

AgSTAR Focus



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Thank you for being a subscriber to AgSTAR's listserv. AgSTAR Focus is a new, technology-centric listserv resource to assist in the safe, efficient, and economical operation of anaerobic digestion (AD)/biogas recovery systems. The previous AgSTAR Focus discussed maintaining your AD system, and our upcoming edition of AgSTAR Focus will cover project financing. Visit our website for a full listing of this year's [AgSTAR Focus editions](#).

Digestate and Its Nutrients

As the summer growing season continues, we wanted to highlight the nutrient benefits of AD. Digestate, the solid and liquid effluent remaining after being processed in the AD system, can be a source of revenue or cost savings and increase the financial and environmental benefit of an



AD/biogas system. The amount, quality, and nature of digestate products will depend on feedstock quality, digestion method, and the extent of post-treatment refinement. Digestate can be used in many beneficial applications, including:

- **Crop Fertilizer:** The simplest use of digestate is land application, where it serves as a source of plant nutrients for crop production. Using digestate as fertilizer can increase crop productivity and yield because digestion increases the availability of nitrogen in manure (as compared to undigested manure). In some cases, fertilizer produced from digestate can be certified as an organic

product, which can have a high economic value in the organic product industry.

- **Soil Amendment:** Solids separated from digestate can be composted with other organic materials to produce a soil amendment or potting soil for horticultural use.

- **Horticulture Products:** Manure fibers can be used to produce marketable products such as planter pots. Freund Farms, for example, exports excess nutrients from their farm in the form of "[CowPots](#)," which replace non-renewable plastic or peat planting containers.



- **Nutrient Recovery:** Liquid effluent may be further processed using advanced nutrient capture technologies such as membrane separation, ultrafiltration, ion exchange, evaporation, or reverse osmosis to produce concentrated fertilizer products that can be sold.
- **Nutrient Reduction Credits:** In some cases, particularly in watersheds where nutrients are already saturated, maximum removal of nutrients from the effluent to be land-applied is desired, and liquid effluent may be processed using advanced nutrient capture technologies. These projects may generate nutrient offset credits, which may be sold in water quality trading markets where available.

Best Practices

Before deciding if nutrient recovery should be a component of your AD project, the rules and regulations related to the application of nutrients to soil are important to consider. AgSTAR Partner, the Sustainable Phosphorus Alliance, has a manure and

biosolids "[GIS-P](#)" tool that includes a centralized database for state regulations on the land application of biosolids and manure. For more information on the tool, visit the [Sustainable Phosphorus Alliance website](#).

At the federal level, the [Food and Drug Administration's Food Safety Modernization Act Produce Safety Rule](#) limits the use of raw manure on crops produced for direct human consumption. While digestate is not specifically described in the Act, the [microbial standards it sets](#) for biological soil amendments should be considered when used on crops destined for human consumption.

Other considerations to bear in mind when evaluating the best digestate use for your system include:

- Land required for applying recovered nutrients at agronomic rates;
- Co-digestion feedstock impact on the Comprehensive Nutrient Management Plan;
- Expense of digestate handling and conversion equipment;
- Cost savings from on-site digestate use;
- Revenue potential from digestate product sale;
- Partners (e.g., who will buy products, how will products be distributed); and
- Time needed to develop and manage new value-added products.

Visit the [AgSTAR website](#) for additional resources to learn how to make the most out of your digestate. Section 5.2 of [AgSTAR's Project Development Handbook](#) discusses digestate and its uses in further detail.

Disclaimer: AgSTAR Focus provides technical information, processes, and concepts to better inform the development and operation of anaerobic digestion/biogas systems. This resource may not address all information, factors, applicable regulations, or considerations that may be relevant or required for anaerobic digestion/biogas

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