

DEODORIZING MATERIAL AND DEODORIZING DEVICE

Technical Field

The present invention relates to a deodorizing material (will be referred to simply as "deodorant" hereunder) used in a deodorizing device in which the biological deodorization method is adopted to remove an offensive odor (mainly ammonia) emitted from a compost shed, livestock barn or the like and an odor emitted from garbage containing oil.

Background Art

The conventional deodorants are made by mixing, in fine granulated wools of "rock wool" including mainly particles of 6 mm in diameter, "urethane chips" to reduce the airflow resistance, microbially active substances such as livestock excrement, stable manure, surplus sludge or the like, "chaffs" as a carbon source to maintain the microbial activity (decomposition and removal of malodorous substance by microbes), "zeolite" to adsorb the malodorous substance for a period up to the development of the microbial activity, etc.

For example, the Patent Document 1 referred to below discloses a deodorant prepared by mixing "microbially active substance" and "rigid urethane foam chips", "chaffs" and "zeolite" in fine granulated wools (rock wool aggregate containing particles having a size of 2.36 to 5.60 mm in more than 50%).

The Patent Document 2 also listed below discloses another deodorant prepared by mixing "microbially active substance" and "zeolite" or "chaffs" in fine granulated wools.

Prior Art Documents

Patent Documents

Patent Document 1: Japanese Patent Publication No. 3829961

Patent Document 2: Kokai Number (2006) 150135

Summary of the Invention

Technical Problem

However, the conventional deodorants described above are disadvantageous as follows:

(1) The cost of raw materials used for making the currently commercially available urethane chips (new ones) and that of processing the raw materials into urethane chips have been elevated. Also as the urethane chips are so deteriorated due to aging, the airflow through the urethane chips becomes uneven and the airflow resistance is higher.

(2) Also, since the chaffs are seasonal products, they are not stably available throughout the year.

(3) Further, mixing the three materials urethane chips, chaffs and zeolite to be mixed in the granulated wools of rock wool causes to complexify the line of deodorant production. Also, since the materials to be mixed in the inorganic granulated wools are different in specific gravity from each other, they are easily separated from the granulated wools. Namely, the material lower in specific gravity is liable to go upward while the material higher in specific gravity will go down, which makes it difficult to mix such materials uniformly in the granulated wools, makes it impossible to fill the mixture evenly into a deodorizing bath, and results in uneven airflow through the mixture. That is, the deodorant thus produced cannot work well enough.

To overcome the above-mentioned drawbacks of the conventional deodorants, the Inventor of the present invention have devoted himself to researches and experiments and worked out an improved and novel deodorant which is a mixture containing mainly of medium inorganic granulated wools and wood chips or a mixture consisting mainly of the medium inorganic granulated wools. and urethane chips (chips having a predetermined size prepared by shredding urethane foam elastomer products discarded as industrial waste to a predetermined size).

Solution to Problem

The present invention will be summarized below.

It provides a deodorant in which "wood chips" capable of reducing the effects on the environment are mainly contained as inexpensive material to decrease the airflow resistance and add a carbon source and initial adsorption effect or in which "urethane chips" are mainly contained which are made by shredding urethane foam elastomer products as industrial waste.

More particularly, according to the first embodiment of the present invention, there is provided a deodorant characterized by comprising a mixture of wood chips and inorganic granulated wool which particles having a size of 1 to 40 mm and a microbially active substance mixed with the mixture, the microbially active substance being livestock excrement, stable manure, or surplus sludge, alone or a mixture of two or more of them, wherein the inorganic granulated wool is medium granulated rock wool containing particles of more than 5.6 mm in size and constituting a content of more than 50%.

In the above-mentioned deodorant, the wood chips may be chips of the woody portion or bark of cedar, hemp palm, *Quercus acutissima* Carruth (or

sawtooth oak), cherry tree, coconut or the like. It should be noted that the wood chips are advantageous in that they do not easily rot because the oil and lignin present therein are not easily degradable.

Also, a single kind of microbially active substance is normally used to simplify the process of producing the deodorant. However, in case the microbially active substance is not available independently in an adequate amount, a mixture of two or more kinds of microbially active substance may be used. This mixture is not so much different in effect from the single kind of microbially active substance and causes no inconvenience (which is also true with the deodorant according to the sixth embodiment of the present invention which will be described later).

According to the present invention, there is provided a deodorant characterized in that the inorganic granulated wools are medium granulated wools of rock wool which are mainly "medium granulated wools" containing particles of more than 5.6 mm in size in more than 50%.

