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1 Introduction on bio-waste management in [Italy]

In Italy the national legislation has introduced in 2006 ambitious targets, namely a 65% MSW Source Separation Level (SSL) for each municipality. Today, biowaste, and particularly food waste from residential source separation, is clearly addressed as the first waste fraction to tackle for municipalities planning to reach the very high source separation targets set by the National law. These high SSLs have been easily achieved by thousands of municipalities in Italy, above all through the so-called “kerbside collection programs”, focusing on food waste collection with the typical Italian scheme. In 2018 (last official data available) the total amount of biowaste collected in Italy was 7.1 Mt, that currently accounts for more than 40% of all MSW separately collected and sent to recycling (i.e. including packaging waste and other municipal waste streams).

2 National concept/strategy on bio-waste management

2.1 Legal framework

In Italy, the national legislation does not explicitly require biowaste to be collected separately, but it becomes compulsory in order to meet the ambitious targets set by the National legislation, of a minimum of 65% MSW Source Separation Level (SSL) for each municipality.

As far as the recycling of the biowaste is concerned, according to the Italian Legislation (D.Lgs 75/2010 and subsequent amendments) the end of waste status is represented by compost, classified as a soil improver and divided into three categories:

- Green Compost (GWC): compost produced from garden waste only;
- Biowaste Compost (BWC): compost produced from biowaste, including both food- and garden waste;
- Sludge Compost (SWC): compost produced including sludge inside the mixture of different feedstock.

Digestate deriving from biowaste anaerobic digestion is considered a waste, and thus needs to be post-composted in order to get the status of product.

2.2 Waste management programs and strategies

Italy has adopted the targets for reducing biodegradable MSW going to Landfills in accordance with current EU legislation; again, the abovementioned 65% SSL targets and the specific programs adopted by the majority of municipalities for the implementation of biowaste (and other biodegradables) separate collection of food waste are helping to meet the goals. Most Regional MSW Management Programs do require the separate collection of biowaste and in many cases the suggested strategy is to collect it at the doorstep.

2.3 National standards and technical guidelines (collection, treatment and use)

Guidelines for separate collection of organic waste have been issued by Regional and District authorities since the mid '90s; the main indications for collecting biowaste can be resumed as follows:

- Collect food waste separately from garden waste
- Collect biowaste (i.e. food or garden waste) through kerbside schemes whenever it is technically and economically possible
- Collect biowaste by using compostable liners only, made of paper and/or compostable plastics that are certified according to the EN13432 standard

2.4 Quality Assurance Scheme (QAS) and National Quality Assurance Organization (NQAO)

A QAS scheme for compost was established by CIC in 2003; the initiative named “CIC Quality Compost Label” (CQL) is the first (and the only, so far) voluntary program for quality compost in Italy, addressed to facilities associated to CIC only.

Currently there are about 50 composting-facilities and 58 products complying with CIC’s QAS scheme and the amount of compost labelled represents more than 36% of Italy's total compost production.

Since January 2018, CIC has achieved the ECN-QAS, becoming the fourth national association provided with such quality assurance scheme.

3 Source separated collection of bio-waste

In 2018 biowaste collected separately in Italian municipalities has reached 7.1 Mt, made of 5.1 Mt or 84 kg/inh/y of food waste (with an increase of about 12% compared to the previous year), while 2,0 Mt (or 33 kg/inh/y) are represented by garden waste , thus almost getting to 117 kg per-capita.

Thousands of municipalities in Italy apply the so-called “kerbside collection programs”, focusing on food waste collection. This approach is based on small volume kitchen caddies fitted with biodegradable bags (i.e. compostable bioplastic or paper liners); collection is done at the kerbside (or door-to-door collection) and adopting convenient frequencies aimed at enhancing citizen's participation. In the last decade the intensive source separation of biowaste (and other recyclables), initially adopted by small municipalities, has been extended to medium/large towns and in metropolitan areas, achieving high participation by the population involved and reaching best-practise performances in terms of amount (between 70 and 120 kg/inh depending on the local context) and quality of the collected food waste; among these, it is worth mentioning the high performances achieved since 2014 by Milan, a city of 1.4 million inhabitants located in a metropolitan area of about 3 million.

In 2018, CIC performed 830 waste composition analyses on food waste to investigate the amount and the type of the impurities (non-compostable materials, n.c.m.) that, being improperly delivered by citizens, are sent to the composting and biogas plants together with biowaste; an assessment focusing on those municipalities collecting food waste at the doorstep shows that this strategy allows the best average food waste quality (4.3% n.c.m.), which is moreover associated to the population of municipalities involved; in fact, the average impurities vary from 2,4% for small municipalities (i.e. less than 5,000 inhabitants) up to a still acceptable value of about 5% for large cities.

