



European focus

An International Look At Compost Standards

Methods used for evaluating compost quality in Europe are summarized in a new report.

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THE CONCEPT of establishing standards specific to compost and the promotion of quality criteria to provide a strong foundation for development of the compost industry has been slowly emerging over nearly two decades throughout the western world. Recently, several European countries have adopted specific standards, and many other countries are in the process of doing so. This overview, based on a report prepared for the New York State Association of Recyclers by Woods End Research Laboratory, Inc., summarizes recent progress.

At a 1999 Vienna Conference, "Steps Towards a European Compost Directive," a status of national compost guidelines was presented. Following is a summary of what had occurred up to that time:

Austria — Fully established quality assurance system (there is a pass/fail on designated criteria for each category); Belgium — Established quality assurance system in Flanders. Brussels and other regions may follow Flanders example; Denmark — Recently implemented quality assurance system with standardized product definition, analysis methods; France — Limited quality criteria,

research program underway for quality management; Greece — Basic solid waste rules, no official compost standard; Germany — Fully established quality assurance system, private association maintains standards; Hungary — New compost quality association; Italy — New decree in place for waste source separation, private compost association formed to evaluate standards; Luxembourg — Some compost plants follow German quality assurance system; Netherlands — Fully established quality assurance and certification system; Nor-

way — Compost quality studies underway, criteria proposed for three quality classes; Spain — Compost guidelines established and proposal for quality certification system in Catalonia region; Sweden — Recently implemented standards and compost declaration system; Switzerland — Established minimum quality standards; United Kingdom — Proposed quality standards by private compost association.

Standards and Seal Programs

Several countries in Europe have some sort of compost grading system, either recommended, required by law, or an association-based quality seal program. Germany has had two types of quality seals that can be obtained for composts: the Bundesgütegemeinschaft Quality Seal and the Blue Angel seal. Both are authorized under the German Institute for Quality Certification and Declaration (RAL) — an agency that has a scope similar to "UL" in North America. The majority of composters seeking quality certification in Germany choose the RAL-BGK over the Blue Angel Seal (more than 200 composters certified under BGK versus 52 under the Blue Angel). The wider use of BGK is attributed to aggressive marketing of the seal that included several meetings and a newsletter for the composters.

The European Commission determined in 1992 that a seal of quality could be issued for any qualifying natural soil amendment produced within a member state. This is part of a wider

Table I. Europe Eco-Label Standards Applicable to Composts

Tested Traits	Limits As Determined By Test Methods 86/278/EEC
Heavy metals	See Table 2
Special metals	If contains industrial or municipal wastes, then test for: Mo, Se, As, F
Constituents	Organic Matter > 20%; Moisture < 75%; Total-N less than 2% TS
N-P ₂ O ₅ - K ₂ O	Application rates shall specify not more than:
application limits	17g/m ² N - 6g/m ² P ₂ O ₅ - 12g/m ² K ₂ O
Pathogens	Salmonella non detect in 25g E. coli < 1000 MPN/g
Other	Contains no offensive odors; No glass, wire or other fragments; No unacceptable weed seeds
Declarations	Must describe recommended use and application rates; All feedstocks >10% must be reported; Nutrients, organic matter and metals must be reported; No phytotoxic effects

Source: Official Journal of the European Community (OJ), 1998

Table 2. Heavy Metals Limits (mg/kg) For European Countries With Compost Rules

Element	Countries ^a											
	A ^b Class		B	B	CH ^b	DK	F	D	I	NL	NL	SP
	A	2 ^c	Agr	Park								
Arsenic	-	-	-	-	-	25	-	-	10	25	15	-
Boron	100	-	-	-	-	-	-	-	-	-	-	-
Cadmium	4	1	5	5	3	1.2	8	1.5	1.5	2	1	40
Chromium	150	70	150	200	150	-	-	100	100	200	70	750
Cobalt	-	-	10	20	25	-	-	-	-	-	-	-
Copper	400	100	100	500	150	-	-	100	300	300	90	1750
Lead	500	150	600	1000	150	120	800	150	140	200	120	1200
Mercury	4	1	5	5	3	1.2	8	1.0	1.5	2	0.7	25
Nickel	100	60	50	100	50	45	200	50	50	50	20	400
Selenium	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	1000	400	1000	1500	500	-	-	400	500	900	280	4000

^a Country Codes: A-Austria; B-Belgium; DK-Denmark; F-France; D-Germany; I-Italy; NL-Netherlands; SP-Spain; CH-Switzerland

^b Calculated on 30% Organic Matter basis

^c NOTES: Class-2 as Versus Class 1 or Class A vs. AA; Agr -Agricultural use; Park= Horticultural use.

program of issuing eco-labels within specific product groups. In 1998, the Directive was modified and upgraded with specific standards that apply to composts in general. The Eco-Label for composts (see Table 1) has not been widely used to date.

Of all potential quality standards, heavy metals have been the focus of most attention. Thus it is useful to explore the details of these standards country by country, beginning with an overview of the range of standards that are evident. The permissible metal ranges reveal significant variation within Europe. However, United States numbers diverge dramatically with regard to allowed Cd, Cr, Cu, Hg and Ni.

In some cases, different grades are distinguished, as in Austria which has three grades and Germany which has two sets of standards (see Table 2). Not all current metal standards are fixed; several countries, including Belgium, Italy and the Netherlands, have been exploring implementing still lower limits and several may adopt a two class system.

