COMPOST PRODUCTION IN ITALY: STATE OF ART AND PERSPECTIVES IN THE FRAMEWORK OF EUROPEAN UNION POLICY ON BIOWASTE

Fabio Tittarelli[1] and Massimo Centemero[2]

[1] CRA – Istituto Sperimentale per la Nutrizione delle Piante – Rome, Italy

[2] Consorzio Italiano Compostatori – Rome, Italy

Introduction

The Italian normative on fertilisers (Law 748/84) makes no distinction among products whose role is to provide plant nutrients and soil organic amendments. Any product which increases one of the aspects of soil fertility can be considered as a fertiliser. In this way, quality composts, which can be applied to soil without any quantitative restriction apart the respect of good agricultural practices, can benefit of the same fiscal advantages allowed to mineral fertilisers. All the competencies, regarding the definitions of quality characteristics for composts to be used in agriculture, are attributed to the Italian Law on fertiliser by the national Decree 22/97, regulating waste management. The normative framework at national level has so determined, during the last decade, the increase of the number of composting plants from less than 50 to more than 250 and the increase of the amount of treated organic biomass from less than 300.000 t $year^{-1}$ to about 2.700.000 t $year^{-1}$ in the same period. On the other side, at EU level, normatives regulating recycling of biowaste in agriculture are of Commission DG Environment competence in the framework of its waste management strategy. In order to understand the weight of waste management in Commission Environmental Policy, it is sufficient to stress that this issue is not only specifically treated in the thematic strategy on the prevention and recycling of waste, but is also mentioned in the thematic strategy on the sustainable use of natural resources and in the thematic strategy for soil protection (three of the seven thematic strategies programmed by the 6th Environmental

Action Plan). Nevertheless, so far, compost production and utilisation is not ruled at an european level.

The main objective of this paper is to give an outlook on quality compost production in Italy, its market and perspectives in the framework of the complex normative regarding european waste management.

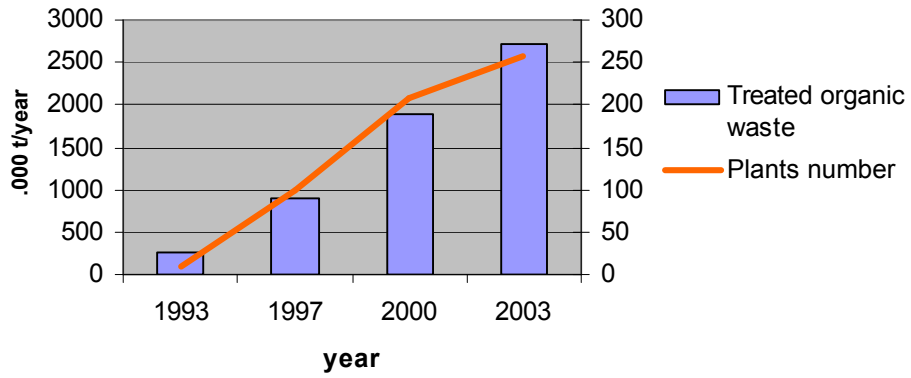
Compost production in Italy

Italian national Decree 22/97, regulating waste management, clearly points out that:

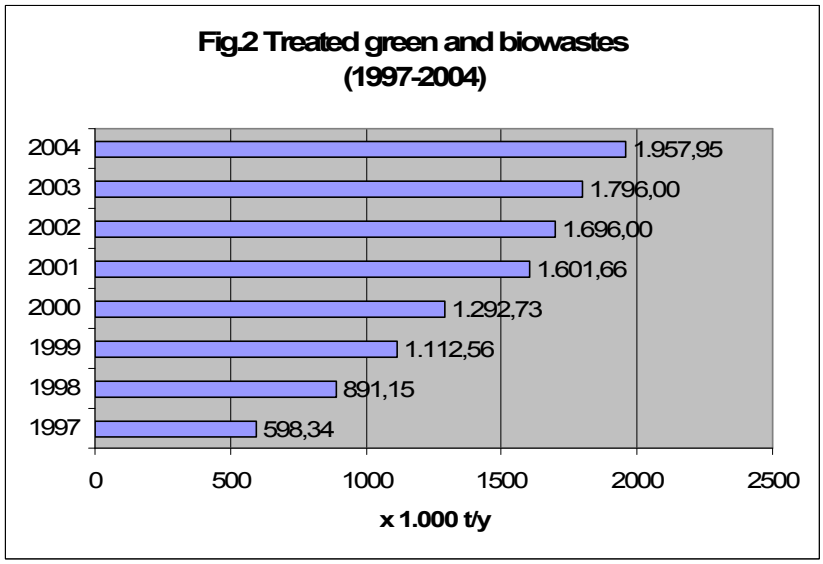
- waste reduction and material recovery, re-use and recycling must be preferred to energy recovery and landfilling (which is seen as last resort);
- specific recycling targets (for each Province) are set;
- landfilling is allowed only for non-recyclable or treated materials;
- waste collection must be organised according to efficiency, effectiveness and cost-optimisation.

