



A New Chemical De-icer?

By Scott A. Mackintosh

Winter, defined in *Webster's Ninth Collegiate Dictionary* is "the season between autumn and spring; the cold-er half of the year." Snow is defined as the "precipitation in the form of small tabular and columnar white ice crystals formed directly from the water vapor of the air at a temperature of less than 32°F." Surprisingly, there is no mention of road salt in either definition. It seems to me that winter, snow and road salt go hand in hand.

Anyone having at least visited the northern half of our great big country will know what it is like to drive on salt laden roads in the winter. It's not long before our cars need washing and the windshield washer reservoir needs filling. The most common form of road salt is sodium chloride (NaCl). A typical application of NaCl ranges from 250 to 450 lbs/two-lane-mile per storm. Over the course of a typical winter up to 5 tons/lane mile could be applied. It's no wonder our infrastructure is crumbling. Chloride ions accelerate the corrosion process by increasing the conductivity of solutions and increasing the time that metal surfaces are exposed to moisture. Spalling, which is the crumbling and chipping of concrete and limestone, can also occur to bridges, parking decks and buildings.

Let us also not forget the environ-

mental impacts from salt application. Soils with high concentrations of sodium and chloride ions increase soil erosion, compaction and runoff of heavy metals. In turn, roadside plants have to endure desert-like conditions. Normally plants absorb water through a combination of osmotic potential and transpiration. In other words, water is drawn into the plant to replace the water that is lost due to transpiration of water from the plant to the atmosphere. In salt laden soils the osmotic gradient is much stronger than in the plant. Therefore, water can not be readily drawn into the plants even when the soils are wet. In response to this stress, the plant defoliates and will soon die unless the soil solution gradient changes. Without roadside vegetation, significant amounts of erosion could take place.

Is there a de-icer that melts ice, won't rust my car before its paid for, destroy bridges and buildings, and is environmentally safe? Yes. The product is called calcium magnesium acetate (CMA). CMA is a hard spherical pellet that is about as corrosive as drinking water. Once dissolved calcium and magnesium are absorbed by soil which can enhance soil structure by restoring soil porosity and aggregate stability. The chemical name for vinegar is acetic acid. The acetate por-

tion of CMA biodegrades into carbon dioxide and water. Like sodium chloride, CMA becomes less effective at temperatures below 20°F.

What about its effect on roadside vegetation? The acetate ion is the most abundant organic acid metabolite found in nature. Research has shown that grass and trees were not affected by CMA applications. The researchers went so far as to say CMA applications can actually enhance growth by improving soil permeability by providing needed calcium and magnesium.

CMA melts ice by releasing heat once it comes into contact with moisture. Last year we had significant ice damage at the Noer Facility and across most of the state of Wisconsin. As we learned at this past year's Wisconsin Golf Course Symposium, the turf, although off color and apparently not growing, is still respiring. Ice formation on cool season turfgrass for more than 60 days on bentgrass and 120 days on bluegrass can actually create an oxygen deficient environment under the ice layer. Since it has been shown that CMA does not effect plant growth, why not try CMA on ice covered turf to prevent suffocation?

Research will be initiated at the Noer Facility this season to evaluate CMA as a possible ice remover. I will be looking for ice formations preferably on creeping bentgrass once the snow begins to melt and freeze. If ice layers do not form naturally, I will make an ice layer on a stand of Kentucky bluegrass and determine the application rate needed to remove the ice layer. Then I will monitor the turf for any deleterious effects throughout the season. 🌱

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