

METHOD AND DEVICE FOR THE TREATMENT OF HOUSEHOLD REFUSE

This invention processes and recycles household refuse and/or for the purpose of obtaining a granulate.

The household rubbish and waste itself comprises of the following products:

- 25 % are organic substances such as vegetables, fruit, kitchen waste etc...
- 50 % are recyclable substances such as paper, cardboard, textiles, leather, plastic, glass, scrap metal (ferrous and non ferrous) etc...
- 25 % are inert and mud-based substances such as stoneware, earthenware, dispersed toxic waste etc...

For many years, much research has gone into finding a process for the treatment of waste and refuse.

Until now the the following methods are being used:

- the discharge of waste wich runs the risk of pollution,
- incineration wich may or may not lead to the loss of useful energy.

The former can produce serious atmospheric pollution, if the filtration of gases is slightly miscalculated.

It requires heavy financial investments, as the operating costs are high and vast amounts of energy are released.

The latter, in theory, has the advantage of been able to recycle the energy produced, but it needs an immediate distribution infrastructure, like for example district heating. This method is only possible in cold countries where inflammable substances are abundant in refuse.

A third possibility exists: compost production from waste and household refuse.

This last technique is now well-known and gives interesting results.

However it can only be used for some domestic waste.



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As a result, workers are made to handle and separate the required substances, which are not only harmful to the environment but also can cause olfactory problems to the workers themselves.

Moreover the compost obtained is very moist, making long-distanced travelling impossible; in the case of agricultural use, due to its moisture and harmful effects the farmer often rejects this method.

This method of processing waste and household refuse, not only offers preferable conditions to the worker and minimizes harmful effects, such as bad smells and dirty conditions, but it also results in producing a drier product of granulous consistence, which can be easily stored, transported and used as manure.

The following method is used:

- a) washing, followed by spin drying and a further drying stage.
- b) Before undergoing the instructions stated in a), a further process is carried out using a bags opener and then the screening is done with accelerated fermentation whilst being watered.
- c) before step a) and after step b), the selection and separation of putrescible organic materials takes place and the recyclable secondary raw material is kept.
- d) the putrescible organic material, after step b) and c), it is dried, crushed and left, in order to obtain a granulate.

Other advantages and characteristics of this technique will come clear when reading the following description of the method given as an unexhaustive example and is illustrated by the attached drawing:

- the unique plate represents a project of planting a processing waste and household refuse by putting into operation the processing method stated.

According to the attached drawing, the device includes a tank N°1 for collecting the waste and household refuse.

The tank N°1 is fitted with a well-known ventilation and watering system.

The tank N°1 may be fitted with a draining system of products.

It includes a widely-used conveyor system: a kind of endless screw or conveyor belt which feeds a loading funnel N°2.

The conveyor system is regulated according to the needs.

The loading funnel N°2 feeds a bags opener device with if possible an integrated watering system, which opens the bags by inertia and feeds a conveyor system with either screws or belts towards the screening and accelerated fermentation station N°4.

The bags opener station opens the bags roughly by inertia.

The screening station N°4 separates the small-sized waste and dust.

This station is also fitted with a watering system.

It feeds a station N°5, which washes the waste.

The station N°5 should be, if possible, equipped with a rotating drum: its spindle is horizontal or upright and the washing is made by using permanently recycled water and grease.

Then products are carried on a conveyor system (screw or belt) towards the centrifuging station N°6 which takes the recycled water towards the processing station.

The centrifuging of the station N°6 is made by means of a rotating system which is constantly turning.

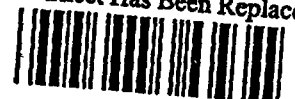
The conveyor system from station N°6 leads to station N°7 where the drying takes place. This drying may be made by a cyclone or by a dryer fitted with an internal conveyor system which dehumidifies products. Later the products will be treated with dried air which is permanently recycled by an aeraulic station.

The system used links a standard heating pump with heat exchangers.

The drying air temperature varies from 30°C to 38°C.

Water is collected when the air is dehumidified.

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From the station N°7 products are lead by conveyors towards a manual sorting area.

As already stated in the introduction, selection is taken from the conveyor according to the waste used.

Sorting stations will collect similar products. Inflammable imputrescible products, plastics, clothes, glass, scrap metal (ferrous or non ferrous metal) and, eventually other products are separated and taken to a storage station N°10 and/or will then be recycled in stations especially adapted for certain products. Other stored products will be recycled.

After putrescible organic materials and household refuse has been dehumidified, these will be lead by a conveyor towards a screening and filtering station N°12.

After screening and filtering the putrescible organic materials are left to stand and granulated.

The screening and filtering processes are adapted to suit the needs of the expert.

The granulate obtained is baged for use (a well-known method).

The bags opener station N°3 and the screening station N°4 are humid stations: there is a pre-washing stage, where water is collected, which allows a quicker fermentation of the putrescible organic materials and makes the operating of the washing stations N°5 and 6 of centrifuging easier.

This humid processing stage is one of the most important characteristics of this technique which allows us to work on waste which will then be rid of most impurities and harmful effects, in particular olfactory. Moreover, it allows their sanitization using accelerated fermentation of the putrescible organic materials.

The dry processing stage for the inorganic materials - the drying station N° 7, sorting station N° 8, and pressing station N°9, and for the organic materials - the previous stations plus the combined grinder and sieve station N°12 and the drying station N°11 allow to increase the comfort and to obtain dry-finished products. In case of granulated organic materials, these are particularly useful as manure.

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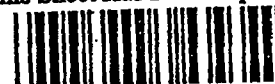


This method allows to use organic waste in agriculture which is free of moisture and impurities unlike the traditional compost process. Instead these impurities have been extracted by watering and accelerated fermentation, drying and maturation.

The documents D1 EP-A-170301 and D2 DE-A-3037717 show that the corresponding state of the technique allows to say and to assert that the invention is new as far as the process of washing the waste, the centrifuging and drying is concerned: the technique described in the documents D1 D2 shows that the waste processing method is carried out using rough methods without washing.

This new method can be applied in industry for the use of processing the waste by washing, centrifuging and drying secondary raw materials; likewise it produces a sanitized putrescible material. This need to sanitize waste was not realised before the registration of this method and its application in industry should be easily put into effect and soon will have to be acknowledged by professionals and experts.

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PATENT CLAIMS

1) Introduction:

In the actual state of the technique no method provided the washing, centrifuging and drying in order to recycle waste and household refuse.

2) This processing is essentially characterized by the following steps:

a) washing, followed by spin drying and a further drying stage.

b) Before undergoing the instructions stated in a), a further process is carried out using a bags opener and then the screening is done with accelerated fermentation whilst being watered.

c) before step a) and after step b), the selection and separation of putrescible organic materials takes place and the recyclable secondary raw material is kept.

d) the putrescible organic material, after step b) and c), it is dried, crushed and left, in order to obtain a granulate.

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