The intensive collection of dry recyclables alone (paper, glass, metal and plastic) has not allowed municipalities to meet imposed recycling targets, so, although source separation of organic waste (kitchen and garden waste) is not compulsory, it has become the real back-bone of the waste management system, yielding (particularly when operated with door-to-door systems) recycling rates as high as 20 – 40 per cent on its own (Tittarelli et al., 2001). The strong sinergy between Decree 22/97 and the Italian normative on fertilisers (Law 748/84), regulating the characteristics of quality compost to be used as fertilisers, has determined the increase, during the last years, of the number of composting plants. Figure 1 reports clearly the trend of either the number of plants and the amount of treated organic materials during the last decade.

Fig. 1 Evolution of composting system in Italy



Over 2,700,000 tons of organic wastes are treated yearly with a strong concentration of composting plants in the northern regions of Italy (Lombardia, Emilia Romagna and Veneto). The observed uneven map of compost production in Italy is due to the uneven development, at a national level, of a waste management system based on source separation of urban organic waste. This is confirmed by the available statistics, according to which municipal organic wastes (green and biowaste) represent up to 74% of the treated organic wastes (Fig.2), being the residual 26% divided between sewage sludge and agroindustrial by-products.



It is extremely difficult to determine the amount of quality compost produced, but around 850,000 – 900,000 tons year^{-1} is considered a quite accurate estimate (Centemero, 2005). According to ISTAT (Italian Official Institute of Statistics), from 1998 to 2004 the group of fertilisers named "amendments", in which green compost and source separated urban wastes compost are included, representing about 50% of the entire group, has increased its production by 400% in a context of low growth for other typologies of fertilisers (Adua, personal communication).

Compost utilisation and marketing

According to Centemero (2005), about 50% of quality compost produced is utilised open field in order to improve soil organic carbon content in substitution of manuring, a traditional agricultural practice which, as a consequence of farming system evolution, has almost completely disappeared in Italy. Even if, so far, main utilisation of compost is as organic amendment in open field condition for both intensive and extensive cultivation, gardening

and plant nursery production represent interesting wholesale and retailed market outlet for quality compost. Market share growth has also been attributed to growing media production especially in Northern regions of Italy where composting plants are more concentrated. Growing media, produced by mixing compost and peat, to be used in pot cultivation and gardening has reached retail prices for non professional consumers of 100 Euros m^{-3} , while wholesale product price ranges 5-10 Euros m^{-3} . Even though market outlets are strongly dependent on compost producers capacity to build widespread commercial network, marketing analysis carried out at european level have put in evidence that compost users main request is a standardised product whose quality is supervised and certified by external institutions. Quality assurance of "Compost System" (facilities, process, products) is perceived to guarantee final users more than the imposition of restrictive laws on heavy metals. So, in order to satisfy the consumers need of a certified product, the Consorzio Italiano Compostatori (CIC), italian association of compost producers, has implemented a Quality Assurance System on the basis of the experiences carried out in central european countries by other compost associations (VLACO in Belgium, KGVÖ in Austria and so on). At the end of a complex protocol including audit, inspection, samplings and chemical analysis done by indipendent laboratories, quality certification is attributed to the products which guarantee the best preformances. In this moment about 200.000 tons/y of quality compost are used in different agricultural sectors with the label of italian composting association (CIC).

European Union environmental policy

The Sixth Environmental Action Programme (6^{th} EAP) (Decision 1600/2002/EC), adopted by the Council and Parliament for the period 2002-2012, sets out key objectives intended to integrate the environmental issue in all sectoral policies for matching sustainable development with the Lisbon agenda. Seven thematic strategies have been individuated which cover the four main priorities of the 6^{th} EAP: climate change, biodiversity, health and resource use. Thematic strategies look at pressure and impacts on the environment, explore short- and medium term measures where appropriate, but usually take the longer-term perspective of two decades. Each thematic strategy is strongly connected to the others, but in particular, the 6^{th} EAP has a vision integrating resource, product and wastes policies. That is why the Thematic strategy on the prevention and recycling of waste and the Thematic strategy on the sustainable use of resources have been developed and adopted at the same time.

