



Practical management of composting process

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Practical management of composting process

- › Process management by composting: from collection of green waste to utilization of the final product
 - › Concept of green manure collection
 - › Composting system
 - › Mixture of raw materials
 - › Process management
 - › Storage of end-products
 - › Choice of the product in relation to the desired application and effect

Concept of green manure collection



Concept of green manure collection

- › Objective: optimal quality of the organic waste to be treated
 - › As little as possible undesirable substances
 - › Source-separated waste
 - › Information/education of the population
 - › Periodical collection of the organic rests, if possible individualization of the collection
- › Biological quality of the organic waste
 - › Frequent collection of non stable organic waste (lawn, peeling waste, ...)
- › Adapted to the specific situation

Concept of green manure collection



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Composting system



Composting system

- › Good compost/digestate can be produced with a lot of systems, but all systems can also produce bad compost/digestate!
- › Choice of system depends on:
 - › Available organic waste
 - › Market opportunities for products
 - › Available space and resources (personal and funds)
 - › Geographical situation
 - › etc...

Mixture of raw materials



Mixture of raw materials

›C:N-ratio („available “)

› Urine:	0.8
› Feathers:	4 – 5
› Chicken manure:	8 – 10
› Grass:	12
› Mature compost:	12 – 15
› Young compost:	15 - 18
› Cows manure:	15 – 20
› Kitchen waste:	23
› <u>Ideal C:N of starting mixture:</u>	<u>30 – 35</u>
› Trees leaves:	50
› Straw:	50 – 150
› Wood (sawdust):	200 - 500

Mixture of raw materials

› “Ideal mixture”

- › 1/3 rough wood
(shredded wood, sieved rest material from compost, snipped bark)
- › 1/3 medium-fine fibrous material
(shredded branches, wood fibers, straw, foliage, switchgrass, reed, peat from consumed potting compost)
- › 1/3 material, nearly without structure
(dung, grass, rumen contents, vegetables manure, etc....)
- › Eventually, utilization of additives
(powdered clay, earth, enzymes, microorganisms, fertilizer, etc....)

Mixture of raw materials

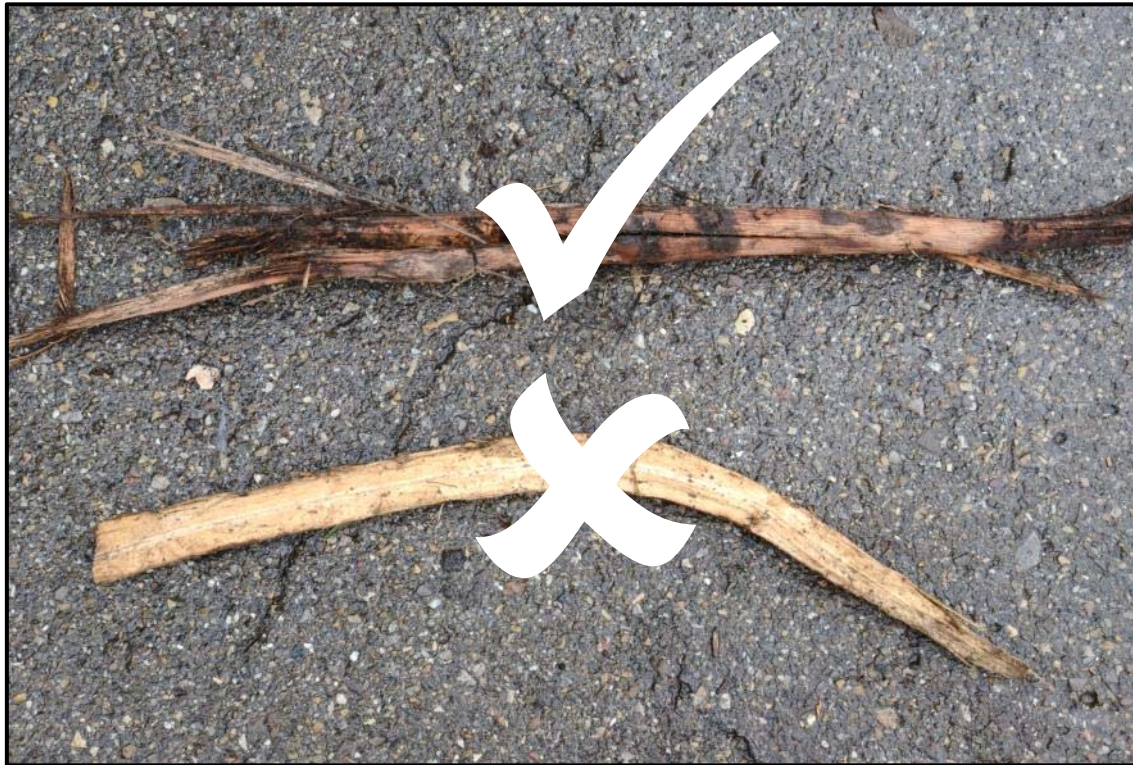
› Mixture of raw materials



› Mix up the organic wastes before or during shredding!

