

**ASPECTS REGARDING RESIDUES TREATMENT IN
AN ORGANIC CATTLE FARM**

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Abstract

On farms where an organic production system is operated, it is obligatory to show great respect towards the environment and the animals. Organic farming cannot be practiced correctly if the balance with nature is continuously broken, because optimum conditions of the fields and pastures where the animals are reared are required. Respect for the surrounding environment, which provides food for the animals, is essential for reaching a good balance and obtaining real profits from the farm.

Keywords: organic, cattle farm, residue treatment, compost

1. INTRODUCTION

On an organic beef cattle farm, organic and inorganic cattle residues are generated and attempts should be made to take advantage of them.

Inorganic residues are plastic containers, paper and cardboard, rests of medicaments, syringes, etc. Some of them can be recycled (paper, containers, cardboard), and others taken to special containers to be processed independently, such as rests of medicaments and syringes. Inorganic residues should never be abandoned in the fields or dumped in rivers because, in the majority of cases, they damage and destroy the flora and fauna of the surroundings, breaking the balance with the environment.

Organic residues are substances obtained as a side effect of beef cattle production and that, if managed well, represent an important factor to the viability of the farm. The main use given to the majority of these residues is fertiliser.

The type and quantity of residues vary according to the established production system. On farms with installations for the fattening lot, the amount of residues will be higher than on farms where this lot is always in the open air, pasturing in the meadows.

In the latter case, organic residues will be absorbed by the soil. There will be areas in the land parcels where the concentration of excrements is higher and other areas where there are more food rests.

Therefore, it is advisable to rake these land parcels in order to spread the residues and to fertilise the soil in an evenly spread manner.

Among organic cattle residues, the following can be emphasised:

- Solid excrements.
- Urine.

- Bedding rests, straw, sawdust, etc.
- Food rests, formula feeds, hay, forage, etc.
- Water from cattle reservoirs.
- Gases.
- Water for cleaning.

Of all of these, the highest proportion corresponds to solid excrements and animal liquids, followed by bedding rests and water.

2. MATERIAL AND METHODS

2.1. Cattle manure

Cattle manure refers to the matured mixture of solid excrements, liquids, bedding, food rests and water.

Slurry is liquid manure that is formed after using water for cleaning the installations.

There are differences in the composition of excrements according to each farm and also based on genetics, diet, the physiological state, age, time of year, etc. The animals' diet has a decisive impact on the production of residues, given that there are certain raw materials that make the excrements more liquid, thus producing dampness problems in the bedding.

It is wise to perform an analysis to determine the characteristics of the excrements and to find out their value for use as fertiliser. In terms of the composition of excrements, the highest percentage corresponds to water, followed by dry matter and then, nitrogen, phosphorous, potassium, calcium and magnesium.

Therefore, the use of this material as fertiliser will enhance the fertilization of the land parcels and increase the production of pasture for animal consumption, either to be consumed directly by the

animals or through the production of hay and forages.

The concentration of cattle manure to be administered to the land parcels is limited and legislated for the purpose of avoiding excessive accumulations of concentrations of nitrogen.

The total amount of cattle manure per farm cannot exceed 170 kg of nitrogen per hectare of agricultural surface per year. To find out the correct density of herds on pasture land and not exceed the imposed nitrogen limit, a series of limits will be established by the competent authorities of each Member State, always in line with the Regulation 2092/91, where the maximum number of animals per hectare equivalent to 170 kg of nitrogen per hectare per year is established.

The maximum number of animals per hectare, in terms of situations of over-pasturing and excessive contamination of the soil, is also regulated in Regulation 2092/91. In case of exceeding these limits, the density of herds on pastureland will have to be reduced and adjusted.

Organic farms can reach agreements with other organic farms to make use of excess cattle manure to spread on their land parcels as fertiliser.

Member States will be able to reduce these limits in consideration of other characteristics of the area and the existence of any other source of nitrogen to the soil.

2.2. Cattle manure management

There are differences in cattle manure management based on the production system.

When fattening calves are reared in the open air, no cattle manure is accumulated, it is simply spread over the land parcel with the help of tractor, making sure the maximum concentration of nitrogen is not exceeded.

If fattening calves are reared inside the installations, cattle manure should be removed often so that the animals' hygienic-sanitation conditions are not affected.

The flooring of the installations should be impermeable. Abundant bedding, which should be changed frequently, is advisable for the habitability and hygienic conditions of the installations to be adequate for the proper development of the animals.

Once the cattle manure has been removed from the installations, it is taken to the manure yard. The manure yard should meet the adequate conditions to avoid contaminating subsoil waters or filtering through the soil (impermeable floor).

A process similar to composting takes place in the manure yard. Whether the cattle manure in the manure yard needs to be protected, watered, aired,

and how long it will take to mature, will be determined based on each area's climate conditions.



Figure 1. Manure residue deposit

In the open air, the conditions to be taken into account for cattle manure are many and vary according to the type of floor. In general, it is convenient to spread it soon (autumn or winter) and as uniformly as possible, so that when sowing is performed, decomposition is already in an advanced state.

