

ellactiva[®]

for life!

ellactiva[®] CALCIUM CHEWS

ellactiva[®] Calcium chews dissolve faster than regular or chewable tablet supplements, even at higher pH conditions, ensuring that calcium is available for absorption by the body. They are formulated with a unique blend of calcium carbonate and milk minerals in our advanced fast dissolving technology to create better tasting chews that deliver high quality calcium without any taste compromise. Because they taste so good, and customers enjoy taking them every day, ellactiva[®] Calcium chews encourage compliance.



SIGNIFICANTLY FASTER DISSOLUTION

The advanced solid dispersion technology used by ellactiva[®] Calcium chews, and the unique blend of both calcium and natural milk minerals result in a significantly enhanced speed of dissolution, and total dissolution of calcium relative to leading calcium supplements, including tablets and chewable tablets.

- 100% of calcium of ground ellactiva[®] Calcium chews (simulated chewing conditions) dissolves within 15 minutes at stomach conditions (pH 1.5 buffer).
- Even if swallowed whole, 90% of calcium in ellactiva[®] Calcium chews (unground) dissolves within 30 minutes at stomach conditions.
- At pH 4 (hypochloridia conditions), 93% of calcium in ground ellactiva[®] Calcium chews (simulated chewing conditions) dissolves by 60 minutes.
- Only 10% of calcium from the leading regular tablet is dissolved after one hour at stomach conditions. Only 20% dissolved after two hours.
- Only 56% of calcium from the leading chewable tablet is dissolved after one hour at stomach conditions. Only 85% dissolved after two hours.

TABLE 1. DISSOLUTION RESULTS pH 1.5

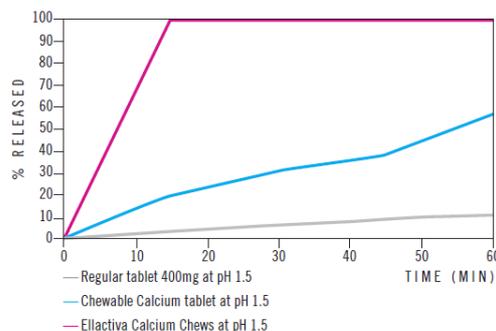
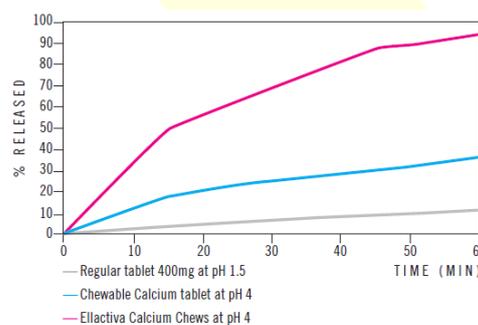


TABLE 2. DISSOLUTION RESULTS pH 4



ADVANCED SOLID DISPERSION TECHNOLOGY

Unlike regular coated tablet or compression tablet technologies, ellactiva[®] Calcium chews are a unique solid dispersion of mineral salts in a water soluble matrix that incorporates very small (micron sized) particles of a blend of calcium carbonate and natural milk minerals. The manufacturing process is such that the insoluble mineral salts are uniformly and substantially distributed or dispersed over the matrix in micron sized particles. The matrix, primarily composed of carbohydrates, dissolves quickly at stomach conditions, helps the 'wetting' of each individual particle, and releases them in conditions ideal for solubilisation.

Importantly, ellactiva[®] Calcium chews also contain natural milk minerals. Milk Calcium is bound to peptides and proteins and is more likely to remain in solution when the pH is unfavourable, such as in hypochloridia. Also, milk calcium may be absorbed in the absence of vitamin D, in the distant small intestine via the paracellular route.

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CALCIUM ABSORPTION AND STOMACH pH

The absorption of calcium is both an active and a passive process. However, regardless of the process involved, calcium must be in solution as ions to be absorbed (Pointillart, 2000). Of the various dietary factors that affect absorption, those that have a negative effect (ie, presence of phytates, oxalates, etc) do so by reducing solubility. On the other hand, numerous researchers have reported that milk or milk products enhance the absorption of calcium because milk contains a more soluble calcium-protein complex, and milk increases acid secretions and residence time in the stomach; both of these conditions increase the solubility of calcium, and thus promote absorption (Pointillart, 2000). The relative solubility of calcium is complicated by the fact that, for many salts, solubility is dependent on the pH of the dissolution medium.

Calcium Carbonate is the calcium salt most widely used in calcium supplements as it contains the highest concentration of elemental calcium.

Calcium carbonate, however, is insoluble in water, needs to be ionized in the acidic pH of the stomach to solubilise, and can exhibit low and irregular bioavailability when administered orally. Variations in gastrointestinal pH, which are known to exist, have a direct and substantial influence on dissolution and bioavailability (Shangraw, 1989). Hypochlorhydria and achlorhydria for example, are conditions which increase with age in which the production of hydrochloric acid in the digestive juices of the stomach is low or absent, respectively (Rekker, 1985). In one report that examined 1590 people, the incidence of achlorhydria was 19% in the fifth decade of life and 69% in the eighth decade (Segal H., 1973).

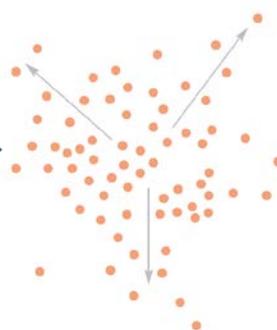
IMPORTANCE OF SPEED OF DISSOLUTION

The ability of a calcium tablet to disintegrate and dissolve rapidly is critical to ensure its bioavailability

(Pluhator, 1992). The pH of the gastrointestinal tract varies from a low of 1.0 in the stomach (high acidity) to neutral or slightly basic in the colon. If a calcium tablet does not disintegrate in the stomach, there is little chance that it will disintegrate or dissolve in the intestine because of the sharp increase in pH which occurs there. This is particularly true when a calcium tablet is taken on an empty stomach, or with a very light meal, when the acidity of even the stomach is low and the contents (including the tablet) are rapidly passed into the duodenum. In this case, there is little or no chance for dissolution to occur (Shangraw, 1989). This is why it is generally recommended that calcium supplements are taken with meals, as this ensures that the tablets remain in the stomach for a much longer time, the acidity is greater, and dissolution has a better chance of taking place. Nonetheless, studies have shown that some calcium tablets are so closely bound that they could take 4~6 hours to dissolve. Since most food passes through the stomach in 3 hours, people have actually had calcium tablets appearing in their stool.

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Homogeneous micro dispersion of CaCO₃ and Milk Minerals