Mixture of raw materials

›Structure of the wood



Mixture of raw materials

› Structure of the wood



› The larger the pile, the coarser the wood should be

Process management

› Regulation of moisture



Process management

› Regulation of moisture



too wet



optimal



too dry

Process management

- › Evolution of the temperature
 - › with protocols



Process management

›Control of the aeration (oxygen level)



Process management

- › Control of the aeration (oxygen level)
 - › Fungi need oxygen to be active.
 - › Bacteria can be active without free oxygen. However, they take oxygen from other molecules, which can produce toxic compounds (e.g. nitrite from nitrate).
 - › The aeration of the compost during the maturation phase is very important. The quality of the products decrease if no enough oxygen is available in this phase.

Process management

›Compost turning



Process management

› Compost turning

- › Compost turning is not only important to ensure an sufficient oxygenation of the compost during the process
- › Compost turning is important to obtain an homogenous product
- › Compost turning also activates the biological activity of the process

Process management

›Compost turning



Storage of the end-products



Storage of the end-products

- › Compost is a living product. If no oxygen is available, it will die! This applies during the storage period too.
- › Mature compost does not need a lot of oxygen. But a minimum has to be ensured. Different factors are important:
 - › Dimension of the storage pile
 - › Maturity stage of the product
 - › Humidity
 - › Use of additives
 - › ...
- › A simple aeration system is generally sufficient

Storage of the end-products



Choice of the product in relation to the desired application and effect



Choice of the product in relation to the desired application and effect

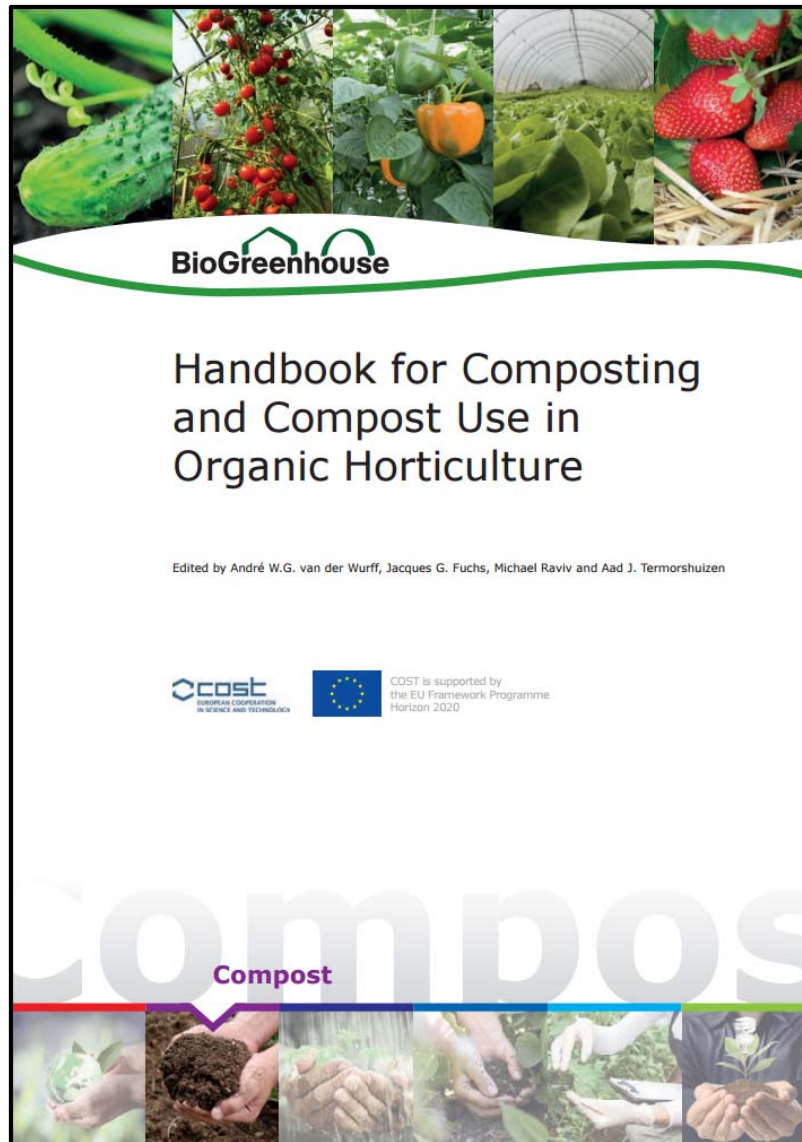
- › Each utilization has different requirements
- › It's crucial to choose the appropriate compost for the specific needs of the specific utilization
 - › Crop
 - › Soil characteristics
 - › Application period
 - › Requested effects
 - › ...

Conclusions



Conclusions

- › Process management is the key for a successful production of quality compost
- › The process management has to be adapted to the treated organic wastes, to the composting system and to the target products
- › Compost quality is the basic condition to improve the market for the products and hence secure the system
- › Quality management begins at the collection of organic waste and lasts until the utilization of the final product



Publication on biology, production quality and use of composts (and digestates)

To be downloaded for free on
www.biophyt.ch

Questions ? Discussion ?

www.fibl.org

www.biophyt.ch

