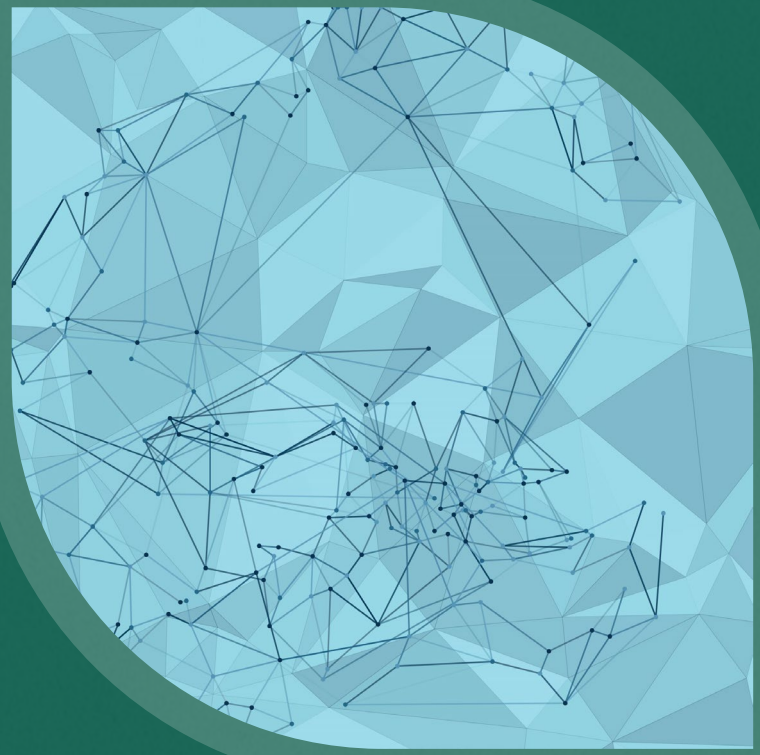
ORGANICS TO HORTICULTURE



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Legislation

- Peat and Peat Free
- No current timeline to introduce retail or professional horticultural peat use ban (2024 missed vs 2030 prof)
- Sarah Dyke MP – Private Members Bill delay
- DERFA has indicated a desire to legislate
- Current task and finish groups looking at producing roadmaps for industry
- No Governmental policy time to implement
- NGOs continue to lobby (PFP, WT)

Legislation

- Mandatory food waste segregation (commercial and municipal)

From April 2025, all non-municipal premises (mainly businesses and institutions) in England must arrange for the separate collection of food waste from their premises

