STUDIES ON UTILIZATION OF SOME DAIRY INDUSTERIAL WASTES AND USING GAMMA IRRADIATION FOR MICROBIAL POLYSACCHARIDES PRODUCTION

By

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B.Sc. Agric. Sc. (Dairy Science and Technology), Ain Shams Univ. (1999)

M.Sc. Agric. Sc. (Dairy Science and Technology), Ain Shams Univ. (2008)

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ABSTRACT

Walaa Said Hendawy Mansour "Studies On Utilization Of Some Dairy Industerial Wastes And Using Gamma Irradiation For Microbial Polysaccharides Production". Unpublished Doctor Philosophy of Science Thesis, Ain Shams University, Faculty of Agriculture, Food Science Department, 2019.

Using sweet whey as a microbial production medium for exopolysaccharides (EPS) presents a Cleaner Production Opportunity (CPO) to create value-added products and protect the environment. Alginates are important polysaccharides with many applications in the food, pharmaceutical, textiles and paper industries. Different bacterial strains such as species of Azotobacter have been reported since long to produce alginate. The bacterial alginate has better qualitative properties, so it may be sold at higher price as compared to that obtained from Seaweed alginate. Therefore, this investigation was designed to study the production of alginate by bacterial fermentation.

In this study, a number of 28 *Azotobacter* isolates were isolated from different soil samples and tested for alginate production. Only two isolates were selected as high efficient alginate producing bacteria and completely identified as *Azotobacter vinelandii* MH249041 and *Azotobacter chrococcum* MH249629. In a series of experiments, modified **Clementi *et al* (1995)** medium and whey production medium (WPM) were recommended, with incubation at 32and 30 ºC for 3 days for alginate production by *Azotobacter* strains in shaking flasks used as a batch culture.

In second culture (WPM), alginate concentration increased by *Azotobacter chrococcum* MH249629 than by *Azotobacter vinelandii* MH249041. The calculated D_{10}-values of *Azotobacter vinelandii* and *Azotobacter chrococcum* were found to be 0.29, 0.33 kGy, respectively.

Gamma irradiation of *Azotobacter vinelandii* and *Azotobacter chrococcum* at the dose of 0.5 KGY, increased alginate concentration and alginate yield for both strains in (WPM).

using microbial alginate produces from *Azotobacter vinelandii* and *Azotobacter chrococcum* as stabilizer in ice cream manufacture had no significant ($P<0.05$) differences in physiochemical and sensory properties of ice cream product compared with using CMC or commercial alginate as stabilizer.

These results suggest that sweet whey as a valuable economic medium for microbial production of alginate, which could be used to improve ice- cream quality.

Key Words: Alginate, A. *vinelandii*, *A. chrococcum*, shake flasks, batch culture, alginate parameters, alginate production and medium composition.

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