



Figure 10.3 Preparation and extraction of alginate from natural resources.

Once alginate is extracted, the refining of alginate is a must because of varieties of impurities present in extracted alginates from the natural sources and additionally for the conversion of either salt or acid alginates [2]. These impurities may be heavy metals, endotoxin, proteins, other carbohydrates, and polyphenols [22]. The low level of impurities in the processed alginates does not cause any mess in the food and beverage industry, but for pharmaceutical applications, there is notable removal of impurities from processed alginates.

10.3.1 Gelation and Cross-Linking of Alginate

Gelation and cross-linking are prepared by exchange of ions in a solution like Na^{2+} alginate ions from α -L-guluronic acids with divalent cross-link solutions such as Ca^{2+} , Sr^{2+} , or Ba^{2+} . There is drawback of monovalent cations and Mg^{2+} ions in the gelation that affects the elasticity of alginate during gelation [2], although Ba^{2+} and Sr^{2+} ions produce active alginate gels [23, 1]. Alternative divalent cations such as Pb^{2+} , Cu^{2+} , Cd^{2+} , Co^{2+} , Ni^{2+} , Zn^{2+} , and Mn^{2+} also formed cross-linked alginate gels, but due to their toxicity, there is limited use of these ions in the formation of gel [24].