reported a visible color difference between the alginate-coated meat and uncoated meat, post 144 h from treatment. As described, calcium alginate helped in maintaining the oxymyoglobin for a long time period in meat, which is responsible for meat's red color. Uncoated meat showed no color retention. These authors further stated that the coating decreased the percentage of meat shrinkage, as well as development of off-flavors in meat with storage.

In another work, Bourtoom [95] explains that the functional property of the film can be improved by combining different proteins, lipids, and some synthetic polymers along with the edible film. This synergistic effect of the film gives compatibility and enhances its mechanical properties, which will further improve the shelf life of the food product. Skandamis *et al*., [96] have verified that infusion of edible oil into meat products extends the shelf life by delaying its lipid peroxidation. Mixing of alginate with essential oils of cinnamon, lemongrass, and palmarosa reportedly rendered extended storability of melons [97]. The benefits of alginate coating, as evidenced, are many. In fact, few alginate compounds are approved to be used as food additives (E 400). Adding plasticizers can improve the flexibility of the biopolymer by decreasing the melting temperature (T_m), melt viscosity, Young's modulus (YM), and glass transition temperature (T_g).

11.8 Interaction between Food and Alginates

The interaction that occurs between the coating and the food matrix is equally important as any other observable effect [97]. Oxidation in the food is one major adverse interaction that happens between alginate packaging and the contained food. Generally, oxidation in the packaged food leads to rancidity of fats therein leading to development of off-flavors. Even residual oxygen can react biochemically with the packed food and cause adverse oxidative effects that further alter the internal temperature of the food product. Sometimes alginate coating reacts with the pigments of the meat product and causes browning and darkening of fresh meats. Under certain circumstances, alginate packaging can affect the respiration of the packed food material also leading to proteolysis and lipolysis, for example, in fresh fruit, vegetables, and meats. Flavor deterioration and discoloration of food due to pigment interaction are some of the most common difficulties in alginate coating [98].