



(43) International Publication Date
14 February 2013 (14.02.2013)

(10) International Publication Number
WO 2013/021406 A1

(51) International Patent Classification:
A01K 1/015 (2006.01)

(21) International Application Number:
PCT/IT2012/000245

(22) International Filing Date:
2 August 2012 (02.08.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
MI2011A001496 5 August 2011 (05.08.2011) IT

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- with amended claims (Art. 19(1))

(54) Title: BIODEGRADABLE GRANULAR COMPOSITION USED AS ANIMAL LITTER AND DISPOSABLE IN TOILETS

(57) Abstract: The finding consists of obtaining plant-based granular material formed of chopped wood, chopped cardboard and paper and compressed, suitable for animal litter use, in particular for cats and rodents. Such granular material is exceptionally light for transport and has high liquid absorbance; biocompatible and non-toxic compounds are added thereto which confer anti-odor and antibacterial power as well as reversible agglomeration, in order to allow the disposal thereof directly in home toilets. In addition, due to the recovery and reworking of the discard material, waste is not produced from the processing steps; hence, this is a very ecological, environmentally-friendly product.



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**BIODEGRADABLE GRANULAR COMPOSITION USED AS ANIMAL LITTER
AND DISPOSABLE IN TOILETS**

Field of application of the invention

- 5 The present invention refers to the field of products for domestic animals, and more precisely to a granular composition for zootechnical litter use for all animals, particularly suitable for cats and rodents.

Review of the prior art

- 10 The litters currently on the market are generally granular or in any case corpuscular products, composed of several different materials.

- 15 The qualities desired for such products generally comprise the following: having good liquid absorbance, combating putrefaction phenomena and hence not facilitating fumes, being light for transportation by the purchasing client, being easy to dispose and having reduced environmental, ecological and eco-compatible environmental impact in the disposal thereof.

Among the products intended for zootechnical litter use for cats and rodents present on the market, there are litters based on, or totally composed of, bentonite, a compound of mineral extract which can absorb liquids up to 70% of its own weight.

- 20 While these litters have good absorbance, they also have a rather high specific weight, which makes the transport by the final user quite difficult, and they do not directly act against bacteria. There is also degradation of the litter with con-

sequent presence of mud and unpleasant odors. The disposal is just as problematic, since the material that composes such litter is not purely biodegradable.

Litters are also known composed of so-called "Silica Gel", and hence silicon litters, which however have the same problems mentioned above.

Litters of plant origin also exist on the market, mainly composed of corn cob.

These litters have a moderate capacity to absorb liquids but are not practical in disposal, since they cannot be directly disposed of in home toilets due to the hardness of the granules formed by the cob (which is simply the core of the corn cob) and their tough resistance to decomposition and hence biodegradability.

Objects of the invention

The aims pursued through the finding, object of the present application, are those of having a litter for zootechnical use and in particular suitable for cats and rodents that is of plant origin, which has antibacterial power by using a process of antibacterial sanification non-toxic for animals and human beings; in addition, the litter also has a high liquid absorbance power, it is capable preventing the forming of foul odors, it is very light in transportation, easy to dispose of, and in disposal has very limited environmental impact (and hence is both ecological and eco-compatible).

Summary of the invention

In order to attain such objects, the present invention has as object a granular material for litter use, especially for cats and rodents, of plant origin, in which according to the invention the granular material is wood-based, as described in claim 1.

Further characteristics of the present invention deemed innovative are described in the dependent claims.

According to another aspect of the invention, the wood at the base of the granular material is fir.

According to another aspect of the invention, the wood at the base of the granular material is poplar.

According to another aspect of the invention, the wood at the base of the granu-

lar material is a mixture of fir and poplar.

According to another aspect of the invention, the granular material also comprises paper or similar material in a percentage comprised between 10% and 70% with respect to the weight of the wood.

- 5 According to another aspect of the invention, the granular material contains anatase titanium dioxide which confers anti-odor and antibacterial properties to the granular material.

According to another aspect of the invention, the granular material contains carboxymethyl cellulose with low viscosity, which acts as an anti-dust agent and
10 granule cohesion agent.

According to another aspect of the invention, the granular material contains carboxymethyl cellulose with high viscosity, which acts as a granule agglomeration agent.

- According to another aspect of the invention, the granular material contains
15 vegetable oil which confers smoothness to the granular material during the working process thereof.

According to another aspect of the invention, the vegetable oil is rape oil.

According to another aspect of the invention, the vegetable oil is from various seeds.

- 20 Another invention object is a method for producing the granular material for litter use, already invention object, as described in the method claims.

The method includes the following steps:

- a) chopping the wood having a relative humidity between 8% and 15%;
b) bringing the humidity of the chopped material to a value not higher than
25 50%;
c) pressing the chopped material in a manner so as to obtain pellets whose size does not exceed a desired value, as described in the merit claim.

- According to another aspect of the method invention, the method comprises a further step comprised between steps a) and b) consisting of adding paper or
30 similar chopped material to the chopped wood, in a percentage that can vary between 10% and 70% with respect to the weight of the chopped wood.