The amount to spread on the soil will depend on the type of cattle manure, the typical characteristics of the floor, the type of crop, etc. For example, with clayey soils, large amounts of very mature cattle manure are used. However, with sandy soils, less quantities of cattle manure are used and it does not have to be that matured.

3. RESULTS AND DISCUSSIONS

Treatment of residues

As explained above, the majority of residues generated on a farm can be adequately treated, avoiding environmental contamination. In order to manage residues well, proper separation of each type should be carried out.

3.1. Inorganic residues

Inorganic residues should be distributed in separate containers for due disposal:

- Paper and cardboard can be used in the composting process (explained below) provided that it has not been chemically treated, i.e., it does not have printing ink, otherwise it is not adequate for use in organic compost, although it can be recycled.
- Medicament rests and syringes are considered biological materials and should be taken to the treatment plants for this type of residues.

- Tractor, car and machinery oils are also treated in specific plants. Special care should be taken in not dumping these substances in rivers or fields because they will remain in the environment for many years.

- Plastics can also be recycled and reused; they should not be left in the fields.

- Other types of residues are metal wires and ropes, materials present on any farm and perfectly reusable. When they are left abandoned in fields either accidentally or piled up in a corner, they pose a danger to cattle as, in the case of ropes, they can produce diseases associated with digestive obstructions and, in the case of metal wires, digestive perforations.

With recycling and reusing we contribute towards preserving the environment by reusing many materials that previously had a single use and went directly into the rubbish.



Figure 2. Inorganic residue containers

3.2. Composting

In relation to the treatment of residues, one of the most important methods in organic production is composting. As already explained in the section on organic farming fertilisation, it involves a relatively simple technique through which organic matter is degraded for plant assimilation.

It is a process through which a homogenous mix, rich in organic matter, is achieved, containing a large amount of minerals and other nutrients.

Composting is similar to the processes that take place in nature on a daily basis.

For example, in autumn, when the leaves fall, they rot at the feet of other vegetables, and provide, together with the water, air and different microorganisms, the organic matter that the vegetables need to grow the following year.

Compost is another element used as fertiliser, and most farm residues can contribute to it.

To make good compost, one needs to have a place where to begin to heap organic matter to be degraded (compost tank).

The location where the compost tank is to be placed should previously be assessed in order to avoid organic matter being dragged away by water, excessive ventilation or temperature. It is advisable to build the compost tank in a place sheltered from severe weather conditions.



Figure 3. Compost

The compost tank has to be in contact with the floor because this enhances the interchange of microorganisms that intervene in the degradation of organic matter process.

The size of the particles influences the decomposition speed, the smaller the size of the materials to be composted, the faster the decomposition. The presence of some elements, such as carbon, nitrogen, phosphorous and other constituents is essential to the degradation reactions of the matter produced by the microorganisms.

Under normal conditions, nature does not need anything that it cannot obtain from nature itself.

A biological accelerator can be added to reduce the decomposition time of the matter. When organic matter is deposited, the accelerator is added at every 20 cm, so that the process initiates with force and speeds up.

4. CONCLUSIONS

To obtain good compost can be used:

- Vegetable rests, such as, straw, dry leaves, pinecones, grapes, branches, fruit peels, sawdust (untreated), cardboard, paper, etc.

- All products produced by organic production.

- Animal rests, such as, skin, flour, bones, slaughterhouse rests, cattle manure that provides nitrogen.

- Mineral rests, such as, granites, limestones, silicates, phosphates that incorporate oligoelements, indispensable for plants.

In the composting process, the temperature varies according to the microbial activity, reaching an approximately internal temperature of 60° C.

Compost is considered mature when, after various temperate variation phases, the temperature holds at ambient temperate.

The optimum pH value ranges from 5 to 8. High ventilation can cool the compost and delay the process. Optimum humidity will depend on the type of microorganism present in the mix, but it generally ranges between 30 and 60%. The compost may need to be watered during periods of excessive heat but, under normal conditions, the water contained in vegetables is sufficient.

After three or four months, fresh compost is formed, where material remains can still be recognised. Two months later (five of six weeks in total), we obtain a black coloured mixture.

Vegetable, animal and mineral rests will have been decomposed and the resulting material will have a high percentage of oligoelements and nutrients.

Once the compost has been obtained, wood ashes, which provide potassium, can be added or organic farm animal manure, which helps maintain the balance between the nutrients.

The following materials should not be used for compost:

- Vegetable rests which have been treated in chemical processes.
- Citrus peels because they are too acidic.
- Oils and grease.
- Any non-biodegradable material.

The results obtained with composting in soil fertilization are similar or better than those achieved with chemical fertilisers..

In addition, negative effects, such as aquifer contamination due to an excess of nitrogen, and the exhaustion of organic matter, are avoided.

Compost enriches soil with organic matter and microorganisms that enhance fertilisation.

In an organic farm, quality takes priority to quantity. Therefore, exploiting everything to the full must be put aside because, without quality, there is no value, although bearing in mind that the farm must be financially viable given that it is a means of life.

Respect for the surrounding environment, which provides food for the animals, is essential for reaching a good balance and obtaining real profits from the farm.

5. REFERENCES

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