FACTSHEET BIO-BASED SOIL IMPROVERS

Procurement of Innovative Products: Bio-Based Products in Procurement

Why bio-based soil improvers?

What are (bio-based) soil improvers?

A soil improver is a substance applied periodically to soil to improve its fertility[1]. Examples of conventionally used soil improvers are peat and mineral and synthetic fertilizer. Bio-based alternatives to these soil improvers are compost, mulch and (non-sewage) sludge. Bio-based soil improvers can be made from various waste streams. This factsheet provides information on bio-based soil improvers and how to take these into account in procurement.

Why should organisations consider bio-based soil improvers in procurement?

Organisations could consider bio-based soil improvers in procurement if they would benefit from one or more of the capabilities attributed to the bio-based soil improvers. Bio-based soil improvers potentially have different capabilities. Aspects to keep in mind are environmental impact over the life cycle of the product (this could be determined through Life Cycle Assessment in accordance with ISO 14040) and the sustainable sourcing of the input material (this could be assessed in accordance with the sustainability criteria for biobased products from EN 16751 in combination with CEN/TR 16957 - Bio-based products - Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase). With this kept in mind, several potential benefits can also be attributed to bio-based soil improvers[2].

- Resource efficiency: For the production of bio-based soil improvers, usually waste streams are used. Conventional soil improvers are peat, which is a fossil material, mineral fertilizers which require energy to mine and synthetic fertilizers, which are made from fossil fuels following an energy intensive process. The switch to bio-based soil improvers will therefore improve resource efficiency. In addition, the market for secondary raw materials and the circular economy in general will be stimulated through this transition.

- *Reduced Greenhouse Gas (GHG) Emissions*: Depending on the raw material used, the production process and the type of conventional soil improver which is replaced; bio-based soil improvers have the potential to reduce Greenhouse Gas Emissions. Reduced greenhouse gas emissions will in turn contribute to combating climate change.

- Reduced environmental impact: Bio-based soil improvers have the potential to reduce the environmental impact compared to conventional soil improvers:

Reduced GHG Emissions

The life cycle GHG emissions of different composting methods, materials and substitutes were assessed by Boldrin et. al., (2009). In the case of compost substituting peat, it was found that a saving in the order of 183 kg CO2-eq per tonne of compost was achieved. Substitution of mineral fertilizers would save emissions of the order 30.3–89.5 kg CO2-eq per tonne of compost. Source: Boldrin et al., (2009), Composting and compost utilization: accounting of greenhouse gases and global warming contributions.

- *Reduced impact from mining of peat*: Peat is a non-renewable material which needs to be extracted from the soil. This extraction results in loss of natural ecosystems and subsequent loss of biodiversity and species. Replacing the use of peat with compost will reduce peat demand and therefore mitigate the impact of peat mining.

- *Reduced impact from transport of soil improvers*: Majority of peat is found and extracted in the United Kingdom and Scandinavia. Fertilizers are usually produced on a large scale at central facilities. Compost and sludges are available and processed more locally. This difference in distribution will result in reduced transportation distances and therefore reduced GHG emissions.

- *Reduced waste*: By using green waste and sludges as soil improvers, this waste stream is diverted and utilised as a resource.

- *Reduced costs*: The initial costs of compost compared to peat and sludge compared to mineral fertilizer is usually lower. One example found a mixture of peat, bark and brick to cost approximately £25/m3 while a mixture of green compost and bark cost approximately £19/m3.The cost during management of the crop depends mostly on the quality of the compost and management practices.

[1] Definition adapted from 'EU GPP Criteria for Gardening products and services'.

[2] These benefits can differ between products and should always be confirmed by the supplier.

How to take into account specific capabilities of soil improvers in procurement?

Procedures and purchasing strategies

Procurement within the gardening and landscaping sector often implies procurement of services or works. Soil improvers are likely to be procured as part of a service or works contract or form part of a supply contract for other products, such as plants. The capabilities of the bio-based soil improvers could be described in terms of general constituents (which addresses aspects such as resource efficiency and reduced environmental impact) and quality of the soil improver. The quality of bio-based soil improvers tends to vary. Therefore the second criterion on quality of the soil improver is included.