4 Bio-waste treatment (recycling, material/energy recovery)

According to the data provided by the Italian Environment Agency’s annual report and subsequent elaboration by CIC, in 2018 n° 281 composting plants and n° 58 Anaerobic Digestion (integrated with composting) facilities were in operation recycling biowaste and other organic waste (sludge from waste-water treatment plants and other organic waste from agro-industries and others) produced in the Country, for an overall amount of 7.8 Mt of waste treated. The ten largest facilities exceed 100.000 tpy capacity each and together they can treat up to 2 Mtons or 25% of the total organic waste treated in Italy.

The biowaste collected separately in Italian municipalities is recycled in composting facilities (51% of the total amounts treated) while 49% are delivered to AD- and composting plants; hence, the AD option is constantly increasing over the last decade and in 2018 about 60% of the amount of food waste was treated in the 58 AD plants, that have largely exceeded the amount of food waste treated by the composting facilities.

Based on the amounts of waste delivered to Italy's composting- and AD&composting-plants, CIC has estimated that the total production of compost has reached almost 2 Mt. Of this compost 40% is produced under the CIC QAS scheme. CIC Compost Quality Label represents an added value in the compost market. Indeed, biowaste recycling facilities that obtained the CIC Label have constantly improved the product quality and, as a consequence, the confidence by the final user.

5 Application and market

Around 75% of compost produced in Italy is used in agriculture or horticulture, while the remaining 25% is sold for gardening or landscaping applications. Thanks to the latest updates of the Italian law on fertilizers, compost can be used to produce other organic fertilizers, such as basic growing substrate, mixed growing substrate or organic-mineral fertilizers.

A market investigation performed by CIC in 2019 shows that the mean price for BWC Compost sold in bulk, which is the more common form of compost sales, is around 7 €/t, and the price fluctuates between 2€/t and 15 €/t. The price of a packed material in bags, that is Compost mixed with peat or other kinds of fertilizers, is remarkably higher.

6 Expected trends and developments

Due to the progressive expansion of the separate collection services of food and garden waste in an increasing number of municipalities, and considering the growth trend over the last years, CIC estimates that by 2025 about 9.2 million tons of biowaste will be collected separately, equivalent to 153kg-per-capita and year.

The number of composting and AD facilities shall further increase, especially in those regions that currently are lacking recycling capacities for biowaste.

In 2018, the Italian Ministry for Economic Development promoted an important decree supporting the production of Biomethane to be used as a fuel for vehicles. CIC has moved accordingly, creating the Biomethane Label "Biometano Fertile" (currently under development) to support biomethane producers to certify the origin and sustainability of their biomethane. The Italian biowaste collection and recycling sector is considering that of Biomethane as a new strategic challenge to take up. As of July 2020, 10 AD facilities (mostly CIC members) do upgrade biogas to biomethane and are able to produce about 100 Mm³ of "Advanced fuel". The biomethane production from biowaste are growing up continuously and we can set an outlook of 200 Mm³ until the next few years.

7 Contacts and sources of information

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About CIC – Italian Composting and Biogas Association

The Italian Composting and Biogas Association (CIC) unites public and private compost producers, local authorities and others involved in compost production, like machinery and equipment constructors, growing media producers, research bodies, etc.

Since the very beginning, in 1992, CIC's mission has been to enhance recycling and prevention of biowaste, share knowledge and know-how between CIC's associates, enhance compost quality and market, perform technical training for the composting sector, assist government bodies in improving biowaste recovery.

CIC members are:

- Ordinary members representing biological treatment facilities such as composting and/or anaerobic digestion plants treating mainly organic waste from separate collection;
- Associate Members representing companies that are not directly managing waste treatment plants;
- General Association Members from the public and private sector involved in MSW management and recycling.

By end of 2018 CIC's Ordinary Members are 78, Associate Members 49 and General Association Members are currently 2.

More info on: www.compost.it www.compostabile.com
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International activities and memberships:

CIC is a founding member of the **European Composting Network (ECN)**.

CIC strongly supports the activities of **ISWA** – the International Solid Waste Association, chairing the Working Group on Biological Treatment of Waste

CIC is a founding member of the **World Biogas Association**.

CIC is Worldwide Ambassador of **Ecomondo**, the leading Exposition on Green Economy, Waste Management and Recycling technologies in the Mediterranean Area.

CIC is a founding member of the **Mediterranean Compost Network**.

CIC is partner of USCC during the **International Compost Awareness Week**