It should be noted that inorganic granulated wools containing the granulated fibers of more than 5.6 mm in size in more than 50% will be referred to as "medium granulated wools" hereunder.

The inorganic granulated wools include, in addition to the granulated wools of rock wool, granulated wools of ceramic fiber, granulated wools of glass fiber or the like for example.

Also, according to the second embodiment of the present invention, there is provided a deodorant characterized in that the wood chips are 10 to 50 mm in length of major axis.

It should be noted that in the present invention the central axis through a portion of a chip or particle, of which the diameter, width, height or length is

largest, is defined as "major axis".

Also, according to the third embodiment of the present invention, there is provided a deodorant characterized in that the wood chips in 20 to 120 parts by volume (preferably 25 to 80 parts by volume or more preferably 40 to 70 parts by volume) are mixed in 100 parts by volume of the inorganic granulated wools.

Also, according to the fourth embodiment of the present invention, there is provided a deodorant characterized in that the dry weight of the microbially active substance is 5 to 30 parts by weight (preferably 5 to 20 parts by weight, more preferably 5 to 15 parts by weight or most preferably 5 to 10 parts by weight) in relation to 100 parts by weight of the mixture of the inorganic granulated wools and wood chips.

Also, according to the fifth embodiment of the present invention, there is provided a deodorant characterized in that the wood chips function to adsorb malodorous substance and supply nourishment.

Since the wood chips have the functions to adsorb malodorous substance and supply nourishment, the deodorant according to the present invention can effectively treat the offensive odor from the beginning of use (before the microbial activity develops) and supply nourishment to the microbes to promote their activity.

Also, according to the sixth embodiment of the present invention, there is provided a deodorant characterized by a mixture of inorganic granulated wool having a size of 1 to 40 mm and urethane chips made by shredding urethane foam elastomer products discarded as industrial waste into chips of which a major axis is 10 to 50 mm long, and a microbially active substance mixed with the mixture, the microbially active substance being livestock excrement, stable

manure, or surplus sludge, alone or a mixture of two or more of them.

It should be noted that the "urethane chips" mentioned above are not any commercially available urethane products but they are obtainable by processing urethane foam elastomer products discarded as an industrial waste. For example, they may be made by shredding urethane foam elastomer products discarded as not complying with the product standard in the production process into chips of which the major axis length is less than 50 mm, preferably less than 10 to 50 mm or more preferably 20 to 30 mm. Thus, the industrial waste can be used as a valuable resource. It should also be noted that the industrial waste usable to produce such chips may be urethane foam elastomer products found in waste architectural materials as well as those found in waste pipe lagging materials emitted from the LNG tankers, factories, plants, etc.

Also, according to the seventh embodiment of the present invention, there is provided a deodorant characterized in that the urethane chips in 25 to 66 parts by volume are mixed in 100 parts by volume of the inorganic granulated wools.

That is, the mixing ratio of the inorganic granulated wools to the urethane chips is 60 to 80 % by volume to 40 to 20 % by volume. It should be noted here that if the mixing ratio of the inorganic granulated wool is set lower than 60% by volume in relation to the volume of the deodorizing bath, the deodorant will be lower in deodorization performance. Also, a higher mixing ratio of the inorganic granulated wools than 80% by volume in relation to the volume of the deodorizing bath will lead to poor aeration (deodorizing airflow) inside the deodorizing bath. On the other hand, if the mixing ratio of the urethane chips is higher than 40% by volume in relation to the volume of the deodorizing bath,

voids will be increased in the deodorant, resulting in reduction of the deodorization performance as will be known from the test results shown in FIG.

5. Also, if the mixing ratio of the urethane chips is set lower than 20% by volume in relation to the volume of the deodorizing bath, the inorganic granulated wools of inorganic fiber, being hydrophilic, will be sodden and closer to each other, resulting in poor aeration (deodorizing airflow) inside the deodorizing bath or any other failure.

It should be noted that according to the present invention, there is also provided a deodorizing device using the deodorant according to one of the aforementioned first to seventh embodiments of the present invention.

Further, in the inorganic granulated wools consisting mainly of "medium granulated wools" in the deodorant according to the first embodiment may contain the particles of which the mixing ratios are shown in Examples 1 to 4 below. However, the mixing ratios are not limited to those in such Examples. Note that the highest mixing ratio may not necessarily be one in the middle of the specified range of the mixing ratios as will be known from the Example 1.

