

Biotechnology-2013 : Mathematical Modelling of Ni²⁺ biosorption by *Schizosaccharomyces pombe* using universal sigmoid approach - Rumeysa Bukcu - Marmara University

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The utilization of microorganisms as biosorbents for the removal and healing of heavy metals from industrial wastewaters has turned out to be a major alternative to standard strategies. Microorganisms, energetic or inactive, can adsorb dissolved metals by way of the courtesy in their unique membrane characteristics. The layout of the proper equipment and the estimation of foremost process enter values have a first-rate significance concerning the evaluation and synthesis of the process below research. to be able to acquire a reliable optimization scheme, the assessment of a wide collection of biosorption data was required. in preference to using a time consuming and costly database matrix, the improvement of an appropriate mathematical model depending on method concepts and a truncated experimental facts may be greater efficient method to set up an optimization result. A satisfactorily accurate version of a machine may be used to predict effects below varying situations without the need for actual experimentation and statement. The intention of this take a look at is to reap extra statistics for Ni²⁺ biosorption by using *Schizosaccharomyces pombe* particularly at pH=4.0 or 6.0 and the improvement of a sigmoidal mathematical model for the biosorption method beneath research. This mathematical version could be a simulation tool for the destiny technique optimization work. in this study, *Schizosaccharomyces pombe*, a species of unicellular yeasts, turned into used as biomass for the bioremoval of Ni²⁺. chemicals which includes agar, yeast extract, glucose, and many others. for subculture media practise specific to yeast species and pure grade acids for pH adjustment have been wished. pure grade of NiCl₂ compound turned into used to prepare the inventory solutions of nickel (II). Equilibrium between the adsorbed segment and answer section changed into attained within 3 hours. The equilibrium uptake reduced with increasing temperature denoting an exothermic behavior. several isotherm fashions such as Langmuir and Freundlich isotherms had been used to assess the equilibrium records. reaction price and thermodynamic residences of Ni(II) biosorption at 20, 25, 30, 35 and 50o C have been additionally decided. investment by means of M.U. Nihad Sayar Egitim Vakfi and M.U. research Fund undertaking FEN-C-YLP-040712-0280 are gratefully acknowledged.

until lately, conventional alcoholic fermentation and malolactic fermentation have been considered to be the unique methodologies to obtain stable purple wine from a microbiological factor of view earlier than bottling. several researchers at the moment are paying special attention to the use of non-*Saccharomyces* yeasts in oenology to improve wine exceptional. those new biotechnologies are producing new tendencies in wine microbiology, to improve wine first-rate. a number of the maximum studied non-*Saccharomyces* yeast species in winemaking, are *Candida zemplinina*, *Torulaspora delbrueckii*, *Kloeckera apiculata*, *Hanseniaspora vineae*, *Hanseniaspora uvarum*, *Candida pulcherrima*, *Hansenula anomala*, *Schizosaccharomyces pombe* (*S. pombe*), and *Lachancea thermotolerans* (*L. thermotolerans*).

most of those researches, file sequential inoculations of a non-*Saccharomyces* and a *Saccharomyces cerevisiae* to produce the excellent upgrades in wine exceptional.

S. pombe turned into historically used for deacidification due to the truth that it is able to convert harsh tasting l-malic acid into ethanol, making very acidic wines smoother. however, microorganisms of the genus *Schizosaccharomyces* are getting used these days to attain different targets in modern winemaking. One new use entail tactics that purpose a high polysaccharide release at some point of fermentation and ageing over lees. another use is decreasing the gluconic acid ranges from preliminary grape juice that allows you to growth wine satisfactory in spoiled musts. *S. pombe* on my own has additionally been verified to enhance the coloration of pink wines, as it will increase the content material of relatively stable pigments along with vitisins and pyranoanthocyanin. subsequently, from a meals protection perspective, the genus *Schizosaccharomyces* is getting used to supply more secure wines, as it possesses urease interest that avoids ethyl carbamate production and reduces the threat of biogenic amine formation by way of wild lactic acid micro-organism [1]. Conversely, *Lachancea thermotolerans* (*L. thermotolerans*) is used to provide extra acidic wines in heat regions from low acidic musts.

The species *S. pombe* has not been historically used for winemaking due to the lifestyles of some collateral consequences as a result of metabolites

inclusive of acetic acid, acetaldehyde, acetoin and ethyl acetate. those issues have been solved lately thru the overall performance of progressed stress choice procedures. the primary difficulty regarding the selection procedures was the issue in keeping apart a consultant wide variety of lines from environmental samples, as a consequence limiting the capacity to attain and gather representative strains of *Schizosaccharomyces* genus. The range of lines to be had is presently very low in comparison to *Saccharomyces cerevisiae* (*S. cerevisiae*) traces offer; therefore, in addition selection processes similar to the ones performed for *S. cerevisiae* in winemaking would be required inside the destiny. New biotechnology related to the combined use of *L. thermotolerans* and *S. pombe* has been studied before concerning basic winemaking parameters and advanced elements which include aroma volatiles, amino acids or meals safety factors. though, many other unexplored wine parameters need to be studied for this novel biotechnology. This specific examine is centered on the impact of the mixed use of *L. thermotolerans* and *S. pombe* on wine anthocyanin composition.

A combination of the *S. pombe* and *L. thermotolerans* selected yeast strains is an alternative to the traditional malolactic fermentation which positively affects the anthocyanin content of wine. The results from the fermentation trails showed positive differences in several parameters such as acetic acid, glycerol, acid profile, sensory evaluation, color and anthocyanin profile.

Biography

Rumeysa Bukcu has studied Chemistry and graduated at the age of 21 years from Middle East Technical University. Her research interests include biosorption and new technologies related to it, and she is currently completing her thesis and study of mathematical modelling of Ni²⁺ biosorption by using Universal Sigmoid Approach. She is graduate student of bioengineering department in Marmara University. By attending to the intellectual and creative knowledge-sharing climate during the conference, she is planning to enrich her thesis work.

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