

Capitalize on Class A

Which of these five trending biosolids techniques should be your next investment?

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While Class B biosolids products always have their place in agriculture and land reclamation, the production and end-use of Class A products in other applications is trending upward — with good reason. The effort and cost invested to produce Class A biosolids products typically creates a more versatile product, meaning it has applications beyond farmland.

But, not all Class A technologies are the same. For example, Class A biosolids treated through a thermal hydrolysis process (THP), thermochemical hydrolysis, and alkaline stabilization, may still require additional processing to improve their versatility and value.

Producing a Class A biosolids product that possesses the characteristics required for a specific application, or end user group, is key to the success of any biosolids management and marketing program. Another key is ensuring the appropriate amount of sales and marketing activity; otherwise, your versatile Class A product might pile up at your facility.

Invest in Marketing

The saying, “Build a better mousetrap, and the world will beat a path to your door,” typically does not apply to biosolids products. I have researched the marketplace success and failure of certain biosolids-based products, and one fact seems very clear: Most facilities fail when they do not invest resources — time, effort, money — into market development. Bringing a biosolids-based product to the market, must be done in a pragmatic way. Enough effort must be expended to create momentum, educate the marketplace, and manage any negative stigma. The sidebar on p. 51 reviews some key marketing advice.

Choose Carefully

Deciding which Class A product(s) to create involves a detailed study, and the decision hinges on several factors. Chief among them is the construction and operations and maintenance (O&M) costs of the technology or processing method you plan to use.

While some secondary processing methods, are patented, others are not. Dryers and granulators, for example, are patented, but soil blending is not.



Yet other processing methods and technologies have both patented and unpatented systems available. Composting, for examples, offers both. When considering what product to manufacture, factors outside of the cost of production also must be taken into consideration:

- Can the product consistently meet Class A criteria?
- Does the product meet end-user quality requirements?
- Does it meet the soil requirements of the region?
- Has there been a similar product marketed in the region?
- What is the realistic product value?
- Can it be sold to generate revenue?
- Will end users pay for transportation?
- Can it be marketed locally and regionally?
- Do you understand the consumptive capacity for the product regionally?
- Will the product allow for versatile usage, on or off agricultural land?
- Can the product be manufactured at the water resource recovery facility?
- Will it be easier to market compared to what you are doing now?
- Will state regulators treat it like a true Class A product, which will allow for easier distribution?

The versatility of the finished product is another key; it is one reason composting biosolids has become popular. Although composting takes a relatively large footprint, as well as the addition of a bulking agent, the finished product is probably the most versatile of any Class A product. It is popular in agriculture, horticulture, landscaping, and turf management industries, as well as the retail sector.

As you evaluate your product's viability, here are options, management techniques, and trends

Class A biosolids products are versatile and applications can extend beyond farmland.

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to consider. Remember, usually, the greater the investment in Class A product manufacturing, yields the most versatile product.

Land Application and Reclamation

I am confident that agricultural demand will grow for land-applied Class A biosolids created through thermochemical hydrolysis, which creates a higher total solids liquid, and THP, which creates a somewhat more stable dewatered cake. As greater amounts of Class A biosolids become available to agriculture, the biosolids sector should aggressively engage with the agricultural community; this includes re-engaging with those who were negative in the past. The expansion of and education around sustainable agriculture in your region also could help biosolids distribution efforts.

For example, take products treated through alkaline stabilization. If the local soil requires lime, then lime-stabilized solids could be a farmer's go-to product because the product's pH adjusting characteristics. Lime addition to farmland can be expensive, so adding a biosolids product already containing lime would be attractive.

However, in a market where land does not require the addition of lime, markets for an alkaline-stabilized Class A product could be more limited. If you are looking to produce this type of Class A biosolid product, then marketing it for mine land reclamation should be considered. The use of these products on mined land and other reclamation sites can still benefit society.

Some companies developing these Class A technologies have been evaluating specific secondary

processing techniques to enhance the versatility of the products. For THP-treated biosolids, for example, companies are experimenting with partial drying or curing of the biosolids cake to change its appearance and improve its handling.

Composting

Properly manufactured compost is extremely versatile. It can be used in landscaping, nursery production, turf management, soil blending, retail sales, agricultural production, and land reclamation. The typical makeup of compost is one part dewatered biosolids blended with two to three parts wood chips or other carbonaceous materials. The addition of the woody material provides carbon to the microbes, absorbs excess moisture, and provides structure to the mass to assist in oxygenating. Thermophilic temperatures are generated for an extended period, during the 60 to 120 days of the composting process. During this time, degradation of the carbon occurs, creating a more biologically stable product. At the same time, ammonia-nitrogen converts into a more slowly releasing (organic) form of nitrogen.

High-quality compost possesses stabilized carbon and a low to moderate amount of ammonia-nitrogen (90% or more of the nitrogen should be in organic form). It is helpful if it possesses a pH below 7.5 without lime added and an electrical conductivity below 5 ds/m. Buyers prefer a finely screened products, under 10 mm, possessing an earthy scent.

An important benefit of composting includes the manufacture of a highly versatile product with established markets. Some drawbacks include a significant land requirement for the composting itself and the addition of carbon, which can be a significant O&M cost and increases the overall volume of the product to be marketed.

Drying and Granulation

It has taken thermal treatment decades to become a mainstream biosolids management technique. These systems dry biosolids to 90% total solid (TS) or greater. Some technologies primarily dry the biosolids for landfilling, land application, and/or burning as a fuel. However, other technologies dry and granulate it to generate a marketable fertilizer or fertilizer component.

