

## Natural Corn Stover Based Animal Bedding or Kitty Litter that Absorbs Ammonia

A variety of conditions cause nuisance ammonia gas, but there are currently no cost effective solutions to remove it from the air. Various hydrochars from agricultural residues and fermentation residues are effective, but they can be expensive and may cause safety and environmental issues.

### Description of the Invention

A novel corn stover-based hydrochar material shows superior ammonia sorption ability under ambient temperature and pressure. The hydrochar, which shows promise as a unique and effective low cost ammonia sorbent, is produced from corn stover and corn oils in distiller grain (or any other vegetable oil source) using hydrothermal carbonization (HTC). The technology offers a novel way of using condensed distillers solubles (CDS), a byproduct of corn ethanol fermentation, and corn stover to produce a char with a much higher capacity to absorb ammonia in the gas phase than hydrochar obtained from agricultural residues. The hydrochar has a variety of potential applications: for example, horse bedding/horse barns, kitty litter, agricultural farming, industrial systems, wastewater treatment facilities, playgrounds, stadiums and residential lawns.

### Features and Benefits

- Absorbs ammonia in the gas phase at ambient temperature and pressure
- Manufactured using a standard hydrothermal carbonization (HTC) process
- Increases value of low value condensed distillers solubles (CDS)
- Low cost adsorbent (made from inexpensive and widely available agricultural residues)
- Does not require strong nitric acid or high temperatures to activate the hydrochar
- Remediate ammonia generation in horse barns and in other applications such as cat litter
- Could be used to make a dual purpose agricultural mulch that adds both organic materials and ammonia nitrogen to soils

### Potential Applications

- Dual use: Ammonia capture from animal waste and then disposed of as ammonia nitrogen source for agricultural use
- Slow release nitrogen fertilizer
- Horse bedding and kitty litter
- Additive to agricultural fields to reduce gaseous ammonia in the atmosphere
- Prevention of ammonia being released in non-agricultural settings (e.g., kitty litter)
- Industrial systems and wastewater treatment facilities
- Residential applications
- Playgrounds and stadiums



### Technology Status

Prototype.

### IP Status

Patent Pending

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### Case Reference

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