According to another aspect of the method invention, the humidification pursu-

ant to step b) occurs by spraying water containing anatase titanium dioxide in a percentage comprised between 0.1% and 10% by weight.

According to another aspect of the method invention, the humidification pursuant to step b) occurs by spraying water containing carboxymethyl cellulose with low viscosity in a percentage not greater than 10% by weight.

According to another aspect of the method invention, the method comprises a further step comprised between steps b) and c) consisting of adding, to the chopped material, carboxymethyl cellulose with high viscosity in a percentage not greater than 20% with respect to the weight of the chopped material.

10 According to another aspect of the method invention, the method comprises a further step comprised between steps b) and c) consisting of adding, to the chopped material, vegetable oil in a percentage that can vary between 0.1% and 5% with respect to the weight of the chopped material.

Advantages of the invention

15 The litter, object of the patent application has very high liquid absorbance equal to about 4 times its weight in kilos; it is biodegradable in a very brief amount of time, given that it is composed of finely chopped wood and paper, and due to the reversible agglomeration it can be easily disposed of in home toilets; it is very light in transportation, weighing about 300-350 grams per liter by volume; it prevents the formation of unpleasant odors and combats the internal proliferation of bacteria in a natural manner, with sanitizing agents added that are bio-compatible and non-toxic in the quantities employed in the invention embodiment.

Detailed description of several preferred embodiments of the invention

25 Further objects and advantages of the present invention will be clearer from the following detailed description of an embodiment thereof.

The finding is based on plant cellulose, specifically wood flour, which is mainly composed of cellulose, and paper, also mainly composed of cellulose.

The wood used for obtaining the mass of material to be initially worked is preferably dried fir and polar with a relative humidity ranging between 8% and 15%. Other plant species can be used as well, so long as they respect the aforesaid moisture parameters at the start of the production cycle.

The wood corresponding to the required moisture parameters is ground and reduced through grinding machines to a semi-granular/fibrous mass similar to wood sawdust, having diameter or length comprised between 0.1 mm and 4 mm.

- 5 One proceeds with an identical grinding process to grind the paper and cardboard, which can be virgin or recycled/recovered, and then one adds this to the wood flour in the hollow cylindrical mixer.

The amount of paper that will be added to the ground wood flour will vary from 10% to 70% with respect to the weight of the wood flour, in accordance with the

- 10 animal species for whom the final product is intended.

With regard to the wood employed, pre-ground wood flours can be used, which can be easily found on the commercial market for timber and derivatives thereof.

- Once the material composed of ground wood and ground paper is obtained, it
15 will be necessary to bring the humidity of the same to a value not higher than 50%.

- In order to reach the desired moisture values, one will proceed, by means of suitable screw, to transport the previously-ground wood and paper into a horizontal and internally hollow cylindrical mixer, which will be driven by a suitable
20 rotor; once the wood flour and ground paper and cardboard are inserted inside such mixer, during the rotation of the cylinder, water will be sprayed by means of an electric pump until the desired moisture level is attained. Such moisture level will be measured with a suitable instrument, called hygrometer, until the desired level is attained.

- 25 In order to confer anti-odor and antibacterial properties to the litter, the water amount inserted with the electric pump (during the rotation of the mixer cylinder for adjusting the moisture level) will have been previously added to and mixed in a container with suitable capacity with 0.1% to 10% of anatase titanium dioxide, together with a percentage not higher than 10% of carboxymethyl cellulose with
30 low viscosity, as granule cohesion agent and anti-dust agent for the litter which will be subsequently obtained.

At this point, the cylinder mixer is rotated for about 5 minutes time for each 500

kg of wood flour and paper mixture placed therein, so as to homogenize the wood flour and paper with all the compounds added together by means of the water, in order to uniformly add moisture to the compound in all parts thereof.

Once this humidification and homogenization step is concluded, the rotation of the mixer cylinder is stopped, and carboxymethyl cellulose with very high viscosity is added through a slit or door, such carboxymethyl cellulose in a percentage not greater than 20%, in order to give the litter granule agglomeration power, for the granules that will be obtained with the following cubing step.

0.1% to 5% of vegetable oil will also be added, preferably rape oil or oil from various seeds, in order to give smoothness to the material during the pellet formation in the draw-plates; in such a manner, overheating is avoided which could blacken or in any case darken the color of the final product.

Once the carboxymethyl cellulose and the oil is inserted, the mixer cylinder is once again rotated for an additional 10 minutes time for each 500 Kg. of compound placed therein.

