

Učinak okolišnih uvjeta na hordeine ječma

Gordana Šimić, Alojzije Lalić, Josip Kovačević, Daniela Horvat, Ivan Abičić

*Poljoprivredni institut Osijek, Južno predgrađe 17, 31103 Osijek, Hrvatska
(e-mail: gordana.simic@poljinos.hr)*

Sažetak

Kakvoća slada u velikoj mjeri ovisi o udjelu bjelančevina u zrnu ječma. Pri tome značajnu ulogu imaju hordeini, kao glavna frakcija bjelančevina endosperma. Hordeini čine heterogenu smjesu polipeptida koji se mogu podijeliti u tri skupine: B, C i D hordeine. U ovom istraživanju korištena su dva seta kultivara ječma, četiri jara i tri ozima, s ciljem utvrđivanja utjecaja okolišnih uvjeta na komponente bjelančevina ječma i kakvoću slada. Istraživanje je postavljeno kao multilokacijski pokus tijekom tri vegetacijske godine. U zrnu ječma određena je količina ukupnih bjelančevina, količina hordeina i izvršeno je mikroslađenje ječma. Hordeini su određeni visokodjelotvornom tekućinskom kromatografijom obrnutih faza (RP-HPLC). Prema dobivenim rezultatima utvrđen je utjecaj okolišnih uvjeta na količinu bjelančevina u zrnu ječma i količinu ekstrakta. Također je uočena značajna varijabilnost u količini hordeina u zrnu ječma između različitih okolina. Značajne razlike utvrđene su u distribuciji relativnih udjela B, C i D hordeinskih skupina između ispitivanih kultivara. Rezultati su pokazali da su jari kultivari ječma imali veći relativni udio C i D hordeinske skupine, dok su ozimi kultivari imali veći udio B skupine hordeina. Ukupna količina hordeina je značajno negativno korelirala s količinom ekstrakta slada. Unutar hordeinskih skupina, B hordeini su pokazali najjaču negativnu povezanost s količinom ekstrakta.

Ključne riječi: ječam, hordeini, okolišni uvjeti, kakvoća slada.

The effect of environmental conditions on barley hordeins

Gordana Šimić, Alojzije Lalić, Josip Kovačević, Daniela Horvat, Ivan Abičić

*Agricultural Institute Osijek, Južno predgrađe 17, 31103 Osijek, Croatia
(e-mail: gordana.simic@poljinos.hr)*

Abstract

Barley malting quality has for many years been recognised as being highly dependent on the amount of grain protein. Hordeins, as the major barley endosperm protein fraction, represent an important determinant of end-use quality. Hordeins are found as a heterogenous mixture of polypeptides and have been categorized into three groups called the B, C and D hordeins. In the present study, we have analysed two sets of barley varieties, four spring and three winter, with aim to investigate the effects of environmental conditions on barley protein components and malt quality. The experiment was set up as multilocation trial during three years. Barley grains were analysed for total protein and hordein contents and micromalted. The hordein groups were characterized using reversed phase-high performance liquid chromatography (RP-HPLC). The total protein content of the barley grain was affected by different growing conditions. Marked variation in malt extract content over the different environments was observed. Hordein fraction content was also sensitive to the growing conditions, indicating that there was considerable variability between environments. Substantial differences in the distribution of protein among the B, C and D hordeins of the barley grain of these varieties were noted. Spring barley varieties had higher relative proportions of C and D hordein groups. In contrast, winter barley varieties showed higher relative proportion of B hordein group. Total hordein content significantly negatively correlated with malt extract content. Of the individual hordein groups, B hordein showed the strongest negative correlation with malt extract.

Key words: barley, hordeins, environment conditions, malt quality.