



Quality of growing media  

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matters

# Reliable raw materials for growing media

## Testing effective sanitation: *Bacillus globigii* as a test organism

5 September 2019 - Hein Boon - RHP



# Introduction

- Growing media for horticultural purposes must be free of plant pathogenic organisms, weeds etc
- Transition to another era
  - sustainability policies
  - circular economy
  - use of residual and renewable materials ...





# Introduction

- Increasing volumes of Coir, Wood-fibre, Bark, Compost ... Perlite, Mineral wool ...
- Some constituents may contain risks because of kind of material, source, way of processing ...
- Peat is generally considered a low risk material, **what about other materials?**





PEAT



COIR



BARK



WOOD-FIBRE



COMPOST





Qu  
m



Qu  
m





Qu  
m



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m



m | Q

Se





# Secure phytosanitary safety

- Prevent and manage risks;
  - Chain control from source to end product
  - Selection on input materials
  - Sanitation of materials
- Sanitation is currently realised by; steaming, dry heat, friction heat, composting and irradiation





# Secure phytosanitary safety

- Efficacy of sanitation treatments must be known and objectively tested.
- Test should be simple and safe.
- Test organisms should be representative for sanitation of plant pathogens and there should be no risk of contamination due to the test.



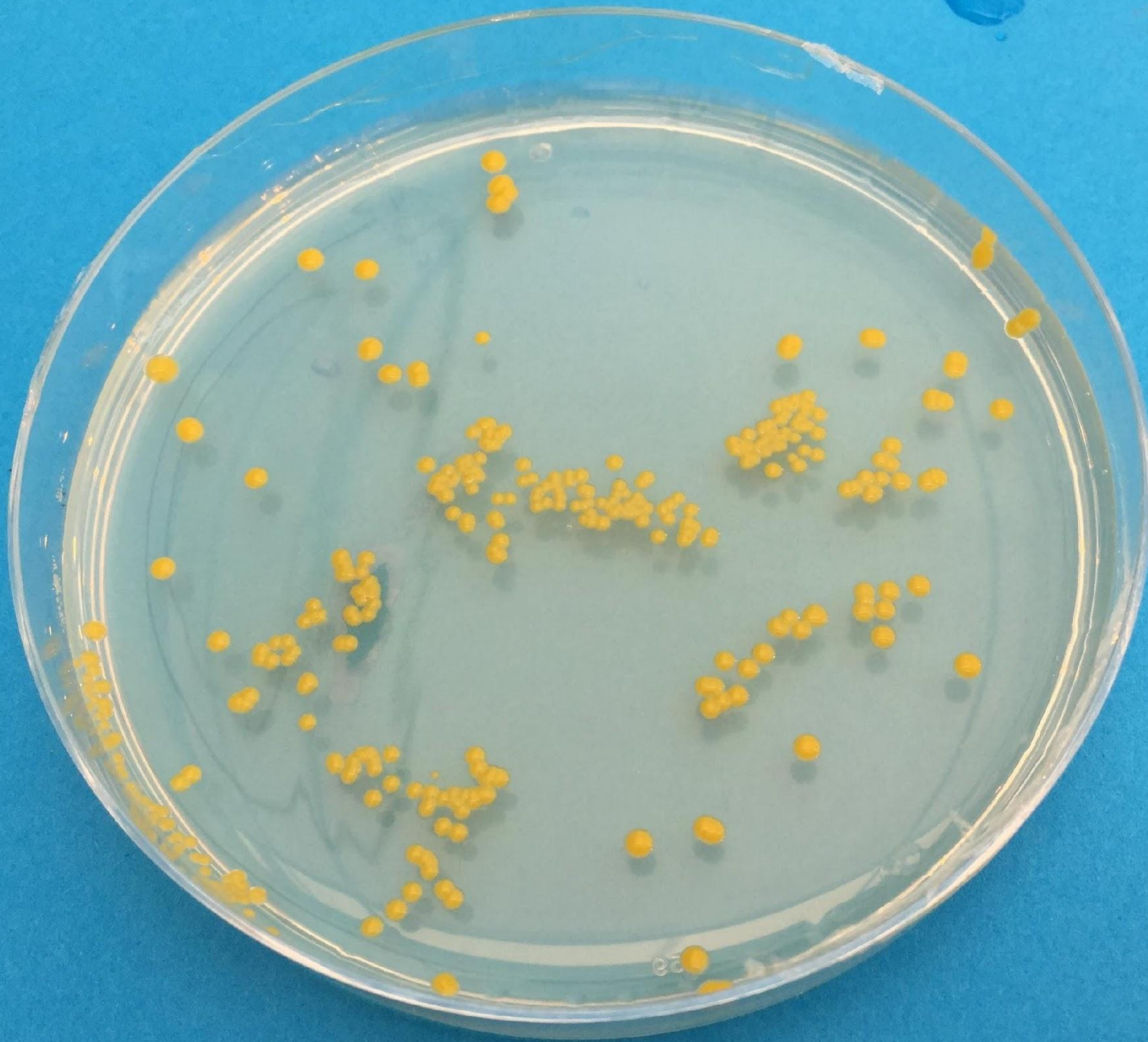
## *Bacillus globigii*

- RHP developed a new test-method by making use of spores of *B. globigii*
  - used in checking sterilisation of medical equipment
  - resistant to heat
  - non-pathogenic for humans and plants



# Test principle

- Laboratory: spore suspension with  $10^9$  cfu/ml = 1.000.000.000 spores
- Product to be tested is evenly contaminated to a level of  $>10^6$  cfu/g
- Number of viable spores of *B. globigii* is counted on the treated and non-treated material.



An extract is made and, when necessary, diluted ...



# Testing various processes

- Steaming of product;
  - cotton bags with Bacillus treated products are brought in the process, a sensor for Temp-measurement is incorporated
  - tests are also performed with 'golf balls' with a patch with *B. globigii* and a T-sensor inside.







