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Effects of Soil Types and Fertilizer Application on Mineral Contents of Wheat Grains and Flour : II. The relationship between quality and mineral content of grains

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Abstract:

The relationship between quality and mineral contents in grain was investigated with Asakazekomugi and Norin 61 cultivated in 4 soil types: Gray lowland soil, Red soil, Thick High-humic Andosol and Light-colored Andosol. There were negative correlations between potassium content and 1000-grain weight ($r=-0.49^{**} \sim -0.80^{**}$), or test weight ($r=-0.80^{**} \sim -0.90^{**}$). Since test weight was related to milling quality, potassium content probably affects milling efficiency. There were negative correlations ($r=-0.79^{**} \sim -0.95^{**}$) between nitrogen content and brightness and chroma of grain color. Brightness and chroma of grain color were decreased with increase of nitrogen content. There were negative correlations ($r=-0.45^{*} \sim -0.64^{**}$) between potassium content and whiteness of flour color. Whiteness of flour color was also correlated with 1000-grain weight ($r=0.47^{*} \sim -0.80^{**}$) and test weight ($r=0.50^{*} \sim 0.78^{**}$). In the plots which 1000-grain weight were over 33g in Asakazekomugi and 32g in Norin 61, there was low correlation in only Asakazekomugi ($r=-0.31^{*}$) between whiteness of flour color and potassium content. These results indicate that decrease in 1000-grain weight and test weight with the increase in potassium content decreased milling efficiency and increased broken pieces of bran in flour and decreased whiteness of flour color. There were significant correlations between extensibility or the ratio (R/E) of microextensogram and nitrogen content or the N-Mg/K ratio. Since the improvement in available phosphoric acid in Andosol decreased 1000-grain weight and test weight. it seems to decrease milling efficiency.

Keywords:

Flour color, Grain color, Mineral, Nitrogen, Potassium, Quality, Soil type, Wheat

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