Waste policy in EU

Waste is one of the first issues that EU environmental legislation tackled in the 1970s.

The overall legal framework includes horizontal legislation on waste management like Waste Framework Directive (75/442/EEC), Hazardous Waste Directives (91/689/EEC) and Waste Shipment Regulation (Reg 259/93). These legislations introduced the definition of "waste" and aimed at regulating waste handling without causing damage to the environment or human health. They were then integrated by legislations concerning waste treatments and disposal operations like Landfill Directive (99/31/EC) and Incineration Directive (2000/76/EC) and legislations regarding specific waste streams like sewage sludge (Dir 86/278/EEC), packaging (Dir 94/62/EC) and so on. Waste policy in EU is based on the so-called waste hierarchy concept which, schematically, represent Commission preferences towards different waste management options. The best option being the prevention of waste production while the worst is landfill disposal. Intermediate options are considered recycling (e.g. composting) and energy recovery. As far as biodegradable wastes are concerned, waste framework legislation as a whole, theoretically encourages recycling in agriculture through composting, since this is considered the most environmental friendly option for biodegradable waste management. In practice, the "waste" origin of produced compost has deeply influenced the perception on the quality of the final product and has led, so far, to a restrictive approach to nearly all environmental parameters regarding compost.

The problem is that, sometimes, the excessive control of waste management can become a limit to recycle under environmentally acceptable conditions. As example, below is reported the case of Cd limits proposed, for compost, in Annex III of the 2nd Draft of the working document "Biological treatment of biowaste" (2001) which should have led to the so-called "Directive on Compost". The criteria followed to set limits of heavy metals in compost is, very often, a vague concept of precaution if not the invocation of the precautionary principle, under the not declared assumption that, when dealing with heavy metals, "the best figure is the lowest".

The misleading application of the concept of precaution has determined year after year the loss of a scientific approach to the problem and the proposal of maximum admissible level of contaminants in compost regardless basic technical and scientific considerations. Moreover, the lack of a structured approach to the management of risk has led to contradictory and paradoxical conclusions (Tittarelli, 2002). In Commission Regulation (EC) N. 466/2001 of the 8th of March 2001, setting the maximum level for certain contaminants in foodstuff, the maximum level of Cd allowed in fruits and vegetables (product code 3.2.11) is 0.05 mg kg^{-1}

fresh weight. Taking into account that the dry matter content of a tomato fruit, as an example of vegetable, is about 5%, it follows that maximum amount allowed is 1 mg Cd kg^{-1} dry matter. This value is 50% higher than the maximum amount of Cd (0.7 mg Cd kg^{-1} d.m.) proposed in compost/digestate class 1 (Annex III of the 2nd Draft of the working document "Biological treatment of biowaste", 2001). The evident paradox we want to underline is the temptative to set the maximum concentration of Cd in compost to a level that is more restrictive than the concentration allowed in foodstuff. The consequence of this approach is a limitation in biodegradable waste recycle.

Thematic strategy on the prevention and recycling of waste

The main long-term goal of the recently published Communication "Taking sustainable use of resources forward: A Thematic strategy on the prevention and recycling of waste", COM(2005) 666 final, is for EU "to become a recycling society, that seeks to avoid waste and uses waste as a resource". Due to its complexity, in this paper only the main aspects of the strategy regarding biodegradable waste management will be reported, but a deep study and analysis of the Communication is strongly suggested.

The strategy is based on two major premises:

- Waste policy should focus on the environmental impact of using respources (the important issue is not scarcity of resources, but the environmental impact of their use);
- Waste policy should be based on a life-cycle approach (strict connection to Integrated Product Policy).

While the 6th EAP had envisaged the publication of a Directive on the management of biological waste in order to encourage and regulate compost production, the thematic strategy proposes quality benchmarks for compost and compost facilities to improve market opportunity. In order to achieve this goal, planned actions are the publication of guidelines for Member States on applying life-cycle thinking to management of biodegradable waste that is diverted from landfill and the adoption, for compost, of a first set of quality standards for defining when certain waste flows cease to be waste.

This approach has been criticised by composting associations because, respect to the hypothesised specific directive regulating biodegradable waste and setting separate collection targets, the framework of the strategy seems too weak and inadequate to tackle such an environmental issue. On the other side, thinking positive, mistakes made in the recent past will be, hopefully, taken into account when compost quality criteria will be adopted. After all,

matching market opportunity and waste recycling under environmentally acceptable conditions has been considered feasible by the thematic strategy itself.

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