

bicarbonate give the medicine Gaviscon, which inhibits reflux. The sodium derivative of alginate is used as an impression-making material in prosthetics, life casting, and dentistry. It is also used in reactive dye printing and as a thickener for reactive dyes used in textiles. Skin wound dressing products include materials of calcium alginate. They are widely used because they are easily removable. Alginate can be used in hydrogels consisting of microparticles or otherwise bulk gels combined with nerve growth factor. It found application in bioengineering research of brain tissue regenerations. Alginate composites are found to have suitable property for regeneration. Research on bone recreations is recently active. Alginates have better porosity, proliferation, and mechanical strength. Alginate hydrogels are found to be popular in applications in biomedical science and engineering because of their favorable properties, including biocompatibility and ease of gelation. Alginate hydrogels are important in case of wound healing. They are used in delivery system and tissue engineering applications, as these retain structural similarity to extracellular matrices in tissues.

Alginate hydrogels are prepared by various cross-linking methods. Wound dressings using alginate hydrogel can maintain a physiologically moist environment, which considerably reduces the bacterial infections at the wound site and facilitates fast wound healing. Alginate hydrogel can be used for the controlled release of drug molecules based on cross-linker types and cross-linking methods. In addition, alginate gels can be administered or injected in a least invasive manner. Alginate gels also pave the way to cell transplantation in tissue engineering. Tissue engineering is related to manmade tissue and organ replacement in patients who suffer from organ failure and organ loss. Hydrogels are nowadays used to deliver cells to the decreed sites in a controlled manner and provide sufficient space for cell formation and tissue formation, and control the function and structure of the engineered tissue. Increasing the size of the alginate, we can also improve the properties of resultant gels. However, an alginate solution formed from a large polymer of high molecular size becomes highly viscous, which turns out to be undesirable for processing. Controlling the molecular weight and its distribution can independently control the pre gel solution viscosity and post gelling stiffness. The elastic modulus of the hydrogel can be easily increased. On the other hand, the viscosity changes are gradual by using combinations of high and low molecular weight alginate polymers.

4.2.1 Preparation of Alginate Hydrogels

Alginate is a naturally derived anionic polysaccharide and alginate hydrogels are prepared by various cross-linking methods.