

Technical Annex 1 - THE CHALLENGE

Before detailing the specific characterisation service that is the subject of this consultation, a general overview of the Organic Waste Collection System is provided below. This is intended to give interested economic operators a clear understanding of the operational context in which the proposed solution would need to be implemented. Following this overview, the current Biowaste Characterisation Service is described in detail, so that economic operators can better understand the specific need this OMC aims to address.

Specifically, as mentioned in the above section 3 of the OMC terms, the purpose of the consultation is to gather information on the challenge related to the development of an automated system aimed at improving the Biowaste Characterisation Service, capable, first of all, of detecting the quantity and therefore the weight of impurities in the organic fraction of municipal waste. Ideally, such a system would also be able to identify the different types of impurities within the organic fraction and calculate their weight, distinguishing it from the weight of the organic fraction itself. Further information on the subject of this consultation can be found in Annex 1 appended to these terms.

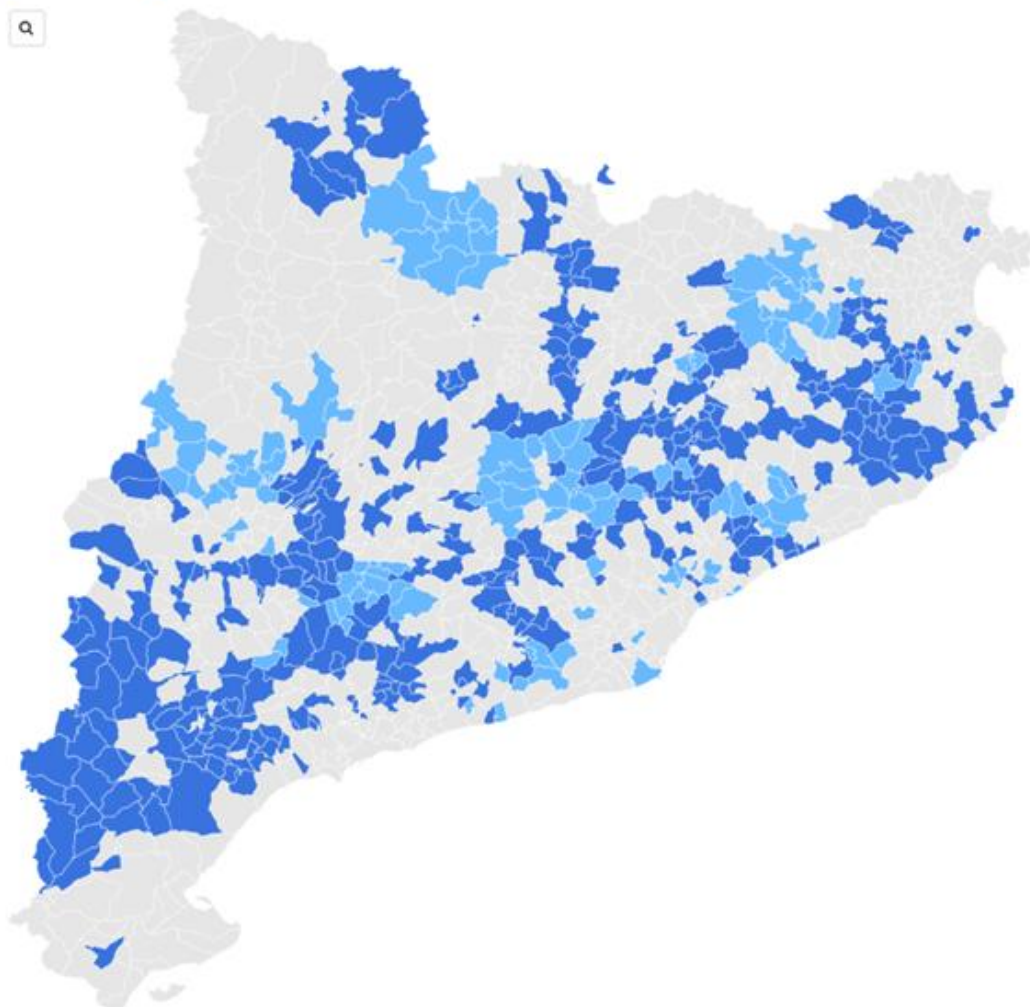
Organic Waste Collection System

In Catalonia, the separate collection of organic waste has been widespread for years. Of the 947 municipalities that make up the Catalan territory, the vast majority have some system for the separate collection of the organic fraction. In the case of some small municipalities, home composting has been implemented as an alternative means of managing this organic material.