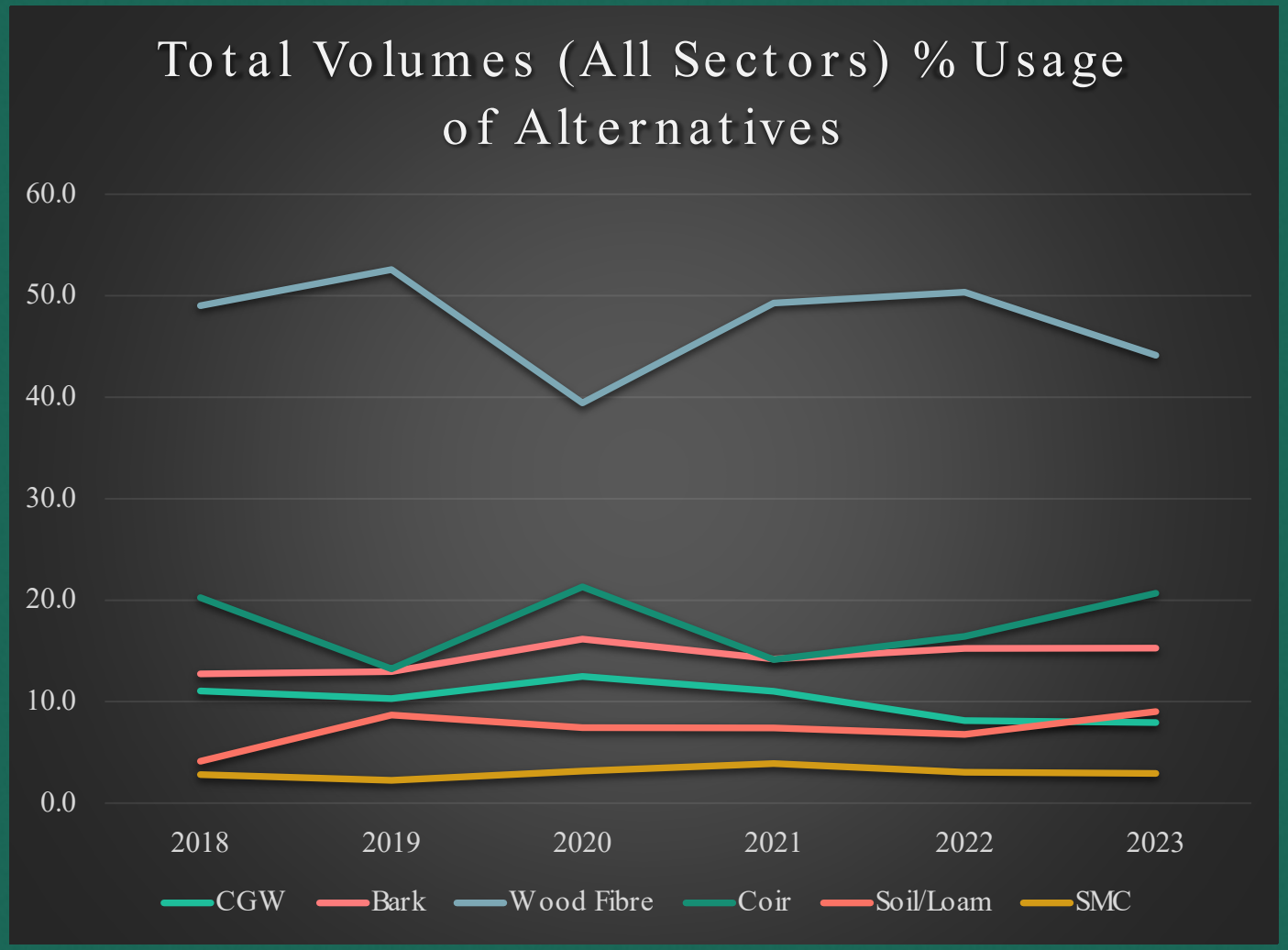
From April 2026, in England a mandatory weekly collection of food waste for recycling or composting from households

- This new legislation will likely increase outputs from composting and anaerobic digestion facilities
- The current policy statement from the government references that anaerobic digestion is preferable to composting
- At present, there is no holistic strategy that addresses food security and soil health utilising biowaste outputs

Legislation

- Compost Quality Protocol and Anaerobic Digestate Quality Protocol – key documents for EoW with PAS standards
- ADQP revision, new markets, lower limits
- Provide clear guidance on the production of a quality output product that would meet regulatory requirements
- In complying with the CQP/ADQP plus PAS standards, end of waste can be achieved
- To use these output products in Horticulture, additional requirements are likely required

Horticultural Use of Organics - Data



- Peat use consistently down for the last 5 years
- Alternatives use consistently up for the last 5 years
- 3.9M m3 substrate produced and sold
- 8%= 200,000 m3 or 100,000T

Total Volumes (All Sectors) % Usage of Alternatives	
Year	CGW+AD
2018	11.1
2019	10.3
2020	12.5
2021	11.0
2022	8.1
2023	7.9
2024	TBC

Supplying Horticulture

- Define a specification with the growing media user/ manufacturer
- Demonstrate compliance
- Maintain consistency
- Continuous improvement

Input Materials

- Making good quality products, consistently, requires good quality ingredients.
- A key risk to manufacturing a growing media from food and or green waste comes from inconsistent feedstocks
- Possibility of containing contaminants or chemicals that could hinder performance.
- Clearly define acceptance criteria with supplier (if applicable)

