TRITICALE IN BEER PRODUCTION

Jelena Pejin[1], Milana Pribić[1], Saša Despotović[2], Sunčica Kocić-Tanackov[1]

[1]*University of Novi Sad, Faculty of Technology, Bulevar cara Lazara 1, 21 000 Novi Sad, Serbia*

[2]*University of Belgrade, Faculty of Agriclture, Nemanjina 6, 11 080 Belgrade, Serbia*

KEYWORDS: beer, brewing, triticale; adjuncts; wort; brewing

INTRODUCTION:

Beer is one of the oldest known beverage in the world and is still a staple low-alcohol product. Malted barley is the favored cereal grain used in traditional brewing process. Barley is modified during the malting process to ensure biochemical changes occur within the grain required in the wort production. Malting is an energy intensive process and brewing with a proportion of unmalted adjuncts has become an attractive option for cost and carbon footprint reduction. Adjuncts like corn, wheat, barley, and triticale are utilized by brewers to increase extract yield, to modify beer quality (flavour, foam, colloidal stability) and to enable production of the innovative products. The inclusion of even a little unmalted raw material in the grist can alter the sensory properties of beer. Thus, it is possible to obtain a product of new flavour and aroma without having to change the production process. Barley and corn are the most commonly used adjuncts in Europe and America, while rice usage is popular in Asia. The main disadvantage when including unmalted adjuncts is the decrease in amylolytic, cytolytic, and proteolytic enzymatic activity in the grist, as these enzyme systems are synthesized during the malting process. But, the first man-made cereal - triticale is an exception. Triticale is a hybrid between wheat and rye and shows a number of advantages for the grower. It shows promising brewing properties because of the high levels of amylolytic and proteolytic enzymes activity even in the unmalted form. In combination with the low gelatinization range of triticale starch (59 to 65°C), triticale could be added during mashing process using temperature regimes similar to those used for barley malt. The usage of triticale in brewing could give viscosous mash, because of the solubilisation of triticale arabinoxylans, which could lead to a slower beer filtration.

OBJECTIVES:

The objective of this study was to evaluate the possibility of triticale application as a partial substitute for barley malt in beer production. Triticale variety NS Paun was used in a different proportions in wort production (10, 30, and 50%) with or without addition of commercial enzyme for wort viscosity reduction - Shearzyme.

RESULTS:

With an increase in triticale content in the grist, viscosity increased, which was corrected with the addition of commercial enzyme Shearzyme. The highest value viscosity was obtained in wort produced with 50% of triticale content in the grist without enzyme addition (1.640 mPa•s) which was reduced to 1.446 mPa•s when enzyme was added during mashing process. The content of the soluble nitrogen in obtained beers was lower in relation to the content of this parameter in the boiled worts, which indicates the fact that the yeast metaolized it. The lowest content of soluble nitrogen was determined in the beer produced with 50% of triticale in the grist without enzyme addition (462 mg/L). The highest ethanol content was obtained in the beer with the 50% of triticale content in the grist (2.95%), without enzyme addition. Produced beers with enzyme addition, showed reduced color (3.5 EBC units) in comparison with beers produced without Shearzyme addition (5.0 EBC units).

CONCLUSIONS:

Extract contents of obtained worts and boiled worts decreased with an increase in triticale content in the grist. Enzyme addition decreased wort viscosity, especially when higher triticale ratios in mash were used. Replacement of the barley malt with native triticale did not have a negative impact on beer fermentation, even at the highest triticale content in the grist (50%). The obtained results indicate that triticale variety NS Paun had good technological parameters and could be used as a partial substitute for barley malt in beer production.

Corresponding author: jpejin@uns.ac.rs