

Calcium lactate (E327)

Culinary data

Calcium salts (calcium lactate or gluconolactate) enable:

- to form beads (caviar looking) in the presence of sodium alginate,
- avoid the bitter taste of calcium chloride.



Technological data

Dissolution

Both salts are soluble in water at the concentration necessary to observe the “spherification” (< 5%, 50g/L). The solubility in water at 25°C of calcium lactate is of 90g/L, this of calcium gluconate is of 30g/L. But this of calcium gluconolactate is greater than 200g/L. These salts are little soluble in alcohol. The amount usually used is 1g for 10cL of “spherification” bath.

Gel setting

The calcium ions interact very quickly with sodium alginate to form a gel, providing the food preparation is not too acidic (pH > 3). The amount of calcium ions and sodium alginate determine the gel's firmness. The gel formed does not melt upon heating.

Sensory characteristics

The gel formed are colourless and tasteless.

Keeping

Calcium alginate gels lose water. It is therefore advised to avoid storing them or to store them into the liquid they are made of.

Influence of the acidity

Une préparation trop acide ne pourra pas gélifier.

Storage

Maximal temperature 25°C
Air moisture < 60%.

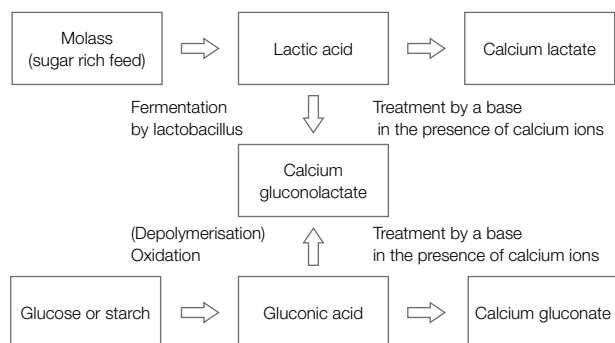
Toxicological data

- As calcium lactate is not coming from dairy products, it can be eaten by people suffering from milk allergies.
- Calcium lactate has no acceptable daily intake, but gluconolactate has one of 50mg/kg. It is therefore the acceptable daily intake of our salts mixture.

Scientific data

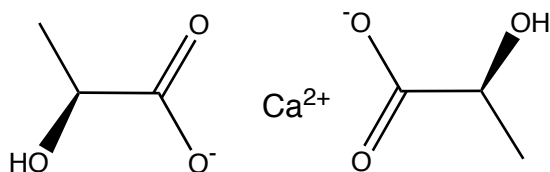
Origin

Lactic acid is produced by numerous organisms, in the mitochondria of the muscles, as in the case of humans, when the oxygen available is not sufficient. It is the case during an intense effort. For its industrial production, lactic acid is obtained by fermentation with bacteria of type *Lactobacillus delbrueckii*, *Lactobacillus bulgaricus* or *Lactobacillus leichmannii*. Calcium lactate is derived from it. Gluconic acid is obtained by glucose oxidation, or by oxidation and acidic treatment of starch. Calcium gluconate is derived from it.



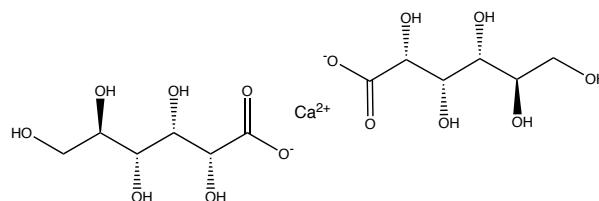
Chemical composition

Calcium lactate is the salt obtained treating the L-lactic acid with a base in the presence of calcium ions. It needs two lactates for each calcium ions to ensure the charge neutrality.



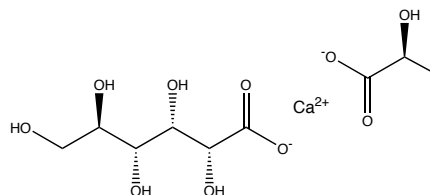
Structure of the calcium lactate.

In a similar manner, calcium gluconate is the salt obtained treating the gluconic acid with a base in the presence of calcium ions. It needs two gluconates for each calcium ions to ensure the charge neutrality.



Structure of the calcium gluconolactate

The mixture of both salts can also form another type of salt using each of the conerion type. Calcium gluconolactate is then obtained. The advantage of this salt is its higher solubility.



Structure of the calcium gluconate

In the formation of a gel starting from sodium alginate, only the calcium ions set in solution by the dissolution of the salts are involved. They form, with alginate chains a helical structure which organize them into a network, as can be seen in the following scheme. This leads to the formation of a gel (see as well the sodium alginate data sheet).

Mechanism of gel formation trough the interaction between calcium ions and sodium alginate: as a drop of the preparation containing the sodium alginate enters the calcium bath, the calcium ions diffuse quickly into the alginate drop to form a gel.