

Calcium Chloride *Market Reviews*

Industrial Uses

2 Animal Feed

Liquid calcium chloride is a more convenient source of macronutrient calcium in liquid animal feed supplements than the more-often-used limestone. It is most often used by liquid feed supplement makers, cattle ranches and feedlots, dairies and hog farmers.

DESCRIPTION

Calcium is an essential animal macronutrient that builds bones, teeth and horns. It plays an essential role in electrolytic balance, heart action, blood enzyme activation, membrane permeability and other vital functions. It also helps prevent milk fever.

Ground limestone (calcium carbonate), the traditional calcium additive in liquid animal feed supplements, derives from mineral deposits and industrial by-products. Other materials that can supply calcium in such supplements include ground oyster shells and bone meal.

The amount of calcium in a supplement varies from 2% to 10% by weight, depending on its intended use. Supplements are often fed in lick tanks (beef) or poured onto silage. They are normally given to cattle 90 to 120 days prior to finishing at feedlots. Feedlots generally enrich the cereals they use with a multi-ingredient supplement containing proteins, fats, vitamins, phosphorous, ionofers and calcium.

CALCIUM CHLORIDE VS. LIMESTONE

- Limestone is the prevailing calcium source in liquid feed supplements because of its relatively low cost and high availability. It has several drawbacks, however:
- It is usually sold in 50-lb. bags as a fine powder (325-mesh or finer) that suspends in air and slowly settles out. Worker safety and health issues, especially in mixing areas, may require ventilation systems, pneumatic handling, special silos and other equipment.
- It reacts with acids to generate carbon dioxide, which can cause foaming. This can create problems in formulations containing phosphoric or sulfuric acid.
- It is insoluble in mild acid solutions, so special gelling agents (e.g. xylene gum or a clay like bentonite) are used to suspend it. These agents have no nutritional value, occupy volume in the product and add cost.
- It tends to settle, so storage tanks must be mixed, agitated or recycled periodically to keep concentration uniform. Even if inert clay, gum or molasses is added to retard settling, limestone can still settle in feed lines, causing lines and nozzles to plug or clog.
- It causes liquid feed supplements stored outdoors in unheated tanks to grow viscous at low temperatures, making them harder to pump.
- It is an abrasive material and can erode pipes, pump impellers and other system components.

CALCIUM CHLORIDE'S ADVANTAGES

Calcium chloride can overcome many of these problems. It is a manufactured product supplied as a 35% aqueous solution and is nutritionally superior to limestone in some aspects.

1 - Operating benefits

- It generates no dust.
- It does not react with acids to cause foaming.
- It does not settle out because it is far more soluble than limestone, so CaCl_2 solutions do not need recirculation or suspension agents. The lack of settling also means that these solutions are easily pumped with little or no clogging of fine orifices or nozzles.
- It dramatically lowers solution freezing point, which aids pumpability in winter and retards ice crystal formation. It is non-abrasive.
- It needs only a storage tank, pumps and piping for normal use.
- These benefits mean that CaCl_2 can decrease labor and equipment costs and improve the convenience and handling of the calcium source. It also

improves quality control, because it mixes in uniformly and does not settle.

2 - Nutritional Benefits

Several studies indicate that the high solubility of CaCl_2 gives it nutritional advantages over limestone, because it is more easily absorbed. One study found 33% and 47% better calcium absorption with CaCl_2 in young steers and in older ones, respectively. Also, CaCl_2 generally has fewer impurities than limestone. Some of these impurities can bind calcium and block its efficient absorption in animal digestive systems

A trial comparing sources of soluble calcium in feedlot rations found that cattle fed a liquid CaCl_2 supplement needed 8.9% less feed (dry matter) than those fed a limestone supplement to sustain comparable weight gains. The decrease in dry feed required with the CaCl_2 supplement saved \$6.75 per heifer. Similarly, a previous study found 4.6% better feed efficiencies in cattle fed liquid CaCl_2 .

Carcass data from these trials found that heifers supplemented with liquid CaCl_2 had, in many cases, less than half the condemned livers of those receiving limestone. The CaCl_2 supplement produced fewer stiff cattle, bloats and diarrhea than the limestone group, which is consistent with the liver data.

APPLICATION

Liquid CaCl_2 is often added after all other ingredients by simply feeding it to batch tanks from storage tanks. Some pH adjustment may be needed after addition.

The use of liquid CaCl_2 can offer strong advantages over ground calcium carbonate. A feedmill in Western Canada, for example, switched to liquid CaCl_2 for its horse, sheep and cattle feeds. It had been using as much as 25 50-lb. bags

of limestone per feed batch. Employees carried bags by ladder to the top of the 2,500-gal. mixer, and cut open and emptied them. Severe dusting often occurred. Gum was blended into the mix to suspend the stone particles. After the supplement was delivered, farmers had to agitate the limestone product every two or three days to maintain suspension.

The switch to liquid CaCl_2 eliminated lifting, pouring and dusting. Instead of hefting 50-pound bags, the operator feeds the liquid CaCl_2 to the final batch tank by opening valves in pipes from an 85-ton storage tank (about one rail car's worth). It also eliminated the need for agitation.

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