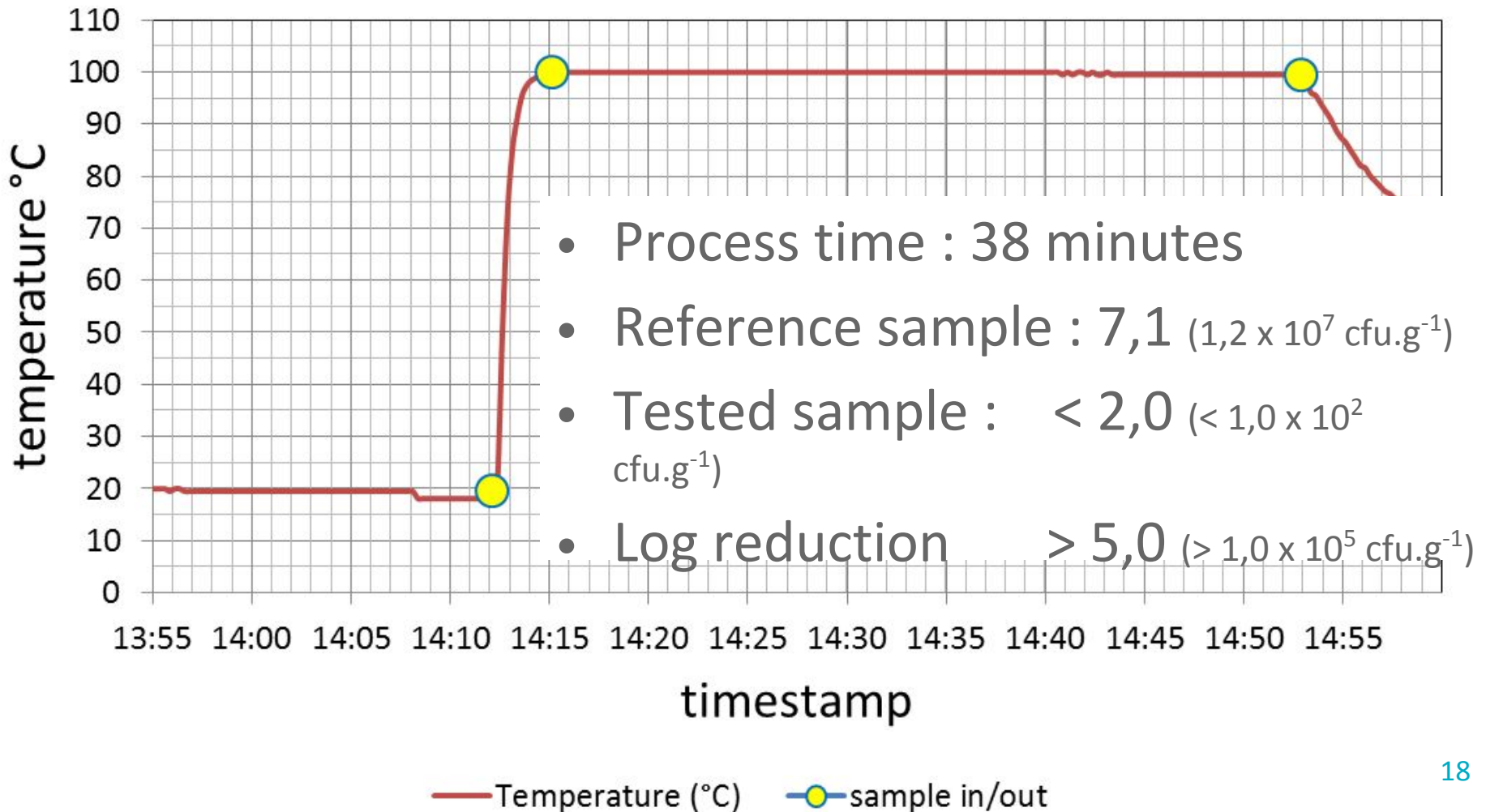


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# Temperature and sanitation