U.S. fertilizer blends require a very dry (95% TS and above), hard, and somewhat uniform granule for fertilizer blending. The preferred size of the granule varies by buyer and market. The type of thermal treatment technology you choose greatly affects how and by whom the product can be used. If your company establishes drying and granulation programs, it must have a clear vision of the available markets. Further, you must be realistic about the product's value and marketability.

Buyers prefer products that possess a total nitrogen content of 5% or greater and a low odor potential. Some thermal treatment technologies can incorporate other fertilizer ingredients into the biosolids, using the biosolids as a carrier, or ingredient, to produce higher analysis fertilizer product. This product enhancement will open new markets from biosolids-based fertilizers.

Some benefits of thermal treatment include reduction in overall volume. This can be helpful when the product is being shipped from the production site to the end user and enables manufacturing within a smaller footprint. Some negatives include relatively high energy requirements and tricky storage (some products can reheat in storage and combust).

Soil Blending

Back in 1992, the City of Tacoma, Wash., started the Tacoma Grow, or TAGRO, program. The city used its Class A biosolids as a component of blended landscape soils, along with sand and bark/wood products. Today, Tacoma produces several blended soil products and primarily markets them to the lawn and garden industry (both residential and commercial).

Despite Tacoma's early adoption, the use of dewatered Class A biosolids as an ingredient to blended landscape soils is a newer biosolids management technique, which is picking up momentum along with the installation of THP systems. Soil blending enables a Class A biosolids generator to create horticultural products to diversify into markets outside of agriculture with a limited construction investment.

The process blends Class A dewatered biosolids and native soil, and/or various other ingredients, such as sawdust, bark, and sand. The blending process typically is done using commercial soil blending and screening equipment. The management technique is not patented, and construction investments are much lower than other management techniques that also produce nonagricultural products. Consider, however, this technique requires more effort for product development. In these soil mixes, biosolids typically constitutes 25% to 33% of the soil mix (by volume) and can even be lower. Therefore, this management technique creates greater volumes of product to be distributed. However, the finished product can be sold, to help recoup all or most of the input costs. Your access to lower cost and good quality materials to blend with the Class A biosolids is paramount in this technique. There are no established standards for these types of products yet; however, the goal is typically to meet established standards for manufactured landscape soils.

It also should be noted that a dewatered Class A biosolids product could be partially dried to improve its handling (blending and transportation). Further, product development research continues on the curing or aging of dewatered THP biosolids to better allow its use as a versatile soil amendment. This product has potential applications in horticulture and agriculture.

Some benefits to soil blending include the manufacture of a nonagricultural product with established markets and lower facility construction costs. Some negatives include a need for product development research and the identification of appropriate ingredients for use in product manufacturing. Further, there is much still to be learned about biosolids soil blending product development and end use.

Pyrolysis and Gasification

The concept of treating biosolids through pyrolysis or gasification is perhaps the newest biosolids management technique. The process thermally decomposes carbon-based materials at varied high temperatures and residence times. This happens in a low- or no-oxygen environment. The process yields biochar as a product, as well as, in certain conditions, energy products such as syngas.

Biochar is a carbon-rich solid material similar to ash (on the low end) and activated carbon (on the high end of the spectrum). The product has applications in agricultural and horticulture as it possesses great stability in the soil and enhances soil cation exchange and carbon sequestration. Aside from being a soil conditioner, biochar also has industrial applications.

Most biochars on the market today are derived from plant-based materials, and they are much different in carbon and nutrient content than biosolids biochars. Biochar standards are still being developed, and a great deal of research is necessary

to create mainstream and expanded markets for biochar. Some benefits of pyrolysis or gasification — similar to drying and granulation — include a reduction in the overall volume of product to be shipped, as well as manufacturing with a smaller footprint. The primary negatives are a lack of established markets (and standards) and limited water sector experience creating the product.

Additional Considerations

As you invest in creating versatile biosolid-based products, you must store them properly to ensure their quality and consistency. Storage requirements vary based on the product type. Dried and granulated biosolids products, for example, often are stored in silos, but compost often is stored on impervious pads, uncovered.

As your finances allow, it is recommended that covered storage be used for such products as compost and blended soils. Keeping these products dry can greatly benefit the overall quality of the product and reduce shipping costs. Further, managing moisture content allows for more efficient screening. Remember, understanding the seasonality of markets for your product will help you determine how much storage will be required. Finally, build strong markets that enable you to cycle products out into the market annually. For the biosolids industry to succeed, it helps to shift your paradigm: You are a product manufacturer, not a waste manager. ↘

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Market Development Basics

- **Quality is key.** Regardless of the type of product you produce, make sure it is "fit for purpose."
- **Understand your product.** Be committed to understand how best to use your product.
- **Invest in product development, sales, and marketing.** Be smart about your spending, but understand that you must invest resources to be successful.
- **Sales is education.** Interaction with the marketplace must be done to educate buyers about your product. This is the building block of sales.
- **Understand the market.** Make an effort to understand how and why your product would be used, and understand the needs of the buyer.
- **Marketing and sales are different activities.** Where marketing creates opportunity, sales captures it.
- **Consider branding.** Having a memorable product name and identity helps to generating customer loyalty.
- **Differentiate yourself from others.** Be different from your competitors, and be better. In biosolids product sales, this often means offering technical product sales and usage assistance.