Example 1:

Particles of 1.70 to 37.50 mm in size in more than 50% by weight (sum of particles indicated with * share 90% of the inorganic granulated wools)

Size	1.00 to 1.70 mm	...	5%
Size	1.70 to 2.36 mm	...	5% *
Size	2.36 to 3.35 mm	...	30% *

Size	3.35 to 5.60 mm	...	10% *
Size	5.60 to 11.20 mm	...	10% *
Size	11.20 to 19.00 mm	...	10% *
Size	19.00 to 31.50 mm	...	20% *
Size	31.50 to 37.50 mm	...	5% *
Size	37.50 to 40.00 mm	...	5%

Example 2:

Particles of 2.36 to 31.50 mm in size in more than 50% by weight (sum of particles indicated with * share 85% of the inorganic granulated wools)

Size	1.00 to 1.70 mm	...	0%
Size	1.70 to 2.36 mm	...	5%
Size	2.36 to 3.35 mm	...	5% *
Size	3.35 to 5.60 mm	...	5% *
Size	5.60 to 11.20 mm	...	25% *
Size	11.20 to 19.00 mm	...	35% *
Size	19.00 to 31.50 mm	...	15% *
Size	31.50 to 37.50 mm	...	5%
Size	37.50 to 40.00 mm	...	5%

Example 3:

Particles of 3.35 to 19.00 mm in size in more than 50% by weight (sum of particles indicated with * share 75% of the inorganic granulated wools)

Size	1.00 to 1.70 mm	...	0%
Size	1.70 to 2.36 mm	...	0%
Size	2.36 to 3.35 mm	...	15%
Size	3.35 to 5.60 mm	...	40% *

Size	5.60 to 11.20 mm	...	30% *
Size	11.20 to 19.00 mm	...	5% *
Size	19.00 to 31.50 mm	...	5%
Size	31.50 to 37.50 mm	...	0%
Size	37.50 to 40.00 mm	...	5%

Example 4:

Particles of 5.60 to 11.20 mm in size in more than 50% by weight (sum of particles indicated with * share 55% of the inorganic granulated wools)

Size	1.00 to 1.70 mm	...	0%
Size	1.70 to 2.36 mm	...	5%
Size	2.36 to 3.35 mm	...	5%
Size	3.35 to 5.60 mm	...	15%
Size	5.60 to 11.20 mm	...	55% *
Size	11.20 to 19.00 mm	...	15%
Size	19.00 to 31.50 mm	...	5%
Size	31.50 to 37.50 mm	...	0%
Size	37.50 to 40.00 mm	...	0%

Advantageous Effects of Invention

The deodorants according to the present invention have effect as will be described below:

(1) If the inorganic granulated wools are too large in size, offensive odor will not evenly pass through the deodorant depending upon how thickly the particles are filled in the deodorizing bath (or deodorizing device) and a route along which the odor goes will be formed in the deodorant which will thus not sufficiently effective. On the other hand, if the inorganic granulated wools are

too small in size, the odor will pass evenly through them but the airflow resistance will be so high that the running cost for the deodorization will become higher (because a blower larger in scale is required) and the throughput of deodorization per unit area will be lower. In this case, the deodorizing device will not possibly be able to perform efficiently. In contrast, however, use of the inorganic granulated wools in which particles of 1 to 40 mm in size "coexist" as in the present invention permits to overcome such drawbacks of the conventional deodorants.

(2) Also, using a larger amount of the "medium granulated wools" of rock wool as the inorganic granulated wools as in the present invention leads to lower costs than those for the conventional deodorants using the fine granulated wools since the degree of processing the material may be lower in the present invention.

(3) According to the present invention, use of a mixture of the inorganic granulated wools and wood chips larger in shape than the granulated wools assures to form in the deodorant sufficient voids which will reduce the airflow resistance. Also, since the wood chips are utilizable as a carbon source, it is unnecessary to mix chaffs in the mixture.

(4) Owing to the effect to adsorb offensive odor, the wood chips can work to deodorize before the microbial activity develops. Accordingly, it is not required to add zeolite to the mixture of the inorganic granulated wools and wood chips.

(5) In the present invention, the wood chips and urethane foam elastomer products which are to be discarded as industrial waste are used. That is, the industrial waste can be recycled, which will lead to friendliness to

the environment, they can deodorize effectively and do not cost much.

