

Controlling Ammonia in Horse Stalls

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One of the irritating compounds that can accumulate inside a horse barn is ammonia (NH₃). High concentrations of ammonia in the air can irritate the mucous membranes of the eyes, nose, and mouth and possibly increase the susceptibility of animals to respiratory infections. In animal buildings aerial ammonia arises from urine and feces, so ammonia concentrations are usually highest near the floor.

Researchers at the University of Kentucky have examined the usefulness of an ammonia-absorbing compound applied to floors to control ammonia concentrations in horse stalls (Pratt et al, 2000, J. Eq. Vet. Sci. 20:197.) A commercially available ammonia-absorbing product (Sweet PDZ, Steelhead Minerals Inc.) designed for daily application to stall floors was tested in a four-stall barn containing mature Thoroughbred geldings. The dirt-floored stalls were cleaned every morning and bedded with straw.

All stalls were tested in the control condition (no ammonia-absorbing compound applied) and in the treated condition (ammonia-absorbing compound applied after cleaning in the morning). The researchers measured aerial ammonia concentrations expressed as parts per million (ppm) in two locations: near the horses' heads with a device attached to their halters, and near the floor in the morning before the stalls were cleaned.

The ammonia-absorbing compound did not completely eliminate ammonia from the air in the stalls. However, stalls treated with the ammonia-absorbing compound had lower ammonia concentrations near the head and near the floor than the untreated stalls. At the end of two weeks, ammonia concentrations near the floor were about 25% lower than in the untreated stalls.

The researchers suggested the extent of the reduction in aerial ammonia might have been greater if measurements had been taken closer to the time of application instead of the morning after application. For example, when ammonia concentrations above three urine spots were measured before and 15 minutes following application of the ammonia-absorbing compound, ammonia concentrations were reduced by 60% or greater.

In addition to evaluating the effect of the ammonia-absorbing compound, the researchers in this study also documented changes in aerial ammonia concentration over the two weeks the geldings were kept in the barn. Ammonia concentrations remained relatively low during the first few days horses occupied the stalls, but then they increased rapidly, particularly near the floor. In the untreated stalls ammonia concentrations near the floor exceeded 200 ppm after seven days, even though the stalls were cleaned daily. The level of aerial ammonia that is unhealthy for horses is not known, however levels of 200 ppm ammonia are higher than those found to produce negative effects in other animals.

In this study ammonia concentrations measured near the halter remained relatively low in both treatment groups. Thus, it seems likely these normal adult horses were not exposed to a high level of ammonia. However, for foals or sick adult horses that spend significant amounts of time lying down, high ammonia levels near the floor might present a respiratory challenge.

Application of an ammonia-absorbing compound to stall floors might reduce the ammonia exposure and possibly enhance well-being.