weight, is enough for the structure retention of mayonnaise. In this way, molecular weight affects the function of alginate.

14.4.2 Solubility

The solubility of alginate is essential for its application in various industries. Alginates are soluble in water and insoluble in organic solvents, whereas alginic acid is insoluble in water and soluble in organic solvents. The solubility of any polysaccharide is affected by external factors such as pH, ionic strength, high temperatures, and reducing agents. For alginates, the solubility is affected by pH, ionic strength, and salts; the pH of the solution affects the alginate by altering its uronic acid units. It has been found that the decreased solubility of alginate during the commercial process of extraction is due to the removal of a compound called ascophyllan. This compound binds with the alginate and makes it more soluble even in low pH [62]. As mentioned earlier, alginic acid is insoluble in water. Therefore, the composition of alginic acid was studied by Haug *et al*., [63] by dissolving it in oxalic acid. It has been found that even at a low pH of 2.85, oxalic acid can dissolve alginic acid to 80–90%.

As discussed earlier, the solubility of alginate is affected by ionic strengths, which cause salting out of alginates and inorganic salts causing precipitation. In case of mixed solution, the solubility is affected by dielectric constant. Since alginates are readily soluble in water, to make use of them in various applications, several hydrophobic molecules are added to their backbone. Such hydrophobic alginates are produced by oxidation of hydroxyl groups or by reacting them with tetrabutylammonium carboxylates [64, 65].

14.4.3 Stability

Alginates can remain stable when not exposed to sunlight without any considerable changes in their molecular weight, and also, they function for several months in a dry, cool place. But alginic acid cannot be kept stable over a period of time [66]. There are several factors that affect the stability of alginates such as acidic hydrolysis, alkaline oxidation, and bacterial degradation. These factors affect the stability of alginate by degrading its molecular structure, thereby reducing its molecular weight. When the molecular weight is affected, the function of alginate is also affected. Therefore, in order to maintain its molecular weight and stability, it has to be protected.

Several studies demonstrated the stability of alginates in their various forms such as impressions, hydrogels, etc. since they are used in dental