

MINERAL CONTENT OF DIFFERENT WINTER WHEAT CULTIVARS

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ABSTRACT

In the present study the contents of Cu, Mn and Zn were investigated in the grains of different winter wheat (*Triticum aestivum* L.) cultivars. The nine varieties of winter wheat were: Potenzial, Kalango, Apache, Soisson, Kristina, Chevallier, Panonnikus, Alex and Lovrin 34. The experimental field was placed in 2009-2010 agricultural year, on a cambic chernozem in Timisoara (west of Romania) with the fertilization level $N_{120}P_{60}K_{60}$. For this goal, the mineral elements mentioned were quantified by Atomic Absorption Spectrophotometry (AAS) and for their determination was used the atomic absorption spectrophotometer's contr AA 300, Analytik Jena. The high contents of Cu were registered by Kalango, Panonnikus and Soisson winter wheat cultivars and the lower contents by Potenzial and Apache. Regarding Zn content, Soisson had the greatest value and Apache the lowest value of this parameter. With the exception of Apache winter wheat cultivar, all the varieties registered high values of Mn content. Results of our study demonstrated that mineral content for winter wheat cultivars is strongly influenced by the biological factor.

Keywords: winter wheat, cultivar, Copper, Zinc, Manganese

INTRODUCTION

Due to the high consumption of wheat in a variety of food products all over the world, wheat is considered an important source of minerals.

Minerals are important components required by humans in their daily food (HUSSAIN ET AL., 2010).

Genetic difference for grain mineral concentration has also been reported from various varietal trials (GRAHAM ET AL., 1999; ZHAO ET AL., 2009).

For human body, Copper, Zinc and Manganese enter into the composition of more than three hundred enzymes and proteins, which are involved in all major metabolic processes.

Copper is contained in enzymes of the ferroxidase system which regulates iron transport and facilitates release from storage.

Manganese (Mn) is the major component of the mitochondrial antioxidant enzyme manganese superoxide dismutase.

Zinc (Zn) is important for reproductive function due to its use in FSH (follicle stimulating hormone) and LH (leutinizing hormone). Deficiency of specific minerals may lead to various chronic diseases (<http://wiki.answers.com>).

The introduction of new local and foreign varieties of winter wheat in the production requires ecological and qualitative knowledge of these cultivars grown in a certain area.

Thus, by selecting genotypes for further breeding, mineral content of the wheat flour for human consumption can be improved.

MATERIAL AND METHOD

Nine wheat varieties were used in this experience: Potenzial, Kalango, Apache, Soisson, Kristina, Chevallier, Panonnikus, Alex and Lovrin 34.

The experimental field was placed in 2009-2010 agricultural year, on a cambic chernozem in Timisoara (west of Romania) with the fertilization level N120P60K60.

The heavy metal contents in winter wheat grains were carried out in HNO₃ solution resulted by grains ash digestion (LĂCĂTUSU AND LĂCĂTUSU, 2008; KHAN ET AL., 2008).

Each sample solution was prepared with dilute HNO₃ (0.5 N) to a final volume of 50 mL and analyzed by flame atomic absorption spectrometry. The concentrations of Cu, Zn and Mn in the filtrate was determined by using flame atomic absorption spectrophotometer with high resolution continuum source (Model ContrAA 300, AnalytikJena, Germany).

The Cu, Zn and Mn concentrations (mean of measurements of three analytical samples) were expressed as mg/kg dry matter.

RESULTS

The concentration of Cu of the studied samples (mg/kg dry matter) is presented in *Figure 1*.

The values of Cu content varies between 3.04 mg/kg for Potenzial and 4.66 mg/kg for Kalango varietie. Kalango is followed very closed by Panonnikus (4.56 mg/kg) and Soisson (4.48 mg/kg). Apache winter wheat cultivar registered a lower value of this parameter (3.08 mg/kg).

Regarding the winter wheat cultivars Zn contents, we observe in *Figure 2*. that Soisson registered the highest value (28.12 mg/kg) and Apache the lowest value (13.6 mg/kg).

Good results registered also Panonnikus (25.52 mg/kg), Chevallier (24.6 mg/kg), Kalango (24.2 mg/kg) and Alex (22.72 mg/kg).

Analysing the *Figure 3*., we can see that the Mn content registered values between 19.92 mg/kg (Apache) and 34.76 mg/kg (Panonnikus). Panonnikus was followed by Chevallier (34.6 mg/kg) and Lovrin 34 (29.92 mg/kg) winter wheat cultivar.

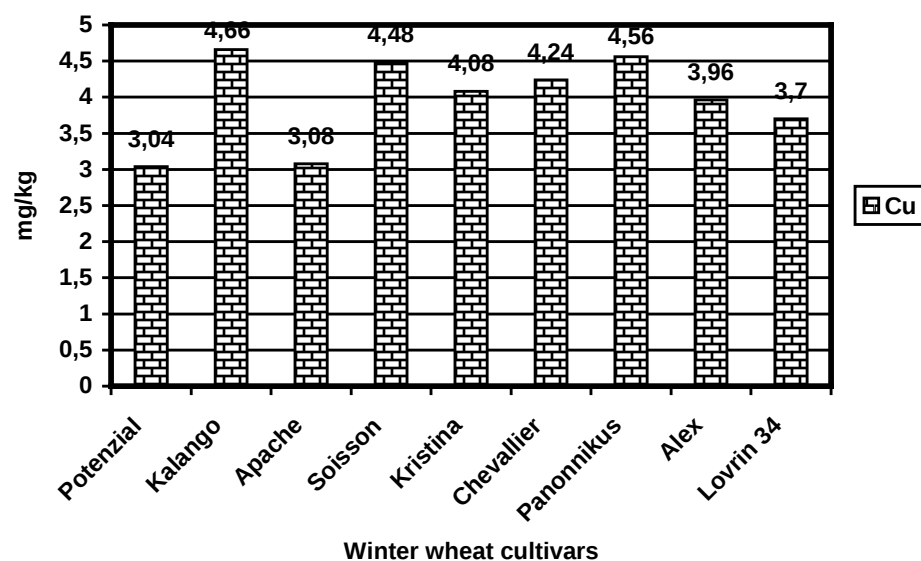


Figure 1. Graphical representation of mean concentration of Cu (mg/kg dry matter) of winter wheat cultivars.