Among the municipalities that have implemented selective collection, several collection models coexist. At the end of the 1st trimester of 2026, around 430 municipalities have adopted models considered efficient: 319 use the door to door collection system and 111 use closed containers with user identification. Furthermore, some municipalities opt for mixed models, combining different systems depending on the waste fraction, such as door to door collection for certain fractions and the open or closed container for others. The remaining municipalities, despite including the separate collection of bio-waste, predominantly use the open-container model, which imposes no usage restrictions or user identification.

Separate Collection model ▾

☒ Door to Door ☐ Locked container



Once the organic matter is collected using these different models, it is transported by lorry to the corresponding treatment facilities, which can be composting plants (14 facilities) or anaerobic digestion plants (8 facilities). At these facilities, the collected waste is pre-treated, separating most of the contaminants and recovering as much organic matter as possible for the subsequent treatment process.

In these facilities, the collected waste is pre-treated, separating the majority of the unsuitable waste and recovering the maximum amount of organic matter that continues the treatment and is transformed into biogas and/or compost, a final product that can later be applied to the soil in the agricultural field.

The characterisation of the biowaste service

In this scenario, the collected organic waste may contain other types of waste, such as plastic bags, paper or glass waste, metals, sanitary pads or textile. The

presence of these materials in the biowaste fraction is regarded as impurities which hinder the composting process, thereby reducing the quality as a fertilizer. Specifically, the Catalan Waste Agency aims at improving the quality monitoring of separately collected biowaste. The characterisation service has been operational since 2006 conducting around 2,000 biowaste fraction checks annually in Catalonia's composting and anaerobic digestion plants. In consequence, the Agency has around 2000 characterisation reports of biowaste, including images of the initial biowaste received at the treatment facility and images of the different types of waste separate in the characterisation process.

The current contract for the characterisation of the biowaste, residual waste, and treatment plant rejects is divided in 4 lots and started in 2024 with a four-year term and with the possibility of annual extensions.

The current system has an economic impact on the redistribution of landfill and incineration tax revenues. How do quality assessment and control of biowaste work in relation to the tax refund mechanism?

- Biowaste treatment: municipalities receive an economic refund of €34 per tonne of biowaste containing less than 20% impurities.
- Biowaste collection: municipalities receive an economic refund of €12 per tonne of biowaste, depending on the level of impurities.

Specifically, the Agency has developed a [Guidance](#) for Local Authorities on the Application of the Waste Tax Credit Return Allocated to the Municipal Waste Management Fund for the Year 2026.

Moreover, it is essential to analyse in detail [how the characterisation of the biowaste fraction works](#).

Firstly it's important to highlight that the characterisation is intended to be applied to the biowaste fraction of municipal waste selectively collected in biological treatment or transfer plants, originating from one or more local authorities or from private collection circuits for commercial or industrial organic waste, similar to municipal waste. Secondly, regarding the characterisation procedure, the Waste Agency of Catalonia conducts these at the treatment plant, where the biological waste is weighed.

Methodology:

The total quantity of the organic fraction collected in a given collection circuit is called the Lot. Since, in general, carrying out the characterisation of the organic fraction on the entire Lot would be entirely impracticable, it is necessary to carry

out a prior sampling process in order to obtain a smaller quantity of material that is nevertheless fully representative of the Lot, called the Sample, on which the characterisation will then be performed. Currently, the analysis is conducted at the treatment plant, where the biological waste is weighed.

- The first step is the identification and weighing of the material, and therefore the identification of the origin of the waste, namely:
 - collection circuit;
 - date and time of reception;
 - type and registration number of the vehicle;
 - quantity unloaded, with a copy of the delivery note attached.
- Subsequently, the material to be characterised shall preferably be deposited in a paved, clean and covered area. The unloading shall take place directly on the ground, without placing any layer of pruning waste or other absorbent materials underneath the material.
- The characterisation shall be carried out as soon as possible after the arrival of the material at the treatment plant, and preferably in natural daylight. The maximum storage time of a Lot, between the unloading of the material and its characterisation, shall not exceed 24 hours during the period from June to August inclusive, and 48 hours during the other months of the year. If the plant where the characterisation is to be carried out does not have suitable paving, the material to be characterised shall be placed directly on tarpaulins laid on the ground, in order to avoid contamination of the sample.
 - The whole Lot is then carefully homogenised in order to avoid compaction or leachate loss. A representative sample is obtained through successive quartering, repeatedly dividing the homogenised Lot into four parts and retaining two opposite sub-samples until a final sample of about 250 kg is reached.
 - Subsequently, manually and with the help of shovels, the material shall be placed in a previously tared and weighed bucket. The contents of the bucket shall then be emptied onto a worktable with a clean surface. It is preferable for this surface to be raised, in order to facilitate the work of the staff carrying out the characterisation.
 - Once the sample of about 250 kg has been obtained, the material is separated into different fractions. The main objective of the characterisation is to distinguish between the compostable fraction and the improper fraction, further dividing them into subcategories. The compostable fraction essentially includes the fermentable organic fraction. The improper fraction