Improving the Quality of Outputs

- Clearly define input acceptance criteria with supplier (if applicable)
- If possible, restrict feedstocks to those that are clean…

segregated vegetable waste from greengrocers, plant materials from growers and florists, vegetable scraps and peelings from food preparation, coffee grounds, tea leaves, spent brewery grains and so on

- Front end contamination removal
- Final maturation stages– stability is key, reduce Ammoniacal N
- Additional screening
- Increase testing frequency for key parameters

Key Parameters for Horticultural use of Organics

- Chemical – pH, EC, N and Am-N, chemical residues, stability, moisture
- Physical – Contaminants, structure and particle size, density
- Microbiological – Plant and human pathogens

PATHOGENS

Parameter	As received (fresh)			Pass or Fail	Method reference
	Result	PAS 100 upper limit	Unit		
E. coli at 44°C	<5	1000	CFU/g	Pass	BS ISO 16649-2
Salmonella spp at 37°C	Absent	Absent	Absent or Present in 25g	Pass	BS EN ISO 6579-1: 2017

STABILITY / MATURITY

Parameter	As received (fresh)			Pass or Fail	Method reference
	Result **	PAS 100 upper limit	Unit		
Carbon dioxide (evolution rate)	8.1	16.0	mg CO_2 / g organic matter / day	Pass	ORG0020
Proportion of particles <20 mm	100.0	N/A	% g/g	N/A	

PHYSICO-CHEMICAL PROPERTIES

Parameter	As received (fresh)		In dry matter		Method Reference
	Result	Unit	Result	Unit	
Bulk Density [1]	573.93	g/l	438.7	g/l	BS EN 13040
Dry Matter	76.4	% m/m	N/A		BS EN 13040
Moisture	135.2	g/l	N/A		BS EN 13040
	23.6	% m/m	N/A		
Organic Matter (Loss On Ignition)	19.2	% m/m	25.2	% m/m	BS EN 13039
Organic Carbon (LOI ÷ 1.72)	[illegible]	% m/m	14.6	% m/m	Calculated
pH	8.7		N/A		BS EN 13037
Electrical Conductivity	862	µS/cm @ 25 °C	N/A		BS EN 13038
	[illegible]	mS/m @ 25 °C	N/A		
Liming potential	N/A	% m/m CaO	N/A		See footnote 2

Plant Response Test	Result	PAS 100 minimum	Unit	Pass or Fail	Method Reference
Tomato plants germinated	100.00	80.00	no. of plants, tests as % of controls	Pass	REAL MT PRT V1 01/12/2020
Tomato plant top growth	85.23	80.00	average g / plant, tests as % of controls	Pass	
Tomato plant abnormalities	Absent	Absent	abnormal tomato plants in test trays	Pass	

Minimum Quality from PAS

Table 3 – Minimum compost quality for general use

Item	Parameter	Method of test
Pathogens (human and animal indicator species) [b]		
1	*Escherichia coli*	BS ISO 16649-2
2	*Salmonella* spp	Schedule 2, Part II of BS EN ISO
PTEs		
3	Cadmium (Cd)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
4	Chromium (Cr)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
5	Copper (Cu)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
6	Lead (Pb)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
7	Mercury (Hg)	Appropriate in-house validated based upon BS ISO 16772
8	Nickel (Ni)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
9	Zinc (Zn)	Appropriate in-house validated based upon BS EN 13650 (soluble in aqua re
Stability/maturity [c]		
10	Microbial respiration rate	ORG 0020
Weed seeds and propagules		
11	Germinating weed seeds or propagule regrowth	REAL MT PRT

