- **Alginate Applications:**

**Textile printing:**

In textile printing, alginates are used as thickeners for the paste containing the dye. Alginates became important thickeners with the advent of reactive dyes. These combine chemically with cellulose in the fabric. Many of the usual thickeners, such as starch, react with the reactive dyes, and this leads to lower colour yields and sometimes by-products that are not easily washed out. Alginates do not react with the dyes, they easily wash out of the finished textile and are the best thickeners for reactive dyes.

**Food:**

The thickening property of alginate is useful in sauces and in syrups and toppings for ice cream. Addition of alginate can make icings non-sticky and allow the baked goods to be covered with plastic wrap. Water-in-oil emulsions such as mayonnaise and salad dressings are less likely to separate into their original oil and water phases if thickened with alginate. Some fruit drinks have fruit pulp added and it is preferable to keep this in suspension; addition of sodium alginate, or propylene glycol alginate ( PGA ) in acidic conditions, can prevent sedimentation of the pulp. In chocolate milk, the cocoa can be kept in suspension by an alginate/phosphate mixture.

Calcium alginate films and coatings have been used to help preserve frozen fish. The oils in oily fish can become rancid through oxidation even when quick frozen and stored at low temperatures.

**Immobilized biocatalysts:**

When used enzymes as biocatalysts for the conversion of glucose to fructose, the production of L-amino acids for use in foods, the synthesis of penicillins , conversion of starch to ethanol , and the continuous production of yoghurt. To carry out these processes on a moderate to large scale, the biocatalysts must be in a concentrated form and be recoverable from the process for re-use.

This can be achieved by "immobilizing" . Beads made with calcium alginate were one of the first materials to be used for immobilization. In use, they are packed into a column and a solution of the substance to be converted is fed into the top of the column and allowed to flow through the bed of beads containing the immobilized biocatalyst in the cells. The conversion takes place and the product comes out at the bottom. A simple example is to immobilize yeast cells, flow a solution of sugar through the beads, and the sugar is converted to alcohol.

**Pharmaceutical and medical uses:**

Good quality stable fibres have been produced from mixed salts of sodium and calcium alginate, and processed into non-woven fabric that is used in wound dressings. They have very good wound healing and haemostatic properties and can be absorbed by body fluids because the calcium in the fibre is exchanged for sodium from the body fluid to give a soluble sodium alginate. This also makes it easy to remove these dressings from large open wounds or burns since they do not adhere to the wound.

Alginic acid powder swells when wetted with water. This has led to its use as a tablet disintegrant for some specialized applications. Alginic acid has also been used in some dietary foods, such as biscuits; it swells in the stomach and, if sufficient is taken, it gives a "full" feeling so the person is dissuaded from further eating. The same property of swelling has been used in products such as Gavisconä tablets, which are taken to relieve heartburn and acid indigestion.

Alginate is used in the controlled release of medicinal drugs and other chemicals. In some applications, the active ingredient is placed in a calcium alginate bead and slowly released as the bead is exposed in the appropriate environment.

**Paper:**

The main use for alginate in the paper industry is in surface sizing. Alginate added to the normal starch sizing gives a smooth continuous film and a surface with less fluffing. The oil resistance of alginate films give a size with better oil resistance and enhances greaseproof properties.

**Welding rods:**

Coatings are applied to welding rods or electrodes to act as a flux and to control the conditions in the immediate vicinity of the weld, such as temperature or oxygen and hydrogen availability.

**Release agents:**

The poor adhesion of films of alginate to many surfaces, together with their insolubility in nonaqueous solvents, have led to their use as mould release agents, originally for plaster moulds and later in the forming of fibreglass plastics.