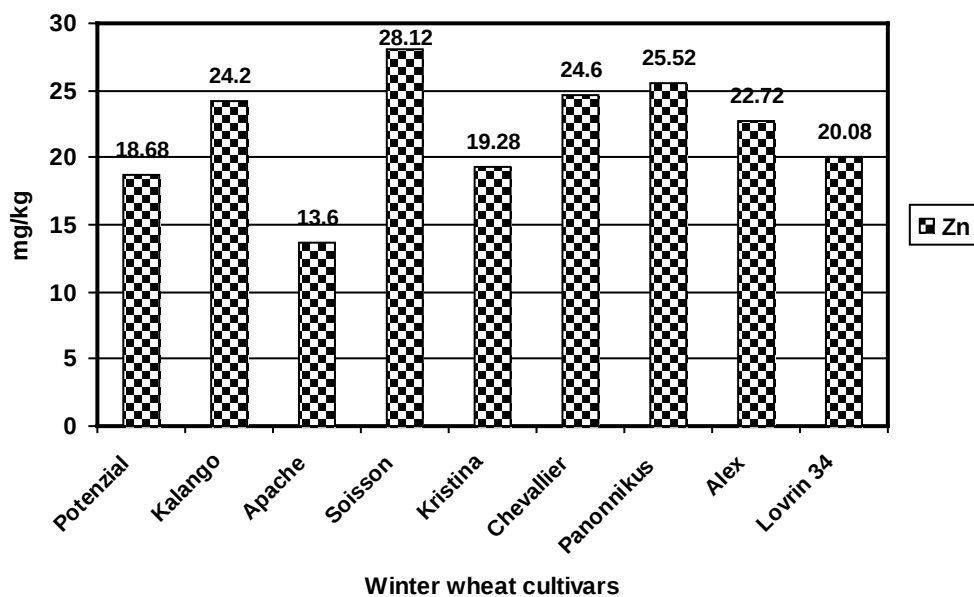


Figure 2. Graphical representation of mean concentration of Zn (mg/kg dry matter) of winter wheat cultivars.

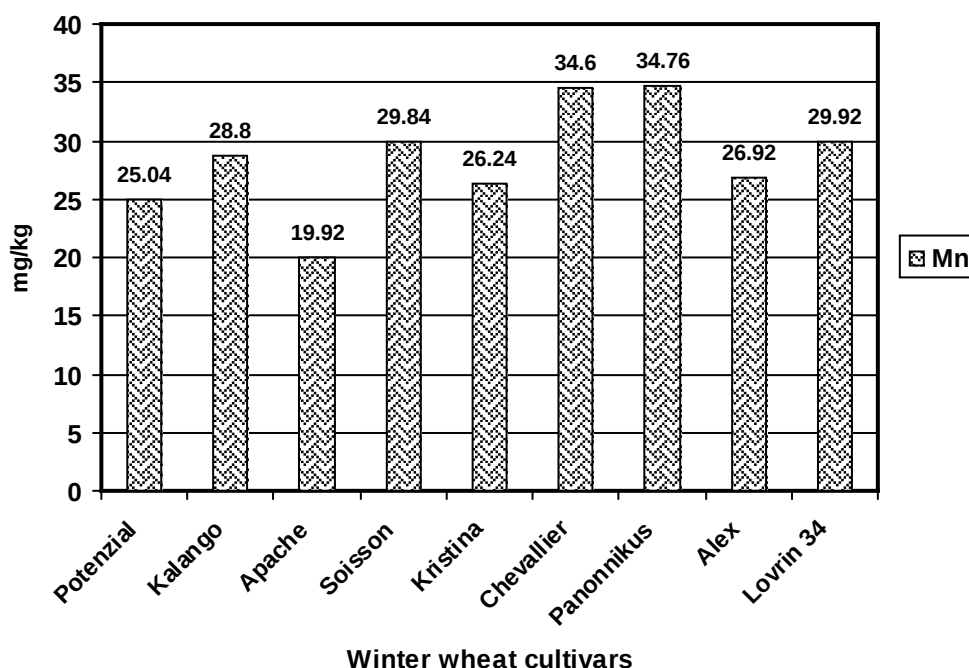


Figure 3. Graphical representation of mean concentration of Mn (mg/kg dry matter) of winter wheat cultivars.

CONCLUSIONS

The high content of Cu were registered by Kalango, Panonnikus and Soisson winter wheat cultivars and the lower by Potenzial and Apache.

Regarding Zn content, Soisson had the greatest value and Apache the lowest value of this parameter.

With the exception of Apache winter wheat cultivar, all the varieties registered high values of Mn content.

Comparing our results with the work already done by other scientists, we observed that the Literature data match with our results, in the case of Cu and Mn content in different winter wheat cultivars. Zn content was found lower than the literature value (HUSSAIN ET AL., 2010). Results of our study demonstrated that mineral content for winter wheat is strongly influenced by the biological factor.

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