The EU Green Public Procurement (GPP) has developed core and comprehensive criteria for soil improvers. It is recommended that these criteria are assessed on their applicability and if relevant used for the procurement of soil improvers. In this fact sheets the criteria developed by the EU GPP are presented and grouped into 1) General Constituents and 2) Quality of the soil improver (EU GPP Criteria for Gardening products and Services[3]).

Example 1. General Constituents

Minimum Requirement 1: The soil improvers to be used in carrying out the service must not contain peat or sewage sludge.

Minimum Requirement 2: Organic matter content must be derived from the processing and/or reuse of waste.

Minimum Requirement 3: Sludges are allowed only if they are identified as one of the wastes according to the European list of wastes.

Additional information: Waste has been defined in Council Directive 2006/12/EC of April 2006 on waste and its Annex I. Sludge waste has been defined by Commission Decision 2001/118/EC of 16 January 2001.

Verification: Tenderers must provide the detailed composition of the product, the origin of the organic matter and a declaration of compliance with the above requirements. Products holding a relevant label fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.

Example 2. Quality of Soil Improver

Minimum Requirement 1: Maximum concentrations of heavy metals in the waste before treatment (mg/kg dry weight) must meet the requirements below on hazardous substances. In the final product, the content of the following elements shall be lower than the values shown below, measured in terms of dry weight:

Element	Mg/kg (dw)	Element	Mg/kg (dw)
Zn	300	Cr	100
Cu	100	Mo (*)	2
Ni	50	Se (*)	1.5
Cd	1	As (*)	10
Pb	100	F (*)	200
Hg	1		

(*) Data relating to the presence of these elements are needed only for products containing material from industrial processes.

Minimum Requirement 2: In the final product, the content of the glass, metal and plastic (the sum of each contribution) shall be lower than 0.5% as measured in terms of dry weight.

Minimum requirement 3: The concentration of nitrogen in the product shall not exceed 3% total N (by weight) and inorganic N must not exceed 20% total N (or organic N > 80%).

Minimum requirement: 4: Products shall not adversely affect plant emergence and subsequent growth, and shall contain not less than 25% dry matter by weight and not less than 20% organic matter by dry weight

Minimum requirement 5: Products shall not exceed the maximum levels of primary pathogens as follows
Salmonella: absent in 25g of product
Helminth Ova: absent in 1.5 g of product
E.coli: <1000 MPN/g (MPN: most probable number)

Verification: Tenderers must provide the relevant test reports (EN 13650, ISO 16772 or equivalent) demonstrating that the above requirements are met. Products holding a relevant label fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.

[3] http://ec.europa.eu/environment/gpp/pdf/criteria/gardening.pdf

What bio-based soil improvers are available?

The following databases contain information on the availability of bio-based soil improvers:
- The ‘Datenbank FNR’ database (Germany) provides an overview of bio-based soil improvers. Information on the product, supplier and whether the product is certified is available within the database.
- The ‘CoE BBE’ database (the Netherlands) provides information on a bio-based soil improver. Information about the producer, product characteristics and whether the product is certified is specified.
- The ‘Agrobiobase’ database (France) provides an overview of bio-based soil improvers, as well as product specifications and whether the product is certified.

Points of attention

The following potential barriers and bottle necks have been identified by procurers, policy makers and professionals that work with bio-based products in procurement. The relevance of each of these potential barriers is discussed for the product group ‘soil improvers’:

- Costs: The use of sludge as a replacement of mineral fertilizer and compost as a replacement of peat are usually found to reduce purchase costs. One example found a mixture of peat, bark and brick to cost approximately £25/m3 while a mixture of green compost and bark cost approximately £19/m3. Other costs, such as application costs and maintenance costs differ and depend largely on the original situation. Application of sludge might be more work than application of mineral fertilizer. However, the application of additional water (in the sludge) might increase yield and reduce the need for irrigation.

- Level of development: The databases ‘FNR’, CoE BBE’ and ‘Agrobiobase’ all provide a range of bio-based soil improving products. Based on this information, the level of development is considered mature.

- Availability: Bio-based soil improvers are available in France, Germany and the Netherlands, following the information on the above mentioned databases. An online internet search also confirms availability in other European countries such as Poland, Belgium and Italy.

- Quality of the products: The quality of bio-based soil improvers can fluctuate. For this reason it is recommended that quality controlling criteria, as presented under the second category of procurement criteria (quality of the soil improver) are incorporated in the tender.

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