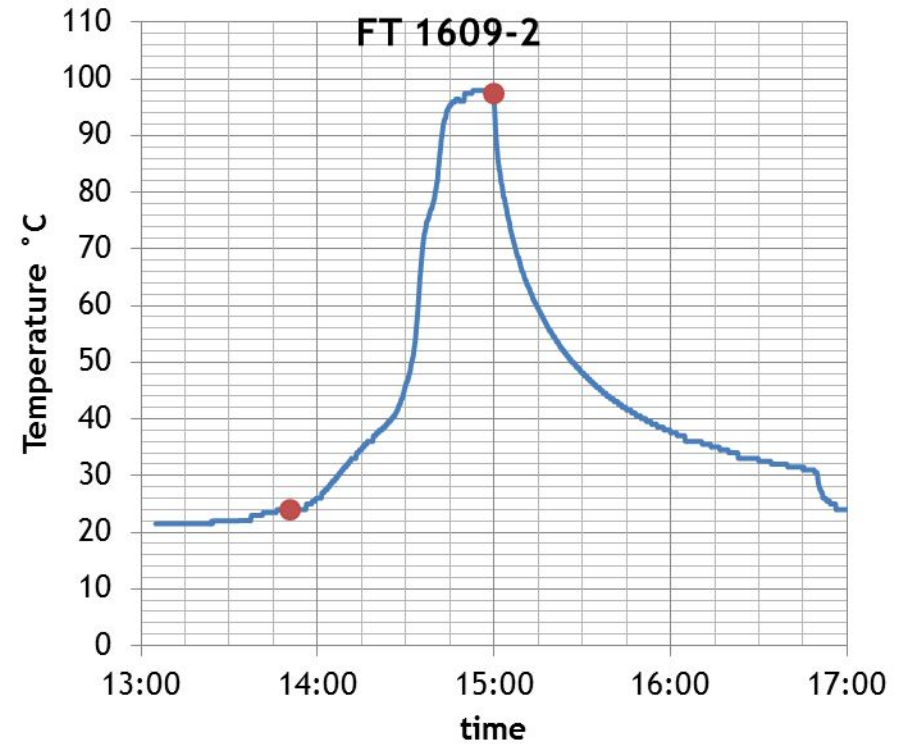
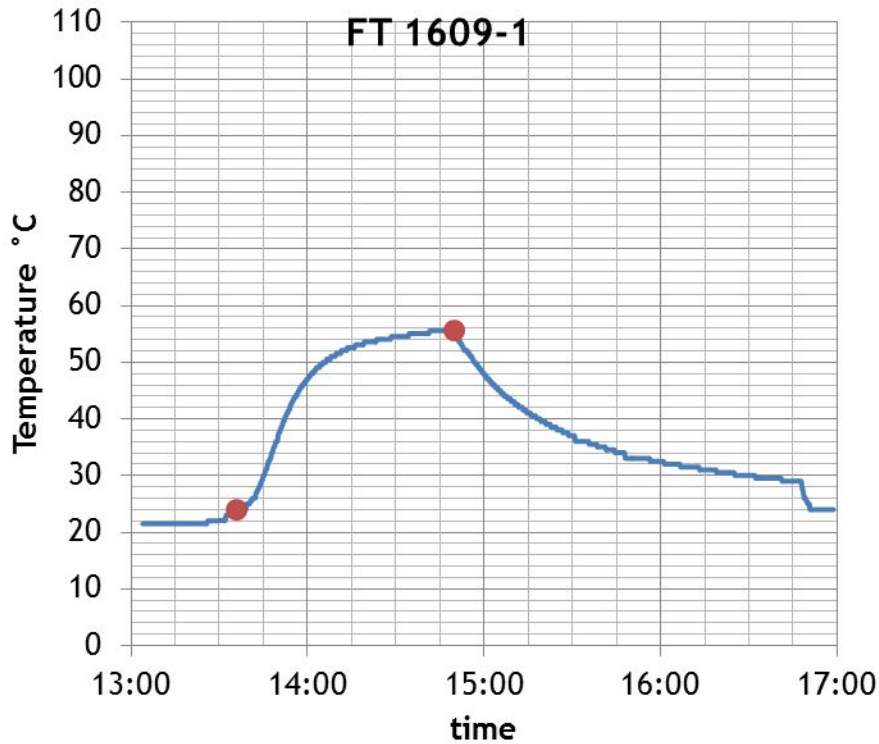
B8







# Another steam installation



- Log reduction 0

- Log reduction > 4,0



# Testing various processes

- Woodfibre units;
  - Contamination of a bigger testing lot, 50-500 litres of wood chips, which is processed to fibre.



