. A Type AAllauto-analyzer (Bran + Luebbe) partially modified can rapidly and conveniently analyze α -amylase activity at almost 50 samples per hour, and can save the cost of reagents as compared to manual analysis. There was no significant difference between α -amylase activity measured by hand and the auto-analyzer. The α -amylase activity in flour correlated well with the maximum amylograph viscosity ($r=-0.922$). The correlation coefficient between α -amylase activity and maximum amylograph viscosity was slightly lower in ground wheat ($r=-0.906$). With regard to fresh wheat, there was no apparent relationship in wheat sampled before maturity, but a high correlation ($r=-0.884$) was exhibited after maturity. To monitor the levels of maximum amylograph viscosity in cargo samples and classify grades, we made tentative criterion for α -amylase activity in fresh wheat. Group 1: most of the wheat with α -amylase activity below 300 mU/g showed a high amylograph viscosity (mean=755B.U.). Group 2: wheat with α -amylase activity between 300 to 500 mU/g widely ranged from low to high viscosity (mean=502B.U.). Group 3: most of the wheat with α -amylase activity over 500 mU/g showed unacceptably levels of amylograph viscosity (mean=109B.U.). Therefore, the auto-analyzer can be utilized to rank wheat quality at receival points, and can also be adapted as a selection method for the development of low α -amylase varieties in wheat breeding.

Keywords:

α -Amylase activity, Auto-analyzer, Maximum amylograph viscosity, Pre-harvest sprouting, Wheat

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