

## COMMON QUESTIONS ABOUT HAY MOISTURE

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The great thing about growing forage in the South is that a lot of high quality forage can be grown. Unfortunately, the bad thing about growing forage in the South is that we often have a devil of a time trying to get it dried down for hay. To make matters worse, it will often “feel” dry enough but isn’t (ryegrass is the worst for this). Each year about this time, new horror stories are told during the monthly cattlemen’s meeting, around the sale barns, and in the local farm supply stores. Whether it is heat damaged hay or hay barns that have burned down, these dismal tales are preventable.

### The Ideal Moisture for Baling

To keep hay stable (minimal heating and mold growth), forage should ideally be at 15% moisture or less when making round bales (or 18% or less for square bales). This, of course, is often difficult when curing conditions are poor or the weatherman changes the forecast. This is especially problematic during the spring of the year, because we are just as likely to have cool and overcast conditions as we are to have warm and sunny conditions.

### Measuring Hay Moisture

Unfortunately, there is no easy way to accurately measure hay moisture. The “easy” ways aren’t very accurate, and the “accurate” ways aren’t very easy. Isn’t that the way it always works out?

So what is wrong with the “easy” way, and why is it frequently wrong (sometimes really wrong)? Well, the “easy way” is to use a hay moisture probe or moisture meter. These devices are almost always capacitance-based moisture meters. They are usually handheld devices or probes that are inserted into the forage or (preferably) a bale, and they measure electrical current between two or more metal leads that are in contact with the forage. These devices are highly (and I mean HIGHLY) dependent on maintaining a high density around and between the contacts. It is virtually impossible to get a high enough density in the windrow, in a bucket, or by wadding it up in a ball in your hand. It has to be compressed in some way. Even when it has been baled up, it still may not be tight enough around the leads to make good contact and get a good measurement. As a result, these devices are notoriously inaccurate and incredibly variable. Even when properly calibrated and used according to their manufacturer’s instructions, hay moisture meters will only get you in the ball park (usually +/- 4 percentage points). The only accurate method for estimating bale moisture is to dry the forage down.

A simple and cheap method to dry forage down is the “microwave method.” To do this, you will need a small scale (a cheap food scale will work fine) and a hand-me-down microwave.\* There’s no need to spend much money on these. The combination of a yard-sale and your favorite discount department store will provide just what you need. Even if you had to buy both of them, the total is still likely to be half of what it costs to buy a hay moisture meter. Once the materials are on hand, dry about ¼ lb of the forage in the

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\* Here’s a tip: to keep peace at home, don’t use the microwave in the kitchen. Ask me how I know.

microwave until it reaches a stable weight. It is best to do this in increments of 1-2 minutes, rather than all at one time. It is also important to put a cup of water in the microwave at the same time, as this will prevent the forage from catching on fire. Divide the change in weight (Before – After) by the beginning weight and multiply by 100, and that will give you the percent moisture. Step by step instructions are also available here: <http://commodities.caes.uga.edu/fieldcrops/Forages/pubs/microwavemoisturetest.pdf>.

### **Going through a Sweat**

Unless the forage is extremely dry, micro-organisms (fungi, mainly) can grow. As these organisms grow, they give off heat. Even at the target moisture for hay, the temperature of the bales may increase for the first 2 – 3 weeks after baling. Some call this going through a “sweat” because, during this stage, some moisture is driven off and the forage drops to a stable level of moisture of about 12%. During this phase, bale temperatures often go as high as 120° F. This is perfectly normal.

### **Temperature Ranges of Concern**

If the forage is baled in excess of the target moisture, the bales will heat up substantially more. If the bale temperatures get above 140° F, the sugars begin to caramelize and the protein becomes degraded. The protein can become so damaged that it will be rendered indigestible and, in extreme cases, the animal becomes protein deficient. Interestingly, however, heat damaged hay is often readily consumed by the animal because the caramelized forage is highly palatable.

If the forage gets above 180° F, it may be in danger of spontaneous combustion. If it reaches 200° F, call the fire department but do not move the hay (this introduces air and increases the risk of fire).

If a thermometer is not available, a piece of rebar or steel rod can be driven into the center of 3 or 4 bales. A couple of times each day, go by and grab the metal. If it is too hot to hold onto for very long, it is likely above 140° F or so. If it is really, really hot, call the fire department and do not move the hay.

### **Learn More about Hay Production**

Whether you are new to hay production or an old hand at it, I invite you to attend the 2009 Hay Production School. This is the only program in the Southeast that offers an “A to Z” coverage of commercial hay production. This year’s event will be held on April 21, 2009 in Griffin in the Stuckey Auditorium on the UGA-Griffin Campus. For more information about the program and to register, check out the Hay Production School webpage on the University of Georgia’s forage management webpage ([www.georgiaforages.com](http://www.georgiaforages.com)).

Additional information on making hay is also available on [www.georgiaforages.com](http://www.georgiaforages.com). Of course, if you have questions about this or any other forage management subject, I encourage you to contact your local University of Georgia Cooperative Extension office at 1-800-ASK-UGA1.