UF UNIVERSITY of FLORIDA
IFAS
Soil and Water Science

BIOENERGY AND SUSTAINABLE TECHNOLOGY LABORATORY

COMPOSTING & VERMICOMPOSTING

An alternative waste management

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Why composting?

- Amount of wastes are generated every day
- Concerns relating to land degradation(soil health, soil biodiversity, soil fertility)
- Mismanagement of waste in developing countries
- Composting is a friendly way to reduce the amount of wastes for landfills

What is composting?

- Biological process of decomposition of organic matter by microorganisms under controlled conditions.
- Organic materials are converted into humus, a rich nutrient material
- Sanitized and stabilized for safe application to the soil
- Compost contains plant nutrient s but not characterized as a fertilizer

What is composting?

Benefits of composting

- Increases microbial activity
- Improves the soil structure, porosity and density
- Improves water holding capacity
- Contributes to carbon sequestration
- Supplies a variety of macro and micronutrients
- Recycles plant nutrients

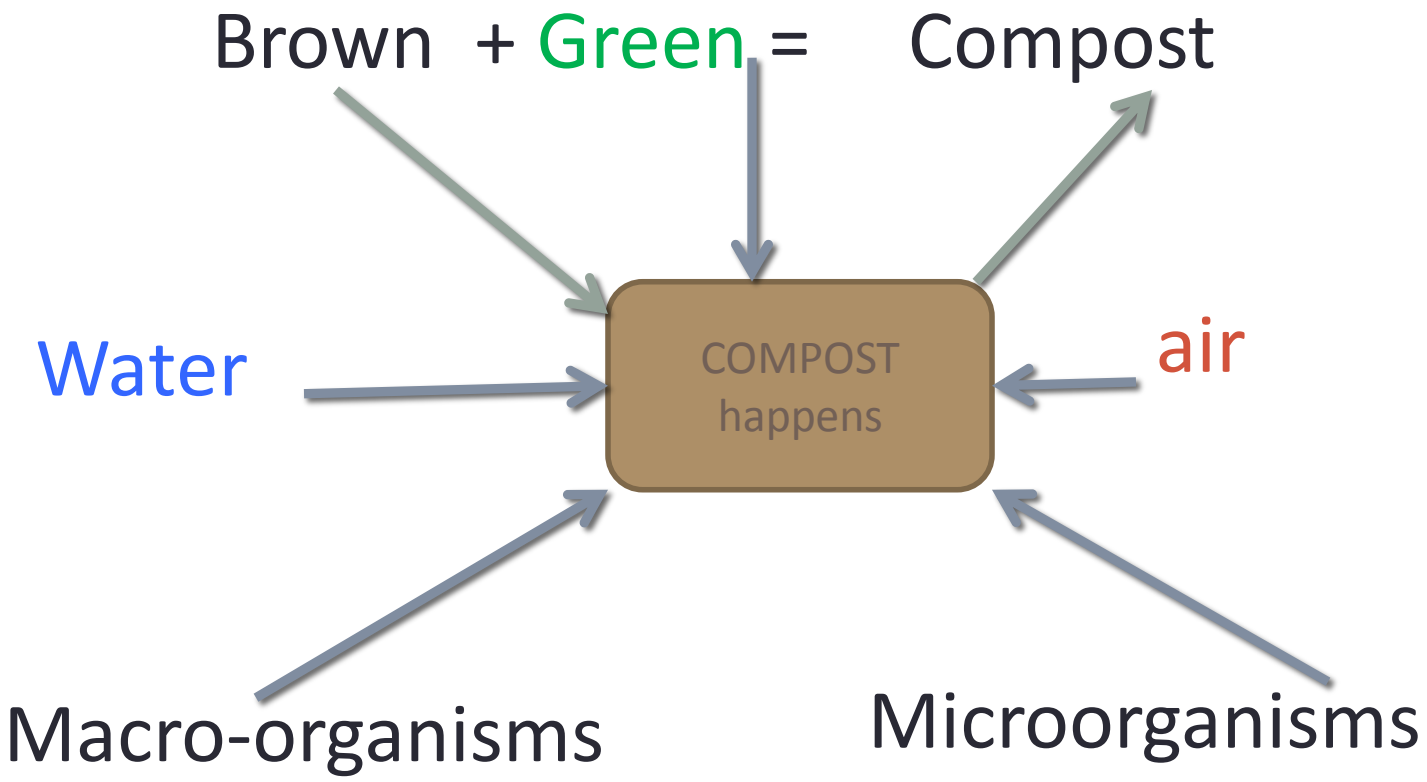
- Healthy soil means there is less need for water, chemical fertilizer, pesticides

What can be composted

- Organic portion of landfilled wastes (food, sludge, etc.)
- Agricultural wastes (Plant or animal)
- Industrial manufacturing byproducts
- Sea food processing wastes

All That ‘s biodegradable

How does compost work?