(6) In case the wood chips are used to form the intended deodorant, the materials to be mixed together are less in kind than in the conventional deodorants. Thus, the difference in specific weight from one to another material can be minimized, the materials can be mixed evenly and easily, and the deodorant can be produced at lower costs. Generally, the wood chips are available more easily throughout the year than the chaffs used in the conventional deodorants. Namely, the wood chips contribute to stable acquisition of materials.

(7) Compared with the conventional materials such as new urethane foam elastomer products or the like, the wood chips are so low in specific gravity that they are not easily separable from the inorganic granulated wools when being mixed in the latter and being filled into the deodorizing bath and they can thus be filled in the deodorizing bath while remaining evenly mixed in the inorganic granulated wools. In addition, the wood chips serve as microbe carriers, so the performance of the deodorant using the wood chips as in the present invention is equal to or better than the conventional deodorants.

(8) Since the urethane foam elastomer products discarded as industrial waste have already been changed in composition under the effect of the molding temperature and pressure, they are not deformed so much under consolidation or other processing when they are processed for the deodorant, and they are equally strong to or stronger than the urethane chips used in the conventional deodorants, whereby it is possible to allow the odor to pass easily through the urethane chips in the deodorant.

(9) Since the oil and lignin present in the bark fiber and the like are not

easily degradable, the wood chips are highly durable even if they are repeatedly subject to wetting by sprinkling and drying while no sprinkling is made.

(10) The wood chips such as the chips of woody portion and bark of cedar, hemp palm, *Quercus acutissima* Carruth (or sawtooth oak), cherry tree, coconut or the like have not much "monoterpene and its compound" which inhibit activity of the aerobes, and thus they provide an environment in which the aerobes will not be killed but rather those aerobes which decompose the odor emitted from the stable manure bath can easily be grown and activated.

Brief Description of the Drawings

FIG. 1 explains the construction of the deodorizing device according to the present invention.

FIG. 2 shows the results of comparison made between the deodorizing device according to the present invention and a conventional deodorizing device.

FIG. 3 shows a table and graph showing the results of the comparison test 1 made on the deodorizing effect.

FIG. 4 shows a table and graph showing the results of the comparison test 2 made on the deodorizing effect.

FIG. 5 shows a table and graph showing the results of the comparison test 3 made on the deodorizing effect.

FIG. 6 shows a table and graph showing the results of the comparison test 4 made on the deodorizing effect.

FIG. 7 shows a table and graph showing the results of the comparison test 5 made on the deodorizing effect.

FIG. 8 shows a table and graph showing the results of the comparison test 6 made on the deodorizing effect.

Description of Embodiments

The present invention will be described in detail below with reference to the accompanying drawings.

FIG. 1 schematically illustrates an embodiment of the deodorizing device according to the present invention.

In FIG. 1, the deodorizing device according to the present invention is generally indicated with a numeral 10. As shown, the deodorizing device 10 includes a high-density polyethylene container (will be referred to as "deodorizing bath" hereunder) 20 filled with a deodorant 30. The deodorizing bath 20 has an air inlet 21 provided at the top and an air outlet 22 provided at the bottom. Offensive odor is charged into the deodorizing bath 20 through the air inlet 21 at the top of the deodorizing bath 10, and deodorized air is discharged from the deodorizing bath 20 through the air outlet 22. (It should be noted that the device 10 may also be designed to charge the offensive odor into the deodorizing bath 20 from the bottom of the latter and deodorized air is discharged from the top of the deodorizing bath 20, which however is not illustrated.) To assure the activity of the microbes, water is supplied to the deodorant by sprinkling from the top of the deodorizing bath 20. The water thus supplied is let out from the air outlet 22 of the deodorizing bath 20 to a discharged water settling tank (drainage tank) 40. The water collected in the drainage tank 40 is reused for sprinkling to the deodorant 30. More specifically, the container (deodorizing bath) 20 is designed to have a diameter of 1000 mm and a height of 1420 mm and the air inlet has a bore diameter of

50 mm.

The deodorant 30 is a mixture of "160 kg (1 m³) of medium granulated wools of rock wool" as the inorganic granulated wools, "200 kg (0.5 m³) of cedar chips" formed as wood chips to have a major axis of 10 to 50 mm in length and "30 kg of poultry manure" (15% in moisture content)" (25.5 kg in dry weight) as microbially active substance. In case the cedar chips are dry, water is supplied by sprinkling to them to elevate the activity of the microbes. It should be noted here that the "medium granulated wools of rock wool" include particles of 5.6 to 11.2 mm in size in more than 50% and those of more than 11.2 mm in size in less than 20%.

