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## **FROM CONVERSION OF WASTE TO PRODUCTION OF GROWING MEDIA CONSTITUENTS; CHANGE OF FOCUS**

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### **SUMMARY**

Peat is by far the most important constituent for growing media. Nowadays (organic) residues from various sources, are offered as potential constituent for growing media. These flows are often derived from processes of waste collection and conversion. Often these products -as such- are not suitable as constituent for growing media, because they do not meet basic requirements with respect to, for example, phytohygienic and nutritional aspects. In order to enhance future prospects of these potential constituents, the production processes need to be converted from waste treatment into the production of a suitable and safe constituent for the production of growing media. A risk assessment is an important precondition and tool to organise and improve production processes with focus especially on phytosanitary safety and quality-guarantees.

*Keywords: growing media, risk-assessment, phytosanitary safety*

### **INTRODUCTION**

Over the past decades the use of growing media has gradually developed. In Europe the annual use of growing media is around 35 million m<sup>3</sup>. Peat is by far the most important constituent. Nearly 75% of the constituents for growing media consist of sphagnum-peat. Over the years the growing media industry as well as growers, have experienced the favourable properties of peat.

A quarter of the constituents for growing media consists of materials other than peat, it concerns mostly organic materials. The origin of these materials is diverse and mostly consists of organic residues. The properties of these materials often differ considerably from the properties of peat-products. In order to know the properties, it is essential to consistently analyse and assess results. Any undesirable properties must –if possible- already be excluded in the production phase of the raw material, with the objective of obtaining a reliable constituent with consistent properties. Often profound risks cannot be seen in the end-product so must be tackled in the first stages of the production.

### **ILLUSTRATION BY THREE CASES**

Examples of successful new constituents for the production of growing media are coir-pith, bark and green-waste compost. For these constituents specific problems were recognised during their development.

#### **Example 1: Coir Pith**

Coir pith was offered as growing medium in the nineties as being the replacement for peat. Previously it was a waste material from the coir fibre industry. Large waste piles could be found everywhere in Sri Lanka. Compressing coir in briquettes in combination with low fares for container transport from Colombo (due to its function as a major transshipment point in container shipping) made it economically feasible to use coir pith as constituent for growing media. However shortly after introduction many problems appeared. One of the main problems was the abundant availability of waste piles containing undefined quality. The material could be very young or very old, infested with weeds and pathogens for plants and humans. Also the nutritional status and physical structure was of such kind that it was often not suitable for use in growing media.

The occurrence of plant and human pathogens, as well as the occurrence of weeds in the material did lead to severe problems in horticultural crops. The unbalanced nutrition and heterogeneous physical structure resulted in cultural problems when coir was applied in higher percentages in mixtures. Cultural problems often resulted in high financial losses.

For coir the whole chain, from the coconut-tree to the final growing media was assessed on risks. Based on this, requirements were set to prevent the identified risks. By setting requirements for handling, storage, transport and treatment of coir a reliable growing media constituent was developed.

#### Example 2: Bark

In the last decade the culture of Phalaenopsis-potplants has grown enormously. Nowadays it is one of the main floricultural crops in the Netherlands. Phalaenopsis is grown mainly on bark based growing media, of which the bark's origin is *Pinus pinaster*. In the first years this bark mainly came from France, out of a region around Bordeaux. When demand did increase bark also was imported from Portugal which also has large areas of *Pinus pinaster*. However part of the Portuguese forest area was infested with *bursaphelenchus xylophilus*. Even though this nematode is not dangerous for Phalaenopsis, it is a known quarantine organism which blocked the export of the bark out of Portugal. Nowadays all Portuguese bark is sanitised by steam-sterilisation to guarantee that the bark is free from *B. xylophilus* and to allow export to other EU countries.

#### Example 3: Green-waste-compost (GWC)

GWC is often considered to become one of the main constituents for growing media production. However GWC in general showed major risks and down-sides. Risk of plant and human pathogens, as well as excessive salt content are the major ones. To get grip on pathogens a strict inspection of the incoming stream of green waste appeared to be necessary. On production locations routing of machinery and flow of product must be considered to obtain a phytosanitary clean product and to prevent (re)contamination. In production a high level of sanitation must be met. By choosing a certain mix of input material, the desired quality with respect to low salt contents can be achieved. Total control of the entire process of composting proved to be a necessity. A proper conduct of processes is monitored by means sampling, analysis and review.

The three examples do show clear risks which did appear after the introduction of the products mentioned. To overcome these kinds of situations with newly developed constituents, it is strongly advised to perform a risk-assessment timely. Risks identified in an early phase of development should be followed by measures with the objective to produce a safe product and required properties.

A proper risk assessment should be carried out by experts with knowledge of growing media production, agricultural and horticultural crops. At least the following main principles should be followed in a risk-assessment;

When should risk assessment take place?

- As first step in designing a production process to convert a (waste) input stream to a constituent for growing media.
- Subsequently it must be repeated frequently to check for 'new' or 'not foreseen' risks.

Where should risk assessment take place?

1. The assessment must start as early as possible in the chain. The majority of waste materials are from agriculture. Assessment should start at point where the agricultural product is actually harvested.
2. The assessment should cover all stages of the production process. Everywhere any handling takes place risks must be assessed. This includes in-between-storage and transport.

What procedure should be followed?

1. Determine the Critical Control Points (CCP's).
2. Analyse the risks or hazards
3. Determine (control)measurements to prevent risks or to decrease them
4. Implement the measures

Monitor or watch over the situation and determine whether the measures have the desired effect