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Absorbency of Alternative Livestock Bedding Sources

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Summary and Implications

Many alternative swine production systems rely on bedding as a key component in housing swine. Niche pork market protocols also often require that the pigs are reared in outdoor or bedded housing systems. The objective of this study was to evaluate the absorbency of some new or alternative bedding sources compared with common Iowa agricultural bedding sources. Two shredded or ground lumber bedding sources were evaluated. These sources are made from demolition of buildings. One was lumber only and one had drywall or plaster added (8:1 ratio). Other bedding sources evaluated were cornstalks, recycled newspaper, oat straw, and triticale straw. Average absorbency was high for cornstalks and oat straw, medium for shredded paper and triticale straw, and low for the two shredded lumber products. Cornstalks or oat straw absorbed about three times their weight in water, shredded paper and triticale straw absorbed about twice their weight in water. The shredded lumber sources absorbed about equal their weight in water.

Introduction

As the demand increases for niche-marketed meats, there is an increasing need for research in this area. One niche market that is being examined is pork raised in deep-bedded systems. There is also a call for alternative bedding materials. Farm-produced bedding sources such as cornstalks and various types of straws are commonly used. However, this study looked at other materials to see if they could also be used. The products were tested to see if they were equal substitutes based on their absorbency. A ground lumber product and the ground lumber with drywall product with a ratio of 8:1, lumber to drywall were tested. These products are produced after the demolition of buildings. It is not the same thing as wood shavings. These products were compared with cornstalks, recycled paper, oat straw, and triticale straw.

Materials and Methods

The trials were run at the Iowa State University Ag Engineering and Agronomy Farm, Boone, Iowa. Samples of cornstalks, recycled paper, oat straw, triticale straw, ground lumber, and a ground lumber drywall mixture were collected. The Taylor Recycling Facility of Iowa, LLC, donated the two ground lumber samples. The rest of the samples were collected from various Iowa State University research farms. Once the samples were collected, they were tested for absorbency. The process used was taken from an article found on the Ministry of Agriculture and Food of Ontario, Canada's website. The steps were:

1. Place 1 lb of the bedding material in one leg of pantyhose, weighing both the pantyhose and bedding material.
2. Place the material in a five-gallon pail of water and leave it completely immersed for 24 hours. Make sure that there is enough water so that some free water is left after the 24 hours has ended. Covering the pails cuts down on the chances of water evaporation.
3. Take the bag out of the water and hang it to drain, but only until it has stopped dripping, not so long that the sample has started to dry out.
4. Reweigh the material and calculate the absorbency factor from the following formula:

   Absorbency factor = (weight after soaking – original weight)/original weight

This process was run for five replications of each bedding type. Each sample was soaked in the buckets for 24 hours and then hung to drip for 75 minutes. This was the time that it took for the sample to quit dripping. After each one dripped, the sample was reweighed to calculate the absorbency factor of each of the bedding sources.

Results and Discussion

The absorbency means of the five replications of the six bedding materials are shown in Table 1. The means shown in Table 1 were compared using the Tukey's test for mean separation ($P<0.002$) with SAS. The data collected show some differences in the absorbency of the different bedding materials. There were three pairs of bedding based on absorbency: a top, middle, and bottom pair. The greater the absorbency factor, the more water the material held. Cornstalks and oat straw each held about 3 times their weight of water. The samples of shredded paper and triticale straw each held about 2 times their weight of water and both the ground lumber and ground lumber/drywall mixture held just over 1 times their weight of water.

After knowing the absorbency, these different bedding materials can be placed in a usage schedule. With the higher absorbency of cornstalks and oat straw, these would be used if you were producing corn then harvested the stalks to use as bedding. The shredded paper would be an option if you were close to a recycling center that had an abundance of this product on supply. The lumber products could be used if there was a shortage of cornstalks or straw or to stretch the current supply of bedding materials. They also might make a good base for a bedding pack, because of their durable structure when wet. The lumber products absorb just

like the others, it just takes more bedding to absorb the same amount of water.

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Table 1. Mean absorbencies of six bedding types.

Materials	Mean absorbency factor
Cornstalks	2.70[a]
Shredded paper	2.08[b]
Triticale straw	1.97[b]
Oat straw	2.86[a]
Shredded lumber	1.15[c]
Shredded lumber plus (lumber/drywall, 8:1)	1.21[c]

Means with different superscripts differ (P<.002).