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# High Ammonia Absorbing Corn Stover Hydrochar for use in Horse Bedding

Technology No. 20180070

**IP Status:** Pending US Patent; **Application #:** 16/388,112

## Ammonia Absorption in the Gas Phase

A corn stover-based hydrochar material shows superior ammonia sorption ability under ambient temperature and pressure. The hydrochar is produced by processing corn stover and vegetable oil using hydrothermal carbonization. The resulting product is expected to remediate ammonia generation in horse barns and could therefore have valuable applications as horse bedding. The technology also has potential applications in agricultural farming, industrial systems and waste water treatment facilities as well as applications in playgrounds, stadiums and residential lawns.

### MN-IP Try and Buy

**Try**

- Trial period is up to 6 months
- Trial fee is $5,000 for six months
- Trial fee is waived for MN companies or if sponsoring $50,000+ research with the University
- No US patent expenses during trial period

**Buy**

- $25,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first $1M in sales

# Effective, Low Cost Ammonia Absorbent

A variety of conditions cause nuisance ammonia gas, but there are currently no cost effective solutions to remove it from the air. And while various hydrochars from agricultural residues and fermentation residues are effective, they can be expensive and may require severe treatments, increasing safety and environmental issues. This hydrochar, produced from corn stover and corn oils in distiller grain (or any other vegetable oil source), shows promise as a unique and effective low cost ammonia sorbent. The technology uses condensed distillers solubles, 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.

**BENEFITS AND FEATURES:**

- Absorbs ammonia in the gas phase at ambient temperature and pressure
- Manufactured using a standard hydrothermal carbonization process
- Increases value of low value condensed distillers solubles
- Low cost sorbent (made from inexpensive and widely available agricultural residues)
- Does not require strong nitric acid or high temperatures to activate the hydrochar
- Remediates 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

**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

**Phase of Development** - Prototype development

**Researchers**

Ken Valentas, PhD
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External Link (www.bti.umn.edu)

**Interested in Licensing?**

The University relies on industry partners to scale up technologies to large enough production capacity for commercial purposes. The license is available for this technology and would be for the sale, manufacture or use of products claimed by the issued patents. Please contact us to share your business needs and technical interest in this technology and if you are interested in licensing the technology for further research and development.

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