Table 3 – Minimum digestate testing and quality requirements after validation

Parameter	Method of test	Upper limit and unit
Pathogens (human and animal indicator species) in WD/SL/SF		
ABP digestate: human and animal pathogen indicator species	As per appropriate ABP regulation or any other method approved by the competent authority/ Animal Health vet/Veterinary Service vet	As specified by the competent authority/ Animal Health vet/ Veterinary Service vet in the "approval in principal" or "full approval"
Non-ABP digestate: *E. coli*	SCA MSS Part 3A [N1] or BS ISO 16649-2	1,000 CFU/g fresh matter
Non-ABP digestate: *Salmonella spp.*	Method as specified by appropriate ABP regulation, according to nation in which digestate is produced, or SCA MSS Part 4A [N2]	Absent in 25 g fresh matter
Potentially toxic elements (PTE) in WD/SL/SF		
Liquid (≤ 15% TS) digestates	For all PTEs [c]: BS EN ISO 15587-1:2002	Declare on a fresh weight basis
Fibre (> 15% TS) digestates	For all PTEs [c] except Hg: BS EN 13650:2001 For Hg:BS ISO 16772	Declare on a fresh weight basis

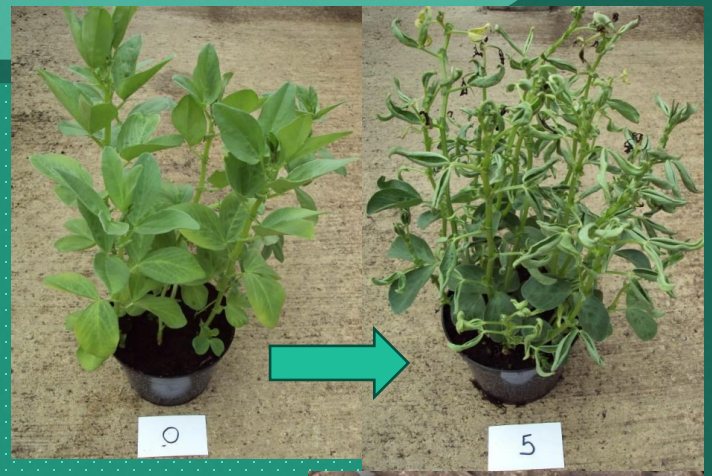
Total nitrogen (N)	kg/t	Less than 1	1 to 1.9	2 to 2.9	3 to 3.9	4 to 4.9	5 to 5.9	6 to 6.9	7 to 7.9	8 to 8.9	9 or more
Cadmium (Cd)	mg/kg	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96	1.08	1.2
Chromium (Cr)	mg/kg	8	16	24	32	40	48	56	64	72	80
Copper (Cu)	mg/kg	16	32	48	64	80	96	112	128	144	160
Mercury (Hg)	mg/kg	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	0.80
Nickel (Ni)	mg/kg	4	8	12	16	20	24	28	32	36	40
Lead (Pb)	mg/kg	16	32	48	64	80	96	112	128	144	160
Zinc (Zn)	mg/kg	32	64	96	128	160	192	224	256	288	320

Stability of WD/SL/SF		
Details of stability testing methods and requirements are shown in Annex A.		
Physical contaminants in WD/SL/SF		
Stones > 5 mm	NRM method JAS-497/001 [N3]	Declare on a fresh weight basis
Total glass, metal, plastic and any "other" non-stone, man-made fragments > 2 mm	NRM method JAS-497/001 [N3]	Declare on a fresh weight basis

- Basic tests required for Eow
- Additional requirements may be specified by end user
- Soil Improver market uses PAS standards

Options to Demonstrate Higher Quality Outputs

- Increase in Quality allows producer to command higher price – note that all other growing media ingredients are more expensive than organics
- Benefits of organics use in horticulture are well documented
- PAS100 Field Bean Assay Test
- PAS100 full suite for principal grade – rather than only mandatory tests (Tomato plant response, nutrients)
- Increased stability testing after maturation
- Increased pathogen testing e.g. salmonella, E. coli
- Scientific studies/ Growing trials
- Finer? Dried? Pelletised? Separated Inputs? Concentrates?



Searching for other By-products

- As an industry, Horticulture requires more materials to enable the complete transition to peat free
- What other materials do you have access to?
- Focus on ‘bio’ additives in horticulture to improve performance – opportunities?

Thank you!

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