A recent development in hay technology involves the use of chemicals that are capable of decreasing the drying time of cut forage, thereby increasing the chances of getting the hay baled before inclement weather arrives. In the humid Northeast, this can be a very important consideration since untimely rainfall is a particular problem in this area.

Many new products have appeared on the market and are referred to as desiccants, drying agents, or chemical conditioners. These should not be confused with organic acid preservatives used on high-moisture hay at the time of baling.

What are some of the basic chemicals used in desiccant formulations? The original formula, produced in Australia, was made from straight potassium carbonate solution. In the United States, some chemical formulations are mixtures of potassium and sodium carbonate. Some retailers have also marketed sodium silicate, methyl ester of fats, vegetable oils, and animal fat. The salt most commonly used today is potassium carbonate (K₂CO₃).

Which of these products is most effective? Recent tests conducted in Michigan have shown that potassium carbonate or sodium carbonate solution works best in improving field drying. Other combinations may produce faster drying times in individual tests, but they have not been any more effective overall than potassium carbonate.

How effective are these drying agents? Findings from Maryland, Michigan, and New Hampshire show similar results: drying agents perform best during the second and third cuttings and work least effectively during the first cutting and late autumn cutting (Figure 1). Generally, during the first cutting there is more forage to dry off, soil moisture is higher, air temperatures are lower, and relative humidity is higher than during the second and third cuttings. Desiccants are also not as effective during fall cuttings, probably because of poor drying conditions.

Researchers in Maryland have studied the possibility of increasing the rate of chemical applied to improve the first harvest drying rate. They found that although the recommended rate was 8 pounds per ton for the product tested, 12.75 to 17 pounds of chemical per ton were required to improve drying time.

Do these chemicals work on all hay crops? No. The chemical conditioners work well on legumes such as alfalfa, birdsfoot trefoil, and red clover but are not effective on grasses. In a legume-grass mixture, they appear to work well because the drying rate of the legume becomes about the same as that of the grass. These chemicals do not adversely affect animals, nor do they affect nutrient uptake.

What is the rate of chemical application? Potassium carbonate is mixed at ¼ pound per gallon of water. Quantities vary from about 5.7 to 8.0 pounds per ton of hay. For most harvests, the cost is between $5 and $10 per ton of hay for the chemical, assuming 1985 prices.

Normally, the chemical is applied during the mowing and conditioning stage. Two techniques are commonly used (Figure 2). In the first, a spray boom is mounted ahead of the reel. A push bar lays the crop over to allow better spray contact with the stems. The other method is to mount the spray nozzles behind the reel but in front of the conditioning rollers so that the rollers help distribute the spray.
Sprayer nozzles vary widely, but little difference has been found between flat-fan and hollow-cone nozzles. Pressures of 10 to 20 psi are adequate. Since a salt solution is being sprayed, drift onto machinery can cause mild corrosion, especially on unpainted surfaces.

How much water carrier is required to do a satisfactory job of chemical distribution? Studies have shown that as the amount of applied solution increases, the speed of drying increases. It is advisable to apply 30 to 50 gallons of solution per acre for good coverage of second- and third-cut alfalfa. Work in New Hampshire indicates that 15 to 20 gallons per ton of hay are effective. Attempts to use less water have shown varied results.

A limitation of this technology is the need for large amounts of water. Because refilling tanks and adding chemicals uses up important time that could be spent mowing, hay producers may prefer to use a large tank filled with enough premixed solution to cover the area they intend to cut that day. The tank can be mounted on a truck and equipped with a high-delivery, gasoline-driven pump in order to maintain efficiency. During mixing, the potassium carbonate salt requires sufficient agitation to keep it from settling in the tank. It is best to add the powdered chemical slowly to a half-filled tank under constant agitation. Once the chemical is mixed, agitation is not necessary to keep the salt in solution; however, mild agitation while spraying can help to ensure complete mixing.

What is the future of chemical drying agents? This technology has potential, especially for hay cash-crop producers and farmers who are confined to hay systems as their only means of forage conservation. At this time, these products are an addition to—and not a substitute for—conventional hay-making techniques.

The initial investment in application equipment can be over $1,000, so this is not a product that most can afford to experiment with on a small scale, but some dealers may be willing to demonstrate the product. Try leaving two or three untreated swaths scattered about the field while mowing in order to compare the treated hay and untreated hay. The texture of desiccant-treated forage is different from that of untreated hay of the same moisture content; therefore, it is best to take samples and test for moisture content with a reliable moisture meter or in an oven.

Suggestions for Further Reading


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