The conventional deodorant used in our tests for comparison with the deodorants according to the present invention was prepared by mixing in "163 kg (about 1 m³) of medium granulated wools of rock wool", "41 kg of zeolite", "32 kg of poultry manure (15% in moisture content)" (27,2 kg in dry weight) as microbially active substance, "13 kg of chaffs", "48.6 kg of urethane chips having a major axis of 10 to 50 mm in length, and water.

In the tests, the deodorant 30 was filled in the container (deodorizing bath) 20 of the deodorizing device 10 shown in FIG. 1 and an odor of about 200 ppm in odor concentration was passed at a rate of about 20 mm per second through the deodorant 30.

Also, water was sprinkled to the deodorant 30 for 15 min a few times a day in order to keep the moisture content. The surplus water was collected into the discharged water settling tank (drainage tank) 40 and reused for sprinkling.

FIG. 2 is a table in which the effect of deodorization is compared in

ammonia gas level between the deodorant according to the present invention and conventional deodorant, the ammonia gas level having been measured in one month after the deodorizing device 10 shown in FIG. 1 was put into operation.

As apparent from the table in FIG. 2, the odor concentration (measured at the air outlet 22 of the deodorizing device 10) attained with the deodorant 30 according to the present invention was two thirds ($2/3$) of that attained with the conventional deodorant. Namely, the difference as much as one third ($1/3$) in measured odor concentration between the deodorant according to the present invention and the conventional deodorant reveals that the deodorant according to the present invention is extremely effective in deodorization.

Tables and graphs shown in FIGS. 3 to 8 show the results of tests made for comparison in deodorizing effect between the conventional deodorant and the deodorant according to the present invention.

The comparison tests 1 to 6 which will be described below were made using a deodorizing device of 800 mm in diameter and 4000 mm in height (not illustrated). It should be noted that the specimens used in the comparison tests 1 to 6 were mixtures of "160 kg (1 m^3) of medium granulated wools of rock wool" as a base material and "40 kg of poultry manure (15% in moisture content)" (34 kg in dry weight) as microbially active substance and that the ratios between the mixed materials are shown in % by volume with the volume of each specimen not including the microbially active substance being taken as 100% since the specimens were used in the same amount in all the comparison tests. Also, the urethane chips used in the comparison tests 1 to 4 were prepared to have a major axis of 10 to 50 mm in length while the wood

chips in the comparison tests 5 and 6 were also prepared to have a major axis of 10 to 50 mm in length.

FIG. 3 (comparison test 1)

Mixture of conventional commercially available urethane chips in 20% by volume and medium granulated wools of rock wool in 80% by volume

FIG. 4 (comparison test 2)

Mixture of conventional commercially available urethane chips in 35% by volume and medium granulated wools of rock wool in 65% by volume

FIG. 5 (comparison test 3)

Mixture of conventional commercially available urethane chips in 41% by volume and medium cottony particles of rock wool in 59% by volume

FIG. 6 (comparison test 4)

Mixture of urethane chips as industrial waste in 35% by volume and medium granulated wools of rock wool in 65% by volume

FIG. 7 (comparison test 5)

Mixture of coconut chips (wood chip) in 35% by volume and medium granulated wools of rock wool in 65% by volume

FIG. 8 (comparison test 6)

Mixture of hemp palm chips (wood chips) in 35% by volume and medium granulated wools of rock wool in 65% by volume

The specimens used in the comparison tests 1 to 3 had mixed therein the conventional urethane chips at different ratios respectively.

In the comparison test 1, the aeration path was found blocked in about 2 months after the test was started. The test was resumed with the aeration path rebuilt. However, the aeration path was blocked again in about one

month. It was revealed that in case the medium granulated wools of rock wool were filled in 80% or more of the volume of the deodorizing bath (namely, in more than 80% by volume), the water supplied by sprinkling to the specimen and hydrophilicity of the water-supplied rock wool particles caused the aeration path to become blocked and thus the deodorizing device could not be operated continuously.

On the other hand, the results of the comparison test 2 were such that the highest ammonia level measured at the air inlet of the deodorizing bath was 75 ppm and that measured at the outlet was only 2 ppm. Also, as the results of the comparison test 3, the highest ammonia level measured at the air inlet was 75 ppm and that measured at the air outlet was 20 ppm.

As revealed from the above-mentioned results of the comparison tests 1 to 3, the deodorant, which was the mixture of the conventional commercially available urethane chips in 35% by volume and the medium granulated wools of rock wool in 65% by volume (as in the comparison test 2), was most excellent in effect of deodorization.

