

14.1 Introduction

Marine organisms have been considered as a valuable source for diverse range of materials that are gaining importance in several fields of development, especially food and medicine. These explorations and use of various marine-originated compounds lead to the development of a new field of biotechnology called blue biotechnology [1]. Among various compounds extracted or obtained from marine organisms, polysaccharides possess a great stand in them [2]. Polysaccharides are a natural, nontoxic, biocompatible substance formed by several polymeric carbohydrate molecules linked together by glycosidic linkages [3, 4]. Though polysaccharides are available in plenty of organisms, those from marine origin have been concentrated by scientists and industrialists since they are the primary constituents of marine organisms, which make them to be obtained easily, and they are available in abundant quantity, which aids in increased production [5]. The main contributor of polysaccharides from marine sources are the sea weeds. During the past few years, polysaccharides from sea weeds are gaining importance due to their diverse structural availability and various biological properties [6]. The polysaccharides obtained from sea weeds include chitosan, fucans, ulvans, carrageenans, laminarins, alginates, agar, hyaluronic acid, xanthan, xyloglucan, pullulan, dextran, etc. [7].

Among various polysaccharides, alginates are the second most common exopolysaccharides produced by bacteria and are abundantly produced in brown sea weeds of Class Phaeophyceae [8, 9]. Like other polysaccharides, alginates form the cell walls and intracellular matrix of brown seaweeds, thereby providing them with mechanical strength and flexibility [10]. Alginates were found to be present in both acid and salt forms and are found to be formed by unbranched exopolysaccharide units of mannuronic acid and guluronic acid [11]. It is the salt form of alginate that is found in the cell wall of brown seaweed and it constitutes 40–45% of dry matter, whereas the acid form of alginate is a linear polyuronic acid called alginic acid [12, 13]. The exploration of alginates has found their application in food industry as gelling agents, viscosity agents, etc. and also in pharmaceutical industry as wound dressings, tissue engineering, etc. [14, 15]. In the present chapter, the biogenesis of alginates along with its applications and future perspectives has been discussed in detail.