

GUSHING POTENTIAL OF WHEAT MALT INFECTED WITH *FUSARIUM CULMORUM*

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Abstract

Gushing is uncontrolled, eruptive foaming of beer after a bottle has been opened, without previous shaking. This is a phenomenon that affects breweries worldwide and all brands and types of beer. Gushing can be divided into primary (secretion of hydrophobins class II and other fungal metabolites from *Fusarium* fungi) and secondary gushing (calcium oxalate precipitations and metal ions). One of the methods to reduce the risk of gushing is the early detection of gushing potential of raw materials such as wheat or barley malt. The aim of this study was to determine the impact of wheat infection by *Fusarium culmorum* on the gushing potential of wheat malt.

Standard micro-malting procedure (MEBAK) was performed using wheat variety „Lucija” (less susceptible to infections by *Fusarium*), the sample „A” was the control sample, the sample „B” was treated with fungicide, sample „C” was infected with *F. culmorum* and treated with fungicide and sample „D” was infected with *F. culmorum* and was not treated with fungicide. Analyses were performed on dried and stabilized wheat malt samples in order to determine the correlation between the *F. culmorum* infection and the malt quality parameters (the share of soluble N in malt, Kolbach index, total proteins, soluble proteins and the gushing potential of malt). All analyses were done according to the methods from Analytica EBC (European Brewery Convention).

Results obtained from this research indicate that the infection of wheat by *F. culmorum* significantly affects and increases the gushing potential of wheat malt, and this is particularly evident in samples „C” and „D” (high gushing potential). By overlooking the selected malt quality parameters (the share of soluble N in malt which ranges from 0.92% in sample „A” to 0.98% in sample „C”; Kolbach index which ranges from 49 in sample „A” to 51 in sample „D”; total proteins range from sample „A” - 11.8% to sample „C” - 12.5%; soluble proteins range from 5.75% in sample „A” to 6.12% in sample „C”) it is evident that they are correlated with *Fusarium* infection, as that they are increasing in samples infected with *Fusarium*.

In conclusion, results obtained from this research indicate that the infection of wheat by *F. culmorum* significantly affects and increases the gushing potential of wheat malt, which is particularly evident in samples „C” and „D”.

Key words: *Wheat, Wheat malt, Gushing potential, Fusarium culmorum.*