



Determination of Optimum Conditions for Ergosterol Production by *Saccharomyces cerevisiae*

Esraa S. Ethafa & Alaa J. A. Al-Manhel*

Department of Food Science, College of Agriculture, University of Basrah, Iraq

*Corresponding author email : alaa.abd@uobasrah.edu.iq, (ESE) esraasabah909@gmail.com

Received 5th October 2021; Accepted 5th March 2022; Available online 31st August 2022

Abstract: Ergosterol is an important provitamin in the present-day of industrial biotechnology. Seven yeast strains were obtained from the market of Basrah city and subjected to screening for their ergosterol production ability using liquid-state fermentation, the cultural conditions, and nutritional requirements for optimal production of ergosterol by *Saccharomyces cerevisiae* under laboratory conditions were determined. Y.6 is the best isolate of the yeast that produced ergosterol. It was identified as *S. cerevisiae*, with a similarity rate of 97% by using the Vitek2 device, this *S. cerevisiae* (Y.6) was further subjected to optimization conditions. The results showed that the best medium for production was yeast extract peptone dextrose broth. The effect of two cheaper carbon sources, molasses and date juice were investigated. Maximum ergosterol (0.55%) was produced using a medium containing date juice, with a replacement ratio of 75%, an incubation time of 72 hours, pH 5, at a temperature of 30 °C, and an inoculation volume of 4 ml. The percentage of ergosterol was (0.47, 0.55, 0.74, 0.66, 0.68 and 0.78 %), respectively.

Keywords: Ergosterol production, Optimum conditions, *Saccharomyces cerevisiae*, Screening.

Introduction

Vitamin D₂ (Ergocalciferol) is a fat-soluble vitamin, which has an important role in the absorption of calcium, phosphate, the prevention of osteoporosis and rickets. This vitamin is found in some seafoods and animal products such as fish, milk, cheese, and butter, while plant foods do not contain D₂, so vegetarians have symptoms of this vitamin deficiency (Martineau *et al.*, 2019; Amrein *et al.*, 2020).

Vitamin D represents a group of 11 sterols. The most important of which is vitamin D₂ or calciferol which consists of ergosterol (produced

in a semi-biological way). It is created by exposing animal sterols derived from cholesterol to ultraviolet rays, as well as vitamin D₃. Provitamin D₂ is another name for ergosterol (ergosta-5,7,22-trien-3-ol). It is one of the most common microbial sterols, a white crystalline organic substance belonging to the family of steroids (Wu & Ahn, 2014; Amrein *et al.*, 2020).

Ergosterol (5,7-dieneoxysterol) is a sterol found in fungal cell membranes and it is responsible for regulating membrane permeability and elasticity (Rodrigues, 2018).