

# ENERGY OF ACTIVATION AND RELATIVE RATES

FST 605 - Laboratory

Date Performed: **January 10, 2006**

Report Due: **January 17, 2006**

Reagents:

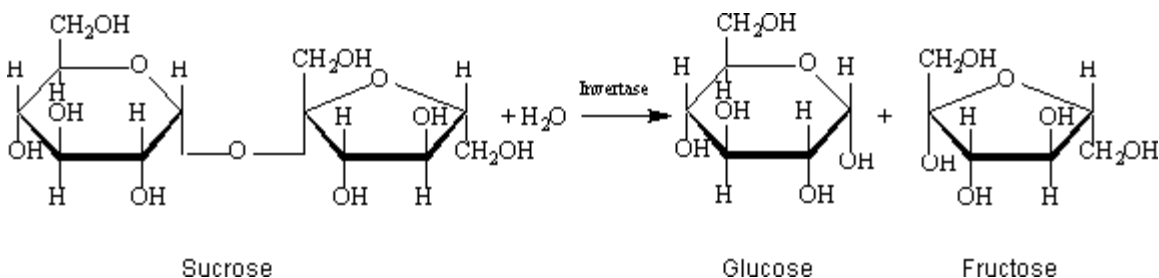
Sucrose - 100 mM in 0.5 M acetate buffer at pH 4.8.

Invertase Enzyme Solution

3, 5-Dinitrosalicylic Acid Reagent - 1 g 3, 5-dinitrosalicylic acid (DNSA) + 30 g sodium potassium tartrate + 20 ml of 2N NaOH to 100 ml with water.

## Introduction

The hydrolysis ('inversion') of sucrose, completely or partially, to glucose and fructose provides sweet syrups that are more stable (i.e. less likely to crystallize) than pure sucrose syrups. This hydrolysis reaction has historically been performed using acid hydrolysis (e.g. Lyle's Golden Syrup). However, with the growth in the market for colorless invert syrups, which are costly to produce using acid due to the downstream purification needed, the use of the yeast enzyme invertase has become more popular. Sucrose is  $\alpha$ -D-glucopyranosyl (1-2)- $\beta$ -D-fructofuranoside and can therefore be hydrolyzed both by  $\alpha$ -glucosidases and  $\beta$ -fructofuranosidases. Invertase is a  $\beta$ -fructofuranosidase that hydrolyses sucrose as well as other  $\beta$ -fructans such as raffinose.



## Procedures:

The effects of temperature on enzyme activity. A number of water baths ranging from 4°C to 40°C will be found in the room. Each group is to perform analysis at RT and at two additional temperatures. These temperatures will be assigned by the instructor. For each temperature, place a tube containing 20 ml of substrate solution and another

