

12.5 Uses as a Food Additive/Ingredient

In general, hydrocolloids are added to beverages to ensure suspension of particles, increase viscosity, improve fruit pulp stabilization, prevent oil separation, induce satiating mouth feel, and enable fiber addition. It is also used in fruit-fermented dairy products to control its viscosity, ensure excellent suspension of fruits, maintain fruit structure, increase gel network formation, and also stabilize the final product [2]. Alginates are widely used hydrocolloids derived from brown seaweed [5]. Various applications of alginates in food industry are as an emulsifier, stabilizer, thickener, flavor enhancer, firming agent, formulation and processing aid, and texture modifier [26]. The various food applications of alginates are achieved by addition at a level of 0.5–1.5% [27].

The application of alginates is mainly based on their three characteristic properties: to modify the viscosity (dissolve in water and thicken the solution), ability to form gels, and to form films (sodium or calcium alginate) and fibers (calcium alginate). The gelation and physical properties of gel are affected by factors like viscosity, molecular weight, structure (M/G ratio), sequence of M-G blocks, and concentration of alginate [28]. The ability of sodium, potassium, and ammonium salts of alginic acid to dissolve in cold water makes its application in food industry vital, as a thickener, gelling agent, stabilizer, film formation, and controlled release of bioactive compounds or food ingredients [8]. The various applications of alginates in food industries are represented in Table 12.3 and its permissible limit in various foods are listed in Table 12.4.

Alginates find major application in beverage industry as a thickener and stabilizer. In fruit and vegetable juices, alginates are used to prevent layering and sedimentation on processing. In products like *Leben*, they are used to prevent milk protein agglutination and sedimentation. Alginates are also used to prevent oil separation and also to avoid protein sedimentation. Similarly in vegetable protein beverages, alginates are added to prevent coagulation of milk protein and other solid particles and also to avoid flotation of fat. The edible coating by sodium alginate of fruit and vegetables helps in ensuring excellent suspension of particles in suspended beverages [29]. The sodium alginate acts as an effective clarifying in wine and also helps in the removal of unwanted color.

The use of alginates such as propylene glycol in yogurt improves its texture, body, and appearance as it leads to stabilization of milk proteins under characteristic acid condition of yogurt. Propylene glycol alginate and sodium alginate also find application in the suspension of fruit pulps