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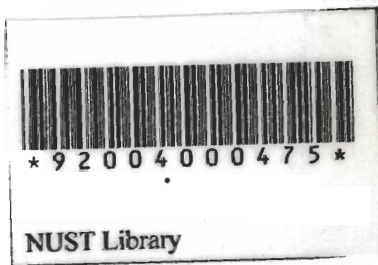
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FACULTY OF APPLIED SCIENCE

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

FINAL YEAR PROJECT

INVESTIGATING THE INFLUENCE OF METAL IONS (Mg^{2+} , Fe^{2+} , Fe^{3+} and Cu^{2+}) ON THE GROWTH OF *Saccharomyces uvarium* AND THEIR ACTIVITY ON THE REDUCTION OF VICINAL DIKETONES IN FERMENTED WORT.



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BIOLOGY	○
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ABSTRACT

The determination of yeast (*Saccharomyces uvarium*) biochemical activity and physiological behaviour under the influence of various metal ions, namely Mg^{2+} , Cu^{2+} , Fe^{3+} and Fe^{2+} , under fermentation conditions was investigated by the headspace capillary gas chromatographic method after wort fermentation using the rapid LE fermentation method.

Although copper appears to be nonessential for yeast growth, iron has a negative effect toward cell growth whilst magnesium has an opposite effect being essential for yeast growth, development and fermentation.

Fe^{3+} ions do not enhance precursor, α -acetolactic acid and α -hydroxybutyric acid, oxidation but rather it has a depressive effect on their conversion at increasing salt concentration. The catalytic effect of Fe^{2+} in increasing the final concentration of vicinal diketones could be attributed to the presence of an additional ion on its salt, NH_4^{2+} . These ions have been found to be important in the provision of a nitrogen for yeast and hence used in the formulation of media for industrial fermentations. Cu^{2+} distinctly enhances the oxidation of the precursor, the deduction that although Cu^{2+} ions may have a positive contribution to the oxidation of α -acetolactate is sound although its overall activity is very limited, and hence the fluctuation pattern produced. It also appears that it catalyses the conversion of other components in the wort and beer (e.g. acetoin) to diacetyl in a phased manner.

The salt concentration of all the ions appears to play a very minor role in the final alcohol level of the beer.