In the following, there will be made a comparison between the most effective one (used in the comparison test 2) among the conventional deodorants and the deodorant according to the present invention (used in the comparison test 4) which is the mixture containing urethane chips as industrial waste in 35% by volume and medium granulated wools of rock wool in 65% by volume.

The results of the comparison test 4 were such that the highest ammonia level measured at the air inlet was 67 ppm and that measured at the air outlet was 1 ppm.

As will be apparent from the comparison between the test results with the above "conventional commercially available urethane chips in 35% by volume" in the comparison test 2 and those with the "urethane chips as industrial waste in 35% by volume" in the comparison test 4, the urethane chips as industrial waste is the same in effect of deodorization as the conventional commercially available urethane chips.

Next, there will be made a comparison between the most effective one among the conventional deodorants and the deodorant having mixed therein "wood chips" of which the mixing ratio is 35% by volume as in the above instead of the "urethane chips".

The comparison test 5 was conducted on a deodorant consisting of a mixture of "coconut chips" as the wood chips and medium granulated wools of rock wool. As the test results, the highest ammonia level measured at the air inlet was 75 ppm and that measured at the air outlet was less than 0.5 ppm.

The test results prove that the mixture of coconut chips and medium granulated wools of rock wool can adsorb the ammonia gas more effectively than the mixture of the urethane chips and medium granulated wools of rock wool.

Similarly, the comparison test 6 was made on a deodorant containing "hemp palm chips" as wood chips instead of the "coconut chips". The hemp palm is also a palm plant. Namely, the deodorant used in the comparison test 6 was a mixture of the "hemp palm chips" and medium granulated wools of rock wool. The test results are such that the highest ammonia level measured at the air inlet was 72 ppm and that measured at the air outlet was less than 0.2 ppm.

As will be known from the above, the mixture of the hemp palm chips and medium granulated wools of rock wool is higher in adsorption ability than the mixture of the urethane chips and medium granulated wools of rock wool.

The aforementioned test results have revealed that even the use of urethane chips as industrial waste can provide a similar deodorizing effect to that with the commercially available chips of expensive urethane foam elastomer products as in the conventional deodorant. Also, as revealed from the test results, the ammonia gas can be removed even with the use of the wood chips such as coconut chips, hemp palm chips or the like instead of the urethane chips as industrial waste.

Industrial Applicability

As having been described in the foregoing, the deodorant according to the present invention widely usable in the deodorizing device to remove the offensive odors as follows by the biological deodorization:

- (1) Odor (mainly ammonia) emitted from compost shed, livestock barn or the like
- (2) Odor emitted from raw garbage containing oil (including both industrially discharged garbage and household garbage)
- (3) Other odor

CLAIMS:

1. A deodorizing material, comprising a mixture of wood chips and inorganic granulated wool which particles having a size of 1 to 40 mm, and a microbially active substance mixed with the mixture, the microbially active substance being livestock excrement, stable manure or surplus sludge, alone or a mixture of two or more of them;

wherein the inorganic granulated wool is medium granulated rock wool containing particles of more than 5.6 mm in size and constituting a content of more than 50%.

2. The deodorizing material according to Claim 1, wherein the wood chips are 10 to 50 mm in length in a major axis.

3. The deodorizing material according to Claim 1 or 2, wherein the wood chips in 20 to 120 parts by volume are mixed in 100 parts by volume of the inorganic granulated wools.

4. The deodorizing material according to any one of Claims 1 to 3, wherein the dry weight of the microbially active substance is 5 to 30 parts by weight in relation to 100 parts by weight of the mixture of the inorganic granulated wool and wood chips.

5. The deodorizing material according to any one of Claims 1 to 4, wherein the wood chips function to adsorb malodorous substance and supply nourishment.

6. A deodorizing material, comprising a mixture of inorganic granulated wools having a size of 1 to 40 mm and urethane chips made by shredding urethane foam elastomer products discarded as industrial waste into chips of which a major axis is 10 to 50 mm long, and a microbially active substance mixed with the mixture, the microbially active substance being livestock excrement, stable manure or surplus sludge, alone or a mixture of two or more of them.

7. The deodorizing material according to Claim 6, wherein the urethane chips in 25 to 66 parts by volume are mixed in 100 parts by volume of the

inorganic granulated wools.

8. A deodorizing device using the deodorizing material according to any one of claims 1-7.