

**PRODUCTION OF SOME BIOMOLECULES  
FROM MILK WHEY VIA  
BIOTECHNOLOGY**

By

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B.Sc. Agric. Sc. (Agric. Biochemistry), Ain Shams University, 2009

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**Approval Sheet**

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## ABSTRACT

**Randa Magdy Abd Elhamed Rafeh: Production of Some Biomolecules From Whey Milk Via Biotechnology. Unpublished M.Sc. Thesis, Department of Agricultural Biochemistry, Faculty of Agriculture, Ain Shams, University 2018.**

Lactose hydrolysis and production of ethanol as a biofuel was evaluated and conducted in the present study. Lactose was hydrolyzed by *Candida pseudotropicalis* and *Kluyveromyces fragilis* that grown in whey and synthetic medium. In addition, optimum pH and optimum incubation temperature for lactose hydrolysis were studied and were found 3 and 37°C respectively in *Candida pseudotropicalis*, while it were 5.1 and 35°C respectively in *Kluyveromyces fragilis*. On the other hand, two isolates and one strain of *Saccharomyces cerevisiae* were tested to produce ethanol from hydrolyzed whey. The current study shows that the strain was more efficiency in bioethanol production with level reached to 1.21% (v/v). Moreover, protoplast fusion was done between lactose fermenting *Candida pseudotropicalis* and lactose nonfermenting *Saccharomyces cerevisiae* and the fusion process gave rise to new hybrid yeast. The recombinants showed growth on lactose in whey and synthetic medium. (The ethanol yields by some recombinants were reached 3.27%, 2.24%, 2.10% and 2.06% from whey medium and 2.54%, 2.00%, 1.88% and 1.65% in synthetic media). Also the conversion of glucose that released from lactose hydrolysis by *Candida pseudotropicalis* into fructose via addition of immobilized glucose isomerase has been carried out and fructose content was 65.21 mg/100ml. In addition antimicrobial activities of whey proteins against the tested microorganisms (*E. coli*, *Staphylococcus aureus* & *Listeria monocytogenes*) were assayed by evaluating the inhibition zones diameters. The highest inhibition zone was recorded for *E. coli* (10mm) followed by *Staphylococcus aureus* (9mm) while there was no detectable effect on *Listeria monocytogenes*.

**Keywords:** Bioethanol, Fructose syrup, Galactose, Glucose isomerase, Lactose, Protoplast fusion, Whey, Whey antimicrobial activities, *Candida pseudotropicalis*, *Kluyveromyces fragilis*, *Saccharomyces cerevicae*.

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