includes all non-compostable materials, such as glass, paper and cardboard, plastics, non-compostable plastic bags, ferrous and non-ferrous metals, textiles, sanitary textiles, hazardous waste, bulky waste, and a residual “other” category. From an operational point of view, the separated materials are placed in identified and previously tared containers and at the end of the separation, each fraction is weighed and photographic documentation is produced. The improper fractions must be sent to the collection and management system for residual waste, whereas the organic matter, where possible, is reintroduced into the biological treatment system.

- The photographic documentation, to be produced during the characterisation, must cover the Lot, its identification sign, the sample after quartering, the clean organic fraction, pruning waste, each improper fraction, any bulky waste, and other relevant aspects of the process.
- Finally, all the data collected in the field sheets and the photographs are entered into the SDR IT system. The system automatically generates the characterisation bulletins, which are then submitted to the Agency for validation.

Examples:

GRAFIC INFORMATION ABOUT DIFFERENT BIOWASTE QUALITY SAMPLES

Example	Initial sample	Materials classification	Result
1. Good quality			94,75% biowaste 5,14% impurities
2. Medium quality			89,79% Biowaste 11,42% impurities

3.Low
quality



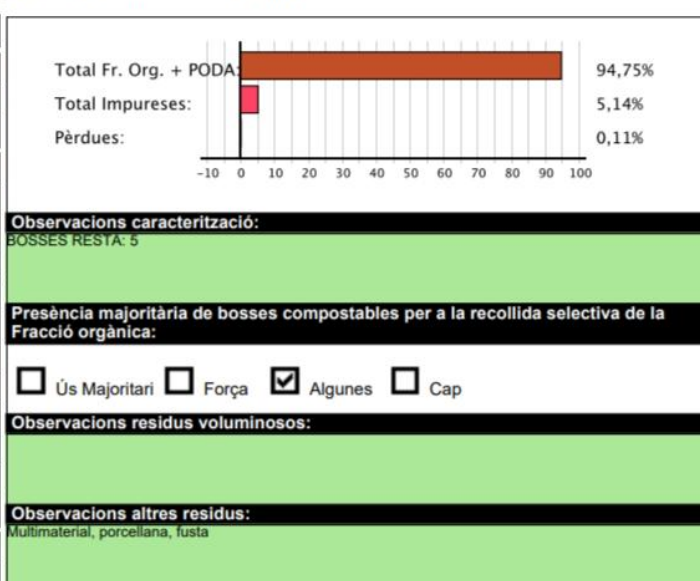
45,67%
Biowaste
54,27%
impurities

Example 1.- Good quality detailed report

Resultat de la caracterització

Frac. org. a caracteritzar **250,38 Kg** Inclou part proporcional de PODA i Residus Voluminosos

Fraccions	Pes en Kg	% en pes
Fracció orgànica	234,41 Kg	94,75%
Podar	0,00 Kg	NaN%
Total Frac. org. + PODA	234,41 Kg	94,75%
Vidre	0,40 Kg	0,16%
Paper i Cartró*	1,31 Kg	0,35%
Plàstic, Mixtos i Film	3,35 Kg	1,34%
Bosses Plàstic*	5,15 Kg	1,11%
Metall Fèrric	0,09 Kg	0,04%
Metall no Fèrric	0,18 Kg	0,07%
Tèxtil	1,48 Kg	0,59%
Tèxtil-Sanitari	1,95 Kg	0,78%
Residus Especials	0,00 Kg	0,00%
Residus Voluminosos	0,00 Kg	0,00%
Altres Residus	1,78 Kg	0,71%
Total impropis	15,69 Kg	5,14%
TOTAL:	250,10 Kg	99,89%
Pèrdues:	0,28 Kg	0,11%

