



## **Applying Immobilization and Gel Entrapment Techniques for Microalgal Cell Preservation and Evaluation of their Efficiencies**

Sarkarat R.<sup>1,2</sup>; Tavakoli O.<sup>1,2\*</sup>; Ajayebi N.<sup>1,2</sup>

1-School of Chemical Engineering, College of Engineering, University of Tehran, Tehran, Iran

2- Development Department, Iranian National Algae Culture Collection (INACC), Tehran, Iran

\*Corresponding autor's Email: otavakoli@ut.ac.ir

### **Abstract**

Microalgae are one of the most important microorganisms in the aquatic ecosystem and are widely used in various industries, such as food and pharmaceutical, agriculture, cosmetics, and animal husbandry. One of the main challenges with microalgae is the preservation of the cells without causing serious damage to the cellular structure. There are several methods for microalgal cell maintenance, such as cryopreservation and freeze-drying. Because of the limitation and complexity of convenient methods, novel preservation techniques have been introduced in recent years. One of these new alternatives is immobilization, which could be passive (using natural or synthetic carriers), or active (gel entrapment). Entrapping the cells in natural polysaccharides like agar and alginate is the most commonly used method for microalgal cell immobilization. Using an immobilized cell system simplifies the biotechnological processes and reduces the cost. Although, employing this technique for preserving living algal cells is still being investigated. There are some studies conducted in this field, and several reports indicated that this technique could be useful and efficient for the preservation of some species up to 3 years. This paper reviews the possibility of using immobilization and gel entrapment for the preservation of different species of microalgae.

**Keywords:** Microalgae, Preservation, Cryopreservation, Immobilization, Polysaccharides