

Isolation and Characterization of Cold Lactose Hydrolyzing Enzyme from Psychrophilic Bacteria

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Abstract

Psychrophilic (cold loving) microorganisms are essential microbes for any biotechnological practices. Enzymes produced from those psychrophilic microorganisms are important in food industry. Nowadays, lactose intolerance is becoming a serious issue around the globe and it is highly required to produce low lactose or lactose free dairy products, in addition to, till now, some psychrophilic bacteria producing beta-galactosidase have been reported, but none of them have been yet used practically in the food industry, meaning that more study is required to find better microbial source. One particularly interesting enzyme to solve such issue is beta-galactosidase which is cold lactose hydrolyzing enzyme, besides, this enzyme is potentially useful for fast lactose digestion below 20°C, to produce lactose-free milk. Therefore, the aim of this study will be to isolate, identify and characterize beta-galactosidase enzyme from psychrophilic bacterium. Soil samples will be collected from cold areas. To cultivate the psychrophilic bacteria, soil samples will be added to Brain heart infusion (BHI; Dif Laboratories, Detroit, Mich) broth containing 1% (w/v) lactose, and will be incubated at low temperature (4°C) aerobically by shaking.

Beta-galactosidase producer bacteria will be isolated by serial dilution and spread plating techniques. The bacterial isolates will be characterized

biochemically by indole test, methyl red test, Simmons citrate test, catalase test, oxidase test urease test, nitrate reduction test, starch hydrolysis test. Lactose hydrolyzing enzyme activity will be screened and determined by measuring the rate of hydrolysis lactose as substrate. The effect of temperature on the activity of cell free extracts for lactose hydrolysis will be analyzed by measuring the enzyme activity at various temperatures.

Biography

My name is Mulugeta Hailu Redae, and I am a graduate of the University of Haramaya, Ethiopian in 2017 Master's Degree in Biotechnology with honours. Since July, 2017 I am working at Mekelle University, Ethiopia as lecturer, researcher and quality assurance head in the department of biotechnology, Mekelle University, Ethiopia. I have publication on reputable Journal.

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