

University of Baghdad	Al-Khwarizmi College of Engineering	Biochemical Engineering Dep.	Project in.:	Date:
Project name :	Invertase Enzyme Production By Recombinant Yeast			
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<u>Aim of work :</u>				
To create a whole plant to produce Invertase enzyme by utilizing modern programming language (MATLAB) in material balance, energy balance and plant design. And work on new fields in energy dynamics and cell growth kinetics.				
<u>Summary :</u>				
<p>Invertase is an enzyme derived from yeast. It has the ability to break sucrose into the simple sugars like glucose and fructose. The resulting product, also known as inverted sugar syrup. Invertase has wide range of commercial applications including the production of confectionary with liquid or soft centers and fermentation of cane molasses into ethanol. Invertase is also used in pharmaceutical industry, as in digestive aid tablets, powder milk for infants and other infant foods.</p> <p>In the working part a program had been used to solve and represent the kinetics of the cell mass balance equations using the Simulink applications .</p> <p>And the material balance of the whole production process had been solved using one function on the MATLAB's programming facilities.</p> <p>Also the differential equations was solved and represented in the MATLAB-simulinks as mentioned previously and the resulted plot is summarize the power consumption with time of the fermentation process and that could help to design a control system on the fermenter. and by working on the mass balance Simulink's of the cell, the reaction that occurs in the fermenter had been obtained.</p>				
<u>Discussion:</u>				
<p>For a production fermenter it can be use a single fermenter with large volume to be capable of containing the large capacity of feed rate, or split it into 3 small fermenters connected in parallel to make the operating condition easy to operate.</p> <p>Another point to be discuss is the material balance of the production process that has been solved in a single function in the MATLAB programming language, were it was able to solve them individually for every unit, but at the case of one function, It will be available to produce different amounts of Invertase easily by changing the feed rate only.</p>				
<u>Future work:</u>				
<ol style="list-style-type: none"> 1. Design a control system by using the power consumption dynamics. 2. Working on an expert system in the plant design to have more accurate and faster results. 3. The use of invertase in the production of fructose, by using a method of two steps the first to produce invertase and the second to use that invertase in the splitting of sucrose into fructose and glucose, separate the fructose and recycle the glucose into the fermenter as a substrate to the cell that produce invertase enzyme. 				