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Liquid and Dried Plant Food Analysis & Benefits

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Liquid Plant Food – as it exits the digester (un-modified)

Liquid un-modified digestate has four beneficial qualities: soil carbon, nutrients, water, and live beneficial microbes. It can be used un-modified. We have even better results by adding biochar and water at 1:1 by volume. This makes the digestate more pleasant to handle (less agricultural odor) and less mineral concentration for the soil and plant root zone.

Raw untreated digestate characterization

		2018	2018	2017	2017	2017	
		IS	SCH	BA	FR	AU	AVG
Solids	percent	1.0%	1.1%	3.8%	1.4%	2.3%	1.9%
Water	percent	99.0%	98.9%	96.2%	98.6%	97.7%	98.1%
pH		8.1	7.9	7.7	8.3	7.7	7.9
Salts	E.C.	16.8	12.0	25.3	21.0	22.5	19.5
Density	lbs/gal	8.39	8.51				8.5
C:N ratio		2.1	3.0	10.0	2.5	5.1	4.5
Sodium	mg/kg/day	17.9%	13.5%	9.2%	23.5%	15.1%	15.8%
Total Nitrogen	percent dry	20.3%	11.2%	4.2%	14.1%	6.3%	11.2%
Total Phosphorus	percent dry	1.3%	1.5%	0.5%	0.9%	0.6%	1.0%
Total Potassium	percent dry	10.8%	9.9%	2.0%	6.6%	2.2%	6.3%
Total Carbon	percent dry	42.0%	33.1%	41.9%	34.5%	32.2%	36.8%
Total Sulfur	percent dry	0.7%	0.6%	0.2%	0.4%	0.3%	0.4%
Ammonia Nitrogen	mg/kg dry	136,900	59,000	31,310	102,813	43,340	74,673
Nitrate Nitrogen	mg/kg/day	900	818	106	355	131	462
Iron	mg/kg dry	1,700	5,909	12,292	1,179	1,995	4,615
Total Nitrogen	percent wet	0.20%	0.12%	0.16%	0.20%	0.14%	0.17%
Total Phosphorus	percent wet	0.01%	0.02%	0.02%	0.01%	0.01%	0.01%
Total Potassium	percent wet	0.11%	0.11%	0.08%	0.09%	0.05%	0.09%
Total Carbon	percent wet	0.42%	0.36%	1.59%	0.49%	0.74%	0.72%
Total Sulfur	percent wet	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Ammonia Nitrogen	mg/kg wet	1369	649	1,186	1,447	991	1,128
Nitrate Nitrogen	mg/kg wet	9	9	4	5	3	6
Iron	mg/kg wet	17	65	47	17	46	38

Dried Plant Food

Dried digestate (Avg 11-1-6 NPK dry basis) can be used as a dry product at 100% content, or it can be blended into a balanced organic fertilizer to further add value/fertility. We have been successfully marketing “mix 5” in Seattle.

Mix 5	N	P	K	Ingredients
	5	4	1	brew dew/bone meal/feather meal/biochar/frass

Benefits

1. Production of continuous, onsite, renewable energy. The energy can be stored at night and used during the day if necessary. It does not depend upon sunlight or wind for production.
2. Elimination of foodwaste dumpsters with the associated odor, birds, flies, rodents, insects, and leakage that commercial foodwaste can produce.
3. Elimination of the hauling, fuel use, and traffic impacts associated with trucking waste from the city to a distant processing facility. This reduces urban traffic congestion as well as truck exhaust emissions.
4. Conversion of the organic materials into valuable plant food, compost, and fertilizer. This can be returned to the soil to improve the sustainability of local gardening.
5. New employment of people in the conversion of waste to bioenergy, commercial products, and the local food supply chain industry.
6. Collaboration with local educational curriculums such as culinary arts, horticulture, sustainable agriculture, viticulture and wine technology, engineering, environmental science, business, biology, and education.
7. Achieving significant diversion of waste from disposal, moving the city closer to zerowaste goals.
8. Improving the local soil-water-air ecosystem by returning carbon to the soil and displacing the need for chemical fertilizers, pesticides, and herbicides.
9. Improving the opportunities for farm-to-table food production and healthy food networks which will improve the well-being of its communities.

Beneficial Uses of Digested Food Waste

There are a number of market pathways for digestate. Some of them are complimentary to compost and mulch sales. The list below shows a few that can and should be considered:

1. Liquid fertilizers or soil amendments
2. Dried organic fertilizers
3. Dried and pelleted organic fertilizers
4. Dried and pelleted fuel
5. Constructed wetlands, forests, bogs, and other high-carbon soil banking projects
6. Constructed pasture and cropland
7. Constructed high organic matter crop land
8. Integrated farming systems in greenhouses and vertical farms
9. Hydroponic farming systems

Some of these produce heat and some require heat. Several of these systems can be combined to make a more robust and sustainable system. Employment opportunities are associated with all these pathways. These examples illustrate how diverse the options are for recycled product marketing. When combined with composting and gasification the list can also include these pathways:

10. Gasified biochar and charcoal products
11. Prepared (shredded and screened) and dried wood fuel
12. Integrated surface water treatment systems and living roofs
13. Non-traditional systems like vermiculture, aquaculture, black soldier fly cultivation