



Figure 7.1 Chemical structure of alginate (adopted from Skaugrud, Hagen [11]).

and cavity [5]. Among these materials, the use of alginates has significantly gained much attention—owing to their biocompatibility [6], low toxicity [2], and simplicity in their use with minimal equipment requirement [7].

Alginates are linear biopolymers consisting of 1,4-linked β -D-mannuronic acid (M) and 1,4- α -L-guluronic acid (G) residues that are arranged in homogenous (poly-G, poly-M) or heterogenous (MG) block-like patterns (Figure 7.1). Owing to this unique chemical structure, alginate has successfully been used in various biomedical and pharmaceutical applications. For instance, alginate hydrogels have found applications most notably in wound healing [8], drug delivery, and tissue engineering [2]. More so, alginates are also used in textile printing, paper industry, and food industry [9, 10]. In the context of dentistry, Srivastava *et al.*, [9] noted that alginates are widely used for recording the impressions of edentulous arches, making dental models for diagnostic purposes, and for duplications of casts. However, these materials have long been known for their inferior ability to record fine details and to resist tearing when used in partial denture cases. Hence, in the present chapter, the evolution of alginate and its modification in dentistry are discussed with particular emphasis on the techniques of alginate impression applications.

7.2 Method of Alginate Extraction

Ever since the discovery of alginate, several attempts have been explored to extract alginates in commercial quantities for both pharmaceutical and biomedical applications. Studies [11, 12] reported that commercial alginates are mainly produced from farmed brown seaweed, mainly from genera such as *Macrocystis pyrifera*, *Ascophyllum nodosum*, and *Laminaria hyperborean* [6, 13]. The constituents of these seaweeds are structurally made up of alginate, playing similar roles analogue to cellulose found