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Effect of Mineral Ion Addition on Yeast Performance during Very High Gravity Wort Fermentation

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Abstract : The effect of Zn2+, Mg2+, and Ba2+ on Saccharomyces pastorianus during very high gravity fermentation was evaluated in this study at independent and three variable combinations. Wort gravity of 21oP was prepared from barley malt, hops and water, to which the metal ions were supplemented in their combinations and subsequently pitched. After 96 h of fermentation, high wort fermentability (%F)= 29.53 was obtained in wort medium containing 900:4 ppm Mg2+ + Ba2+. Increased ethanol titre 7.3491 %(v/v) and 7.1313 %(v/v) were obtained in media containing 900:4 ppm Mg2+ + Ba2+ and 12:900 ppm Zn2+ + Mg2+. Decrease %F= 22.54 and ethanol titre 6.1757% (v/v) was recorded in wort medium containing 12:4 ppm Zn2+ + Ba2+. In media containing the individual metal ions, increased %F= 27.94 and %F= 26.03 were obtained in media containing 700 ppm Mg2+ and 2 ppm Ba2+, with increased ethanol yield of 7.8844% (v/v) and 7.6245% (v/v) respectively. Least %F of 11.75 and 10.80, and ethanol titre of 4.99 (%v/v) and 4.80 (%v/v) were obtained for 10 ppm Zn2+ and 4 ppm Ba2+ respectively.

Keywords : ethanol yield, fermentability, mineral ions, yeast stress, very high gravity fermentation
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