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Environmental Science 210  
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Introduction & Methods  
  
**Introduction**  
Biomass-based fuels, which involve burning biomass for energy, have been used throughout history, only relatively recently being supplanted by fossil fuels (Searchinger and Smith 2012). Due to the risks caused by burning fossil fuels, including greenhouse gas emissions and fossil fuel depletion, biofuels there is now significant renewed interest in biofuels and bioenergy. A number of different fuels and feedstocks are under consideration, including microalgae (Greenwell et al 2009), corn, grain, and sugarcane for fermentation into ethanol (Börjesson 2009, Lin and Tanaka 2005), and biodiesel derived from lipids (Greenwell et al 2009). One such feedstock currently under consideration is switchgrass, which may be burned as pelletized biomass or fermented to cellulosic ethanol (Palmer and Downing 2006).

Switchgrass (*Panicum virgatum*) is a promising feedstock for a number of reasons, including effectiveness in carbon sequestration (McLaughlin and Kszos 2005) and the ability to be grown on poor soils.  Companies such as Ernst Biomass LLC in Meadville, Pennsylvania have begun producing pelletized switchgrass, eventually intended to be used as a fuel source (Ernst). However, this product has yet to be sold as an energy product for home heating or electrical generation. Rather, the pelletized switchgrass is currently marketed as an absorbent product for industrial use. This deployment of switchgrass pellets allows for the product to be produced and brought to market while its uses as a fuel source continue to be investigated.

A major purchaser of pelletized switchgrass is the hydraulic fracturing industry. Absorbents are very important to natural gas drilling companies, because process of hydraulic fracturing creates a great deal of liquid waste, called cutting fluids, that cannot be easily disposed of. These spills must be cleaned One route for the disposal of this waste involves allowing the cutting fluids to be absorbed by solid absorbants before disposal at landfills. While a number of different absorbent products have been used, many drilling companies are purchasing palletized biomass products, such as wood pellets and switchgrass pellets. In order to use these products effectively and efficiently, it is necessary to understand its properties as an absorbent. Previous studies have already investigated the use of switchgrass as an absorbent, determining that it is effective compared to other biologically-derived renewable absorbents. The objective of this study was to determine the saturation point and absorption curves for switchgrass pellets, and to compare the absorption rates of switchgrass pellets to those of other renewable absorbents, in order to determine how these absorbent products can best be deployed in an industrial setting.

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