

PERSPECTIVE FOR THE USE OF ALGINATES IN THE TECHNOLOGY OF SOFT DOSAGE FORMS

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"Alginate" is the term usually used for the salts of alginic acid, but it can also refer to all the derivatives of alginic acid and alginic acid itself. Most of the large brown seaweeds are potential sources of alginate. Alginic acid is a linear polymer based on two monomeric units, b -D-mannuronic acid and a -L-guluronic acid. Sodium alginate is the main form of alginate in use. Smaller quantities of alginic acid and the ammonium, calcium, potassium and triethanolamine salts are also produced. Calcium alginate and alginic acid are made during the calcium alginate process for making sodium alginate; each can be removed at the appropriate stage, and after thorough washing, can be dried and milled.

The uses of alginates are based on three main properties. The first is their ability, when dissolved in water, to thicken the resulting solution (more technically described as their ability to increase the viscosity of aqueous solutions). The second is their ability to form gels; gels form when a calcium salt is added to a solution of sodium alginate in water. The gel forms by chemical reaction, the calcium displaces the sodium from the alginate, holds the long alginate molecules together and a gel is the result. The third property of alginates is the ability to form films of sodium or calcium alginate and fibres of calcium alginates.

The ionotropic gelation of sodium alginate with calcium cations is conventionally described by the "egg-box" model, where calcium cations interact with guluronic acid monomers in the cavities formed by pairing up of the G sequences of the alginate molecular chains.

Several gelling systems based on alginates can be formulated, but the most frequently used are diffusion setting or internal setting.

Diffusion setting. In this system, a calcium salt which is insoluble at neutral pH, is mixed with the alginate. When an acid comes into contact with the surface of the mass, the calcium salt is solubilized. The soluble calcium will then react with the alginate and start the gelation process.

Internal setting. In this process, calcium is released within the product under controlled conditions. It employs the combination of alginate, a slowly soluble calcium salt and a suitable calcium sequestrant, such as a phosphate or citrate.

Thus, due to their properties alginates may be used in the technology of soft medicinal forms.