Occurs Naturally but accelerated by controlling essential elements

How to make compost

- Keep in mind that composting is a dynamic biological process made up by microorganisms

- A perfect environment must to be maintained for the explosion of microbial populations involved in the decomposition process

Perfect environment means Water, oxygen, Nutrients, pH, non-toxic

Conditions for good composting operation

- Carbon/ Nitrogen ration (C/N : 20/1 to 35/1)
- Carbon/Phosphorus ration (C/P : 100/1 to 150/1)
- Moisture content (50% to 60%)
- Particle size(¼'' to ¾'')
- Porosity (35% to 50%)
- pH (6.5 to 8.0)
- Oxygen concentration
- Temperature (130 ^{o}F to 150 ^{o}F)

Characteristic of some feedstock

Feedstock	C/N	Moisture content
Food waste	14-16:1	70%
Refuse/trash	30-80;1	
Sewage sludge	5-16:1	72-84%
Corrugated cardboard	563:1	8%
Telephone books	772:1	
News prints		3- 8%

Types of composters

Typical Compost Characteristics

Parameter	Typical Range	Importance
pH	5.0 –8.5	Optimum plant health
Soluble Salts	1 – 10 dS (mmhos/cm)	Phytotoxicity
Nutrients	N (0.5-2.5%), P (0.2-2.0%), K (0.3-1.5%)	Plant Vitality Need for fertilizers
Water Holdng Capacity	75 - 200% dry weight basis	Irrigation requirements
Bulk Density	700 - 1200 lbs/yd^3	Handling/Transportation
Moisture Content	30 – 60%	Handling/Transportation
Organic Matter	30 –70%	Application Rates
Particle Size	< 1” screen size	Porosity
Trace Elements	40CFR503 Regs	Toxicity
Stability	Stable – Highly Stable	Phytotoxicity

Troubleshooting

No /slow decomposition	Causes: too brown or dry, needs turning
Low temperature	Causes too dry or brown, needs turning, adds water
High temperature	Causes, too green, two much heat trapped, adds water
Bad smell	Causes, too wet or green, needs turning, stops adding new feedstock
Pests	Causes , unwanted materials, easy access

Vermicomposting

What is vermicomposting?

- Use earthworms for composting organic materials
- Worms breakdown organic matter and leave behind castings, a Valuable type of fertilizers
- Nutrient value : 6600 ppm organic nitrogen, 1300 ppm phosphorus and 1000 ppm potassium

Vermicomposting = Worms + bedding

Why vermicomposting?

- Deal with any kind of food waste
- Make a good and rich compost
- Fun
- Required small space
- Worms eat ½ to all their weight per day
- Increase their population in a short period of time

Vermicomposting with which worm?

- Over 7,000 varieties of earthworms can be found in a good soil but only a few species are suitable for Vermicomposting

- Red worms Eisenia foetida is the most common used

How vermicomposting works?

- Keep in mind that earthworms are taken out of their natural environment, appropriate management is necessary to ensure their health and survival

- Also, worms don’t have teeth, they depend on other organisms to predigest their wood

- Make them happy by providing them good environment

How vermicomposting works?

- Preparing your worms 'arrival
- Bedding: a generous bedding layer a least 10cm depth is required. Worm will die if they dry out
- Getting your worms. Use only compost worms. Don’t dig worms out of the soil of your gardens
- Start your wormery

Feeding your worms?

- Worms can eat about half their own weight in food each day
- What they eat ?
- Vegetable waste : Any kind of waste generated during food preparation can be used
- Coffee grounds, tea leaves, tea bags, banana spill, and coffee filters are suitable
- Egg shells can also be used

What to feed worms?

Office wastes

News papers

Kitchen wastes

Garden waste

What worms don’t eat

- Non- biodegradable
- Plastic, glass, rubber
- Pet feces
- Toxic materials
- Orange peels
- Plant cutting treated with herbicides or insecticides
- Creasy, oily foods
- Meat, fish, cheese or butter

Take care of your worms!

- Consider your worms as a pet rather than a compost system
- They will be happy only if you provide them the suitable environment
- Cool and moist but not too cold
- Aerobic condition
- Moderated temperature

Harvesting the castings

- when your vermicompost is completely built up, you can process to the harvest. You can do lots of things with it

- Add it to the soil as a rich fertilizer
- Add it to your potting soil

- Make worm tea and water your plant

Summary

- Composting can help reduce the amount of wastes available for landfill
- Composting of agricultural waste allows the recycling of nutrients back to the soil
- Composting reduces the need for water, chemical fertilizer, and pesticides
- Composting is a key element for sustainable agriculture

Student Compost Cooperative

The Student Compost Cooperative (SCC) is a student-run cooperative organized by the BioEnergy and Sustainable Technology (BEST) Laboratory. The SCC was started in order to educate UF students about the importance of food waste composting and to give them an opportunity to compost their own food waste. Because many college students live in dorms or apartments, household composting is not an option. The SCC maintains several composters to allow these students to compost their food waste.

What are you waiting for ?

Composting

Is

Get Started and Go Gators !!!

Thank you !!!