

Diversity of spelt and wheat at different sites based on their bioactive component composition



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Hypothesis

Spelt (*Triticum spelta*) is said to be healthier than common wheat (*Triticum aestivum*), but this statement was never approved based on the compositional traits of the grain. The environment and the field management practices however could also have an effect on grain composition. Consequently the differences in spelt and wheat bioactive component composition and the effect of growing site and field management was evaluated.

Conclusion

Lower amount of fiber content (arabinoxylan, β -glucan) was found in spelt than in wheat at both conventional and organic growing conditions. No difference was found in the mean alkylresorcinol content of spelt and wheat at any sites. The organic field management resulted significantly higher mean values of β -glucan content than the conventional site in both species.

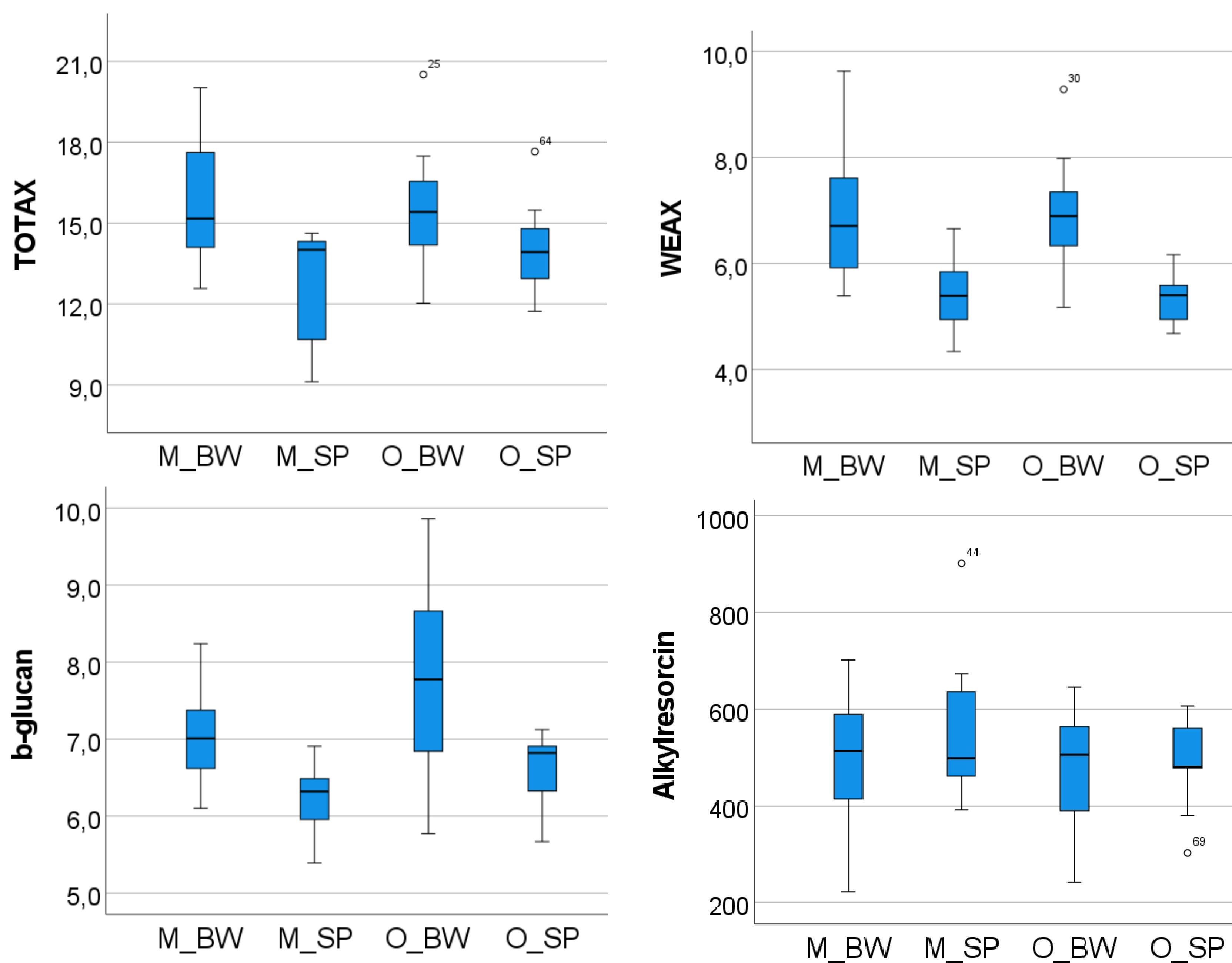


Figure 1. Box-plots based on total- (TOT), water extractable (WE)- arabinoxylan (AX), β -glucan and alkylresorcinol content of spelt (SP) and wheat (BW). (M-conventional site, O-organic site)

Introduction

Wheat and other cereals are major sources of dietary fibers and antioxidants. The major dietary fiber components in wheat grain are the cell wall polysaccharides, arabinoxylan and β -glucan. Barley and oat are rich in beta-glucan, while wheat and rye rich in arabinoxylan. This branch of dietary fibers has two forms. Water soluble (WE) and insoluble (WU) fractions, which differ in their health benefits. Antioxidants delay or inhibit the oxidation process. It is formed in the organism, against free radicals which are responsible for the degradation of the cells. Alkylresorcinol has such activity.

Materials and Methods

Five wheat and five spelt varieties were grown in three years (2019-21) at two sites of Hungary (conventional (M), organic (O)). Organic site means such experimental field, where no artificial fertilisation and chemical treatment applied for at least three years.

The total amount of mixed-linkage β -glucan was determined according to the protocol of the Megazyme assay kit (Megazyme, Bray, Ireland) (ICC166). Total and water-extractable pentosans, of which AX is the main component, were determined using the colorimetric method reported by Douglas (1981). The content of alkylresorcinol was measured according to Tluscik et al. (1981) with spectrophotometric method.

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Results

The main fiber of wheat, so the arabinoxylan (AX) content was higher in bread wheat than in spelt, but there was no difference between the conventional and organic growing sites. The water extractable part of the AX was also higher in wheat than in spelt without difference resulted by the different field management practices. The β -glucan, which is present in lower quantities than AX, was also present in higher quantities in wheat than in spelt. The highest mean value was found at the organic site for both species, however the variation was very high in case of wheat samples grown at the organic site. The alkylresorcinol, which has antioxidant activity, was at similar level in spelt and wheat, with higher variation in the latest specie (Figure 1.).