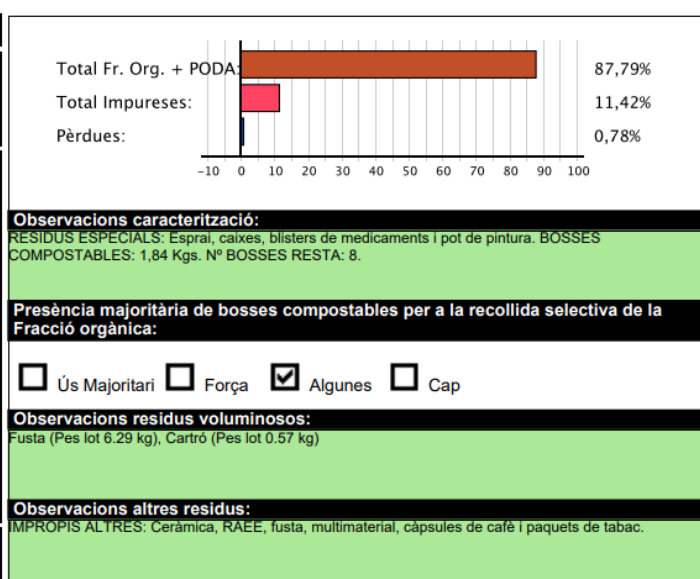


Example 2.- Medium quality detailed report

Resultat de la caracterització

Frac. org. a caracteritzar **240,96 Kg** Inclou part proporcional de PODA i Residus Voluminosos

Fraccions	Pes en Kg	% en pes
Fracció orgànica	206,94 Kg	87,79%
Podar	0,00 Kg	NaN%
Total Frac. org. + PODA	206,94 Kg	87,79%
Vidre	1,41 Kg	0,59%
Paper i Cartró*	4,22 Kg	1,16%
Plàstic, Mixtos i Film	8,97 Kg	3,72%
Bosses Plàstic*	6,89 Kg	1,54%
Metall Fèrric	0,00 Kg	0,00%
Metall no Fèrric	0,91 Kg	0,38%
Tèxtil	4,57 Kg	1,90%
Tèxtil-Sanitari	2,07 Kg	0,86%
Residus Especials	0,74 Kg	0,31%
Residus Voluminosos	0,24 Kg	0,10%
Altres Residus	2,11 Kg	0,88%
Total impropis	32,13 Kg	11,42%
TOTAL:	239,07 Kg	99,22%
Pèrdues:	1,89 Kg	0,78%



Example 3.- Low quality detailed report

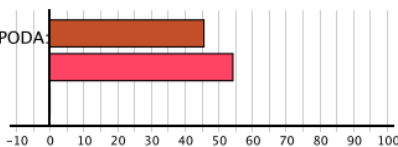
Resultat de la caracterització

Frac. org. a caracteritzar	241,03 Kg	Inclou part proporcional de PODA i Residus Voluminosos
Fraccions	Pes en Kg	% en pes
Fracció orgànica	93,42 Kg	45,67%
Poda	0,00 Kg	NaN%
Total Frac. org. + PODA	93,42 Kg	45,67%
Vidre	0,03 Kg	0,01%
Paper i Cartró*	34,57 Kg	9,47%
Plàstic, Mixtos i Film	63,63 Kg	26,40%
Bosses Plàstic*	10,64 Kg	2,38%
Metall Fèrric	1,28 Kg	0,53%
Metall no Fèrric	2,49 Kg	1,03%
Tèxtil	16,56 Kg	6,87%
Tèxtil-Sanitari	15,77 Kg	6,54%
Residus Especials	0,92 Kg	0,38%
Residus Voluminosos	0,00 Kg	0,00%
Altres Residus	1,57 Kg	0,65%
Total impropis	147,46 Kg	54,27%
TOTAL:	240,88 Kg	99,94%
Pèrdues:	0,15 Kg	0,06%

Total Fr. Org. + PODA: 45,67%

Total Impureses: 54,27%

Pèrdues: 0,06%



Observacions caracterització:

Residus especials: medicaments, aerosòl, pila **BOSSSES RESTA: 0**
 ???FIXFO1Q3GO002M-20260323-B13d (Algunes lletres o números no son visibles)

Presència majoritària de bosses compostables per a la recollida selectiva de la Fracció orgànica:

☐ Ús Majoritari ☐ Força ☐ Algunes ☒ Cap

Observacions residus voluminosos:

Observacions altres residus:

Multimaterial, fusta, RAEE, càpsula de café, fregall, encenedor, contingut, burilles de tabac, full d'afaitar, bolígrafs

Prior art analysis

The prior art analysis has been conducted to identify market solutions available (existing products, ongoing product development and published ideas), whether IPR protected or not, to check the innovative aspect of this unmet need.

From the patent research, the main result identified as relevant to the contracting authority is the following:

[Waste disposal system and method for detecting foreign matter in waste containers](#) : This invention is designed to improve the safety and efficiency of waste management by automatically identifying and handling foreign objects or prohibited materials during the collection process. The system scans/captures images of the contents of waste containers as they are being disposed of. It uses a real-time data processing unit that analyses these images to classify contents and identify contamination.

It should be noted that this patent (EP4181086B1), granted in September 2024 and valid until November 2041, covers European territory. However, it does not preclude the development of technically distinct solutions from the specific system it protects.