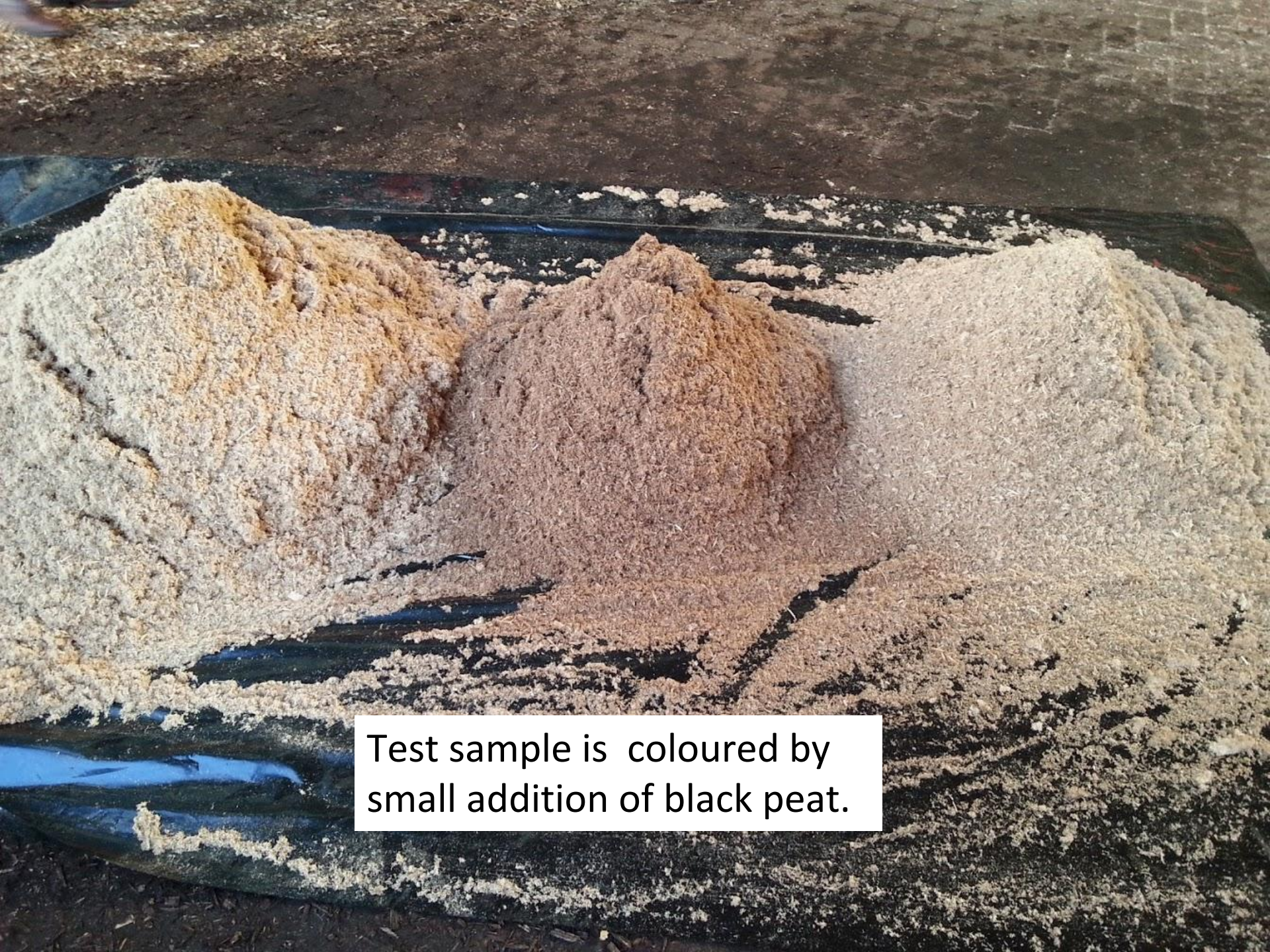












Test sample is coloured by small addition of black peat.





# Level of sanitation

- Bacillus showed distinct levels of sanitation, depending on the type of process and temperature
- Example 2 types of wood-fibre processing

| Wood-fibre processing     | Biologic log reduction              |
|---------------------------|-------------------------------------|
| Wood-fibre process type 1 | (input 7,9 – after process 5,0) 2,9 |
| Wood-fibre process type 2 | (input 6,3 – after process 2,0) 4,3 |
|                           |                                     |



# Testing various processes

- Irradiation (gamma sterilisation by means of Cobalt 60)
  - Dose is depends on the density of products
  - Patches with *B. globigii* in plastic bags are positioned in the centre of a pallet to be sanitised







# Level of sanitation

- Bacillus showed distinct levels of sanitation
- Example irradiation

| Irridiation (kGy) | Biologic log reduction |
|-------------------|------------------------|
| Minimal 5         | 3.1                    |
| Minimal 6         | 3.9                    |
| Minimal 7         | 5.7                    |





# Conclusions

- RHP developed a *practical tool* for assessment of the efficacy of sanitation processes
- *B. globigii* is not dangerous for humans or plants and is relatively easy to handle in various testing conditions
- *B. globigii* gives good distinction of various sanitation processes and intensity of sanitation.



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**Thank you for your interest!**

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