Among metal limits some countries expect to lower are: zinc, nickel and mercury, based on current investigations. The metal limits may eventually be so low in some European countries that it may act as an absolute bar on composting for some types of wastes. Application of biowaste and other composts is controlled by existing soil metal levels. In Germany, according to the Waste Decree, compost application to land may require special permits based on soil metals for each soil type.

Other Parameters For Compost Standards

The acceptable quantities of foreign matter in compost have been a subject of some debate, but generally there is greater agreement on these standards. Normally, stones are distinguished from nondecomposable "foreign matter" which includes glass, plastic and metal. The limits pertain to a percentage at a specific screen size. The following summarizes physical standards of countries that regulate compost. (see Table 3):

Sampling size and frequency have been examined by many countries. Both the quantity of a batch and the particle size or coarseness of the compost affect recommendations. For example, Germany recommends that for facilities processing less than 2,000 tons/year (t/a), composting testing be done four times each year; over 12,000 t/a, it is 12 times/year. The Netherlands recommends one

Table 3. Maximum Foreign Matter Particles Allowed in Composts in Various National Standards

Country With Standard	Stones (% Of Dry Weight)	Man-Made Foreign Matter (Glass, Plastic, Metal, % Of Dry Weight)
Austria	Must be < 3% of > 11 mm size	< 2% of > 2mm fraction
Belgium	< 2%	No visible contaminant, max 0.5% > 2mm
France	-	max. contamination 20%; < 6% of > 5mm fraction
Germany	Must be < 5% of > 5mm size	< 0.5% for >2mm fraction
Italy	-	< 3% total
Netherlands	Must be < 3% of < 5mm size	< 0.5% for >2mm fraction
Spain	-	"Free of contamination"
Switzerland	Must be < 5% of > 5mm size	< 0.5% for >2mm fraction; max 0.1% plastic
United Kingdom	< 5% > 2mm	< 1% > 2mm < 0.5% if plastic

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time each 5,000 tons, or a minimum of six times/year. In Austria, the figures are one time/year minimum or once each 2,000 cubic meters. France and Denmark specify once every six months, while Italy and Spain are unregulated.

Concerning temperature and time requirements for compost products as they relate to hygiene and pathogen reduction, Germany specifies more than 55°C for two weeks or more than 65°C for one week for open windrow systems. For closed/in-vessel composting systems, the requirement is more than 60°C for one week. In Austria, all composts are required to go through more than 60°C for six days, or more than 65°C for three days. In Denmark, the standard for all composts is more than 55°C for two weeks. Germany has extended the concept of hygiene in compost by distinguishing human/animal from plants or phytohygiene. In the latter category, all new compost facilities must demonstrate kill potential for tobacco mosaic virus (TMV) and club-root disease caused by *Plasmodiophora brassicae*. This is a procedure similar to PFRP equivalency in the United States.

There are few hygiene standards evident for worker safety at composting or organics recycling plants. However, a body of new evidence from international studies

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suggests that a number of areas of concern exist for airborne contaminants within compost plants. These include allergic alveolitis (EAA); Organic Toxic Dust Syndrome (OTDS); respiration allergies from inhaled spores; dermal, pulmonary and systemic infections; and contact allergies. It is rare to see a composting plant in Europe that does not have negative air and vacuum air hoods over bio-waste sorting conveyors.

Weed Content

At least three European countries have written or implied weed standards in compost: Holland, Germany and the United Kingdom. Holland has a limit of 2 weeds/liter. Germany has a limit of one weed/2 liters and considers compost heavily contaminated when more than four weeds are found in two liters. The United Kingdom limit is five weeds/liter. The German test requires three liters of compost for the test; this can be a cost and space constraint for many laboratories. (Woods End has arbitrarily set a limit of less than five weeds/liter for agricultural composts.)

Plant Phytotoxicity Tests

There are a variety of compost phytotoxicity tests which have been proposed and published. Use of plants to indicate compost maturity is seen as a protective approach, since respiration or stability testing does not directly indicate potential plant problems. The various plant based tests rely either on a mixture of compost with soil or peat (Germany) or 100 percent compost using garden cress, barley or radish seeds. In Switzerland, straight (100 percent) compost is used and an additional test called the "closed cress test" is applied; this distinguishes gaseous phytotoxicity in addition to compost-borne toxicity. Austria recommends a test with a range of compost/peat dilutions.

Regarding plant growth performance standards, Germany specifies 25 percent and 50 percent compost in standard soil media; barley or cress seeds must pass over 90 percent. Australia lists up to 100 percent compost blend with peat; cress and barley seeds must pass more than 80 percent. Switzerland lists 100 percent compost in open and closed cress tests, with no pass/fail levels.

Conformity Vs. Disagreement In Existing Standards

Compost quality assessment has gradually evolved differently in various parts of the world as political and industrial developments have taken place. Surprisingly, there are a number of areas which seem to be in close agreement across national boundaries. Not surprising are the areas of difference.

One approach to choosing viable compost standards is take the "path of least resistance." Formulate a set of criteria which reflect where general agreement is readily apparent, then identify areas where disagreement or weakness in approach is evident. Where moderate to significant steps are needed to reach a general accord, it may be best to allow voluntary standards (and discrepancies) to be used until further research indicates specific changes.

Will Brinton is founder of Woods End Research Laboratory in Mount Vernon, Maine; www.woodsend.org. This excerpt is from his report: Compost Quality Standards & Guidelines: An International View, which includes data and comments comparing compost standards in the United States with Europe, including variations in heavy metal standards. The full report is available on the Woods End website.