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(54) Title: THE WAY OF DISPOSAL OF WASTE FROM OLIVE OIL PRODUCTION

(57) Abstract

The way of disposal of waste from olive oil production using intensive grinding and mixing of effluent water with natural bentonite, which is thus activated. The solution is based on a continuous mixing of the liquid phase of waste, whose density is between 800 to 1000 kg/m³, at a ratio of up to 300 kg of natural bentonite, to 1 m³ of the liquid phase of waste, followed by the admixture of solid phase of waste after which the mixture is inoculated and subject to forced aeration.

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The way of disposal of waste from olive oil production

The invention deals with the way of disposal of waste from olive oil production.

Production of olive oil mainly takes place at olive pressing shops, situated in the vicinity of live groves. The oil is pressed out of the olive pulp or olive cake or olive kernels. Waste originating during the process of olive oil production consists of pressed out matter of the pulp, husk, kernel shells, leaves and remnants of twigs and the sap remaining after separation of the oil. Disposal of this waste is currently carried out via burning of the solid portion at site while the sap, for which the term "marga" is used in the technology of olive oil production, is discharged into environment, because construction of the digester tank is regarded as expensive. Since the sap contains, apart from other components, considerable proportion of phosphatides, which tend to decompose via putrefactive processes, environmental damages take place - spreading of bad smell, water and soil contamination.

Other possible ways of organic waste disposal have been published in the literature, e.g. inoculation with horned cattle sewage or sludge from sewage treatment plants, which should affect the proliferation of methane-generating bacteria and hence the production of biogas. Because of the fact, that the rate of methane production is not constant and sometimes even falls to zero, inoculation with reticulum content or reticulum liquid extracted from the slaughtered fatstock has been tried. Thus, to some extent, it is possible to control the activity of bacteria, however, it is not possible to use this method as a routine method for disposal of waste with the above described composition and location.

Also the chemical ways of disposal of similar wastes are known, e.g. using the acids and following neutralization.

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However, apart from being very expensive and complicated, these methods bring about the risk of overdosage and ensuing environmental damages.

Another method is used e.g. for the disposal of sludges resulting from wine clarification, so called blue sludges. This method is based on calcination of the sludges at high temperatures, i.e. in principle on their pyrolytic decomposition. Advantage is taken of the fact that the sludge contains certain amount of bentonite and the final product can be used as an additional raw material in the field of brickmaking, ceramics, cement and other industries. Neither this way of disposal is suitable for the purpose of this invention, since it assumes the proximity of a high temperature source and the presence of e.g. ferrocyanides, so that the process of calcination can occur.

The said shortcomings are in principle eliminated by the method of disposal of waste from olive oil production which is using an intensive grinding and mixing of the waste water with natural bentonite which is thus being activated.

Principle of the invention is as follows: Liquid phase of the waste, whose density is between 800 to 1000 kg/m³, is continuously mixed, at a ratio of up to 300 kg of natural bentonite, to 1 m³ of the liquid phase of waste. After that a solid phase of waste is admixed and the mixture is inoculated and subject to forced aeration.

Advantage of this way of disposal of waste from olive oil production is a simple and cheap equipment which, for example, can only consist of the tank and grinding and mixing pump. Another advantage is the absence of chemicals and availability of all the necessary raw materials as well as energy and especially that of inoculation material. The latter can easily be prepared from the soil containing micro-organisms being for a long period modified via the acting of olive-tree products and thus provided with a specific biodegradation properties. Resulting product is a loose, lumpy mass suitable for exploitation in agriculture. The matter does not further

decompose neither smells bad even in a humid environment.

EXAMPLE

The method of waste disposal, as described in the invention, has been used under the field conditions.

Waste from olive oil production was used containing 28.6 % (by weight) of olive press cake, 17.4 % (by weight) of olive sap after the oil separation - so called marga and 54 % (by weight) of vegetable waste.

Marga, as the liquid phase of waste with the density of 970 kg/m^3 , was adjusted via mixing with natural bentonite, coming from the deposit Obrnice, at a ratio of 200 kg of bentonite to 1 m^3 of marga. The mixture was further mixed up with a solid phase, i.e. press cakes and with vegetable waste while inoculation material was being added. Inoculation material was obtained as follows: 25 kg of the upper soil from the immediate vicinity of olive-trees was taken away and well mixed with 55 litres of untreated fresh-water water. After the sedimentation of insoluble parts the water portion was drawn off and immediately used.

The adjusted compost charge, its temperature of 31°C , was charged into the bioreactor equipped with a controlled aeration regime and measurement of carbon dioxide concentration on the bioreactor off-gas.

After 7 days the temperature of deposited waste reached its maximum of 65°C and, simultaneously, the amount of carbon dioxide reached the maximum value throughout the whole course of the process. During the following 7 days values of both the measured parameters went down. In the final stage the temperature of composted material did not exceed 45°C , which shows the accelerated disintegration of the biomass.

Appearance of the product shows unambiguously that the quality inter-reaction of original raw materials took place. Neither during the fermentation nor after its completion the decomposition processes occurred which commonly accompany putrefaction of olive waste with the release of undesirable and smelly compounds.

CLAIMS

The way of disposal of waste from olive oil production using intensive grinding and mixing of effluent water with natural bentonite, which is thus activated, characterized by continuous mixing of the liquid phase of waste, whose density is between 800 to 1000 kg/m³, at a ratio of up to 300 kg of natural bentonite, to 1 m³ of the liquid phase of waste, followed by the admixture of solid phase of waste after which the mixture is inoculated and subject to forced aeration.