



21 March 2016
Paul Cross
GreenScene Agritek

Dear Paul,

Per our discussion of 18 March 2016, I wanted to provide a supporting opinion related to the fate of dimethyl sulfoxide (DMSO) introduced into GreenScene's cleaning process. Our understanding is that your company uses the following measures to clean bedding materials used in horse stables.

- *Steam treatment at 700°F*: This is well above the boiling point of DMSO (372°F, 189C). As such, any DMSO on the bedding material would be lost to volatilization and collected elsewhere in the steam condensate. At this temperature some decomposition of DMSO might additional occur. The typical DMSO decomposition products are more volatile than DMSO itself, and would also evaporate.
- *Water washing*: DMSO is readily soluble in water and may be effectively removed by water washing.

The basis of this request is the concern that some horses - which had not been intentionally treated to DMSO - would be unintentionally exposed through contact with cleaned bedding material. This seems quite unlikely for several reasons:

- The treatment methods described above would seem entirely adequate to remove any residual DMSO present on fouled bedding, prior to cleaning.
- The amount of DMSO in the fouled bedding would likely be negligible. Presumably the source of DMSO contamination would be the urine / excrement of the horse. The amount present is limited by a) the actual amount used to treat the horse b) the unmetabolized portion of the dose and c) the extent to which the bedding is fouled.
- Even in the unlikely event that residual DMSO would survive the cleaning process and was present in a meaningful amount, atmospheric water would interact strongly with DMSO to minimize its dermal penetration potential. It has been well documented that –while anhydrous DMSO has the ability to penetrate the skin of mammals- hydrated DMSO mixtures lose this capability.

If I can clarify the above, please feel free to contact me.

Artie McKim.

A handwritten signature in blue ink that reads 'a. s. mckim'.

Artie S. McKim PhD MBA
Quality Manager
Gaylord Chemical Company LLC
+1.205.561.5043
amckim@gaylordchem.com



1880 Fairlawn Road • Tuscaloosa, AL 35401
☎(205) 561-5044 • Order Desk: (800) 426-6620