Once the above-described mixing step is completed, the obtained material will be discharged via suitable screw, which will transport it into the upper loading hopper of a machine called pellet mill or cube mill so to be subjected to a pellet-forming or cubing process, which is none other than a pressing operation by means of annular or flat mechanical rollers and draw-plates; the result of such pressing will give pressed wood pellets with diameter that can vary from 4 mm to 8 mm according to the hardness of the wood fibers to be worked, but preferably a draw-plate with holes of 5 mm diameter will be used. This processing allows obtaining a pellet of pressed material which will have a very low specific weight with respect to its own volume; indeed, it will have a weight that will range from 310-360 grams per liter by volume of final product, in addition to having an exceptional absorbance capacity due to the light pressing that is applied in cubing, giving rise to a very light and porous pellet.

For the purpose of the abovementioned cubing, the pellets will be cooled to room temperature, perhaps by means of forced ventilation and in any case in accordance with production needs; nevertheless, natural cooling to room temperature is preferred.

After cooling, the pellets made of wood fiber and ground paper, with all of the above-described compounds previously added thereto, will be brought through suitable screw or even with a conveyor belt to a "crumbling" machine, which will be provided with two opposite and adjustable rolling rollers; such machine will

5 crumble the pellets according to a specific size, and hence grain size, which will preferably be between 2 mm and 5 mm overall, both regarding diameter in the case of round bodies and length in the case of oblong bodies resulting from the machine crumbling.

At this point, the granules with grain size adjusted through the crumbler will be

10 passed through a shaker screen provided with sieve net for eliminating the corpuscles of size less than 2 mm.

The corpuscles with grain size less than 2 mm, discarded by the shaker screen, will fall into a funnel which via gravity will convey them onto a conveyor belt, which in turn will transport them into the upper loading hopper of the pellet mill;

15 here, they will be reformed into pellets during the following processing, preventing any form of discard and hence production waste from the aforesaid processing due to the recovery of the discard material.

The granules exiting from the crumbler having size greater than 5mm will be re-conveyed, through suitable screw, to a new crumbling cycle until the desired

20 grain size is obtained.

The addition of carboxymethyl cellulose with high viscosity, necessary as granule agglomeration agent, can be avoided if the pellets/litter is intended for use for rodents or reptiles.

Once the aforesaid processing is completed, the pellets will fall from the shaker

25 screen into large polyethylene sacks called "big bags" with 2000 liter capacity, where they will remain, ready for bagging and commercialization.

On the basis of the description supplied for a preferred embodiment, it is clear that some changes can be introduced by the man skilled in the art without departing from the scope of the invention, as results from the following claims.

CLAIMS

1. A granular material for litter use, especially for cats and rodents, of plant origin, characterized in that it is wood-based.

2. The granular material of claim 1, characterized in that the wood at the
5 base of the granular material is selected from the group comprising fir and poplar.

3. The granular material of claim 1, characterized in that it also comprises paper or similar material in a percentage comprised between 10% and 70% with respect to the weight of the wood.

10 4. The granular material of claim 1, characterized in that it contains anatase titanium dioxide.

5. The granular material of claim 1, characterized in that it contains carboxymethyl cellulose.

15 6. The granular material of claim 1, characterized in that it contains vegetable oil.

7. A method for producing the granular material for litter use of claim 1, characterized in that it includes the following steps:

- a) chopping the wood having a relative humidity between 8% and 15%;
- b) bringing the humidity of the chopped material to a value not higher than
20 50%;
- c) pressing the chopped material in a manner so as to obtain pellets whose size does not exceed a desired value.

8. The method of claim 7, characterized in that it comprises a further step between steps a) and b) consisting of adding paper or similar chopped material
25 to the chopped wood, in a percentage that can vary between 10% and 70% with respect to the weight of the chopped wood.

9. The method of claim 7, characterized in that the humidification pursuant to step b) occurs by spraying water containing anatase titanium dioxide in a percentage comprised between 0.1% and 10% by weight.

30 10. The method of claim 7, characterized in that the humidification pursuant to step b) occurs by spraying water containing carboxymethyl cellulose in a percentage not greater than 20% by weight.

AMENDED CLAIMS

received by the International Bureau on 02 January 2012 (02.01.12)

1. A granular material for litter use, especially for cats and rodents, of plant origin, said granular material being wood-based, said granular material comprising substances which confer anti-odor and antibacterial properties to the granular material, said granular material being characterized in that said anti-odor and antibacterial substances comprise anatase titanium dioxide.

2. The granular material of claim 1, characterized in that the wood at the base of the granular material is selected from the group comprising fir and poplar.

3. The granular material of claim 1, characterized in that it also comprises paper in a percentage comprised between 10% and 70% with respect to the weight of the wood.

4. The granular material of claim 1, characterized in that it contains carboxymethyl cellulose.

5. The granular material of claim 1, characterized in that it contains vegetable oil.

6. The granular material of claim 5, characterized in that said vegetable oil is chosen in the group comprising rape oil and vegetable oil from various seeds.

7. A method for producing the granular material for litter use of claim 1, said method including the following steps:

a) chopping the wood having a relative humidity between 8% and 15%;
b) bringing the humidity of the chopped material to a value not higher than 50%;

c) pressing the chopped material by means of mechanical rollers and draw-plates obtaining pressed wood,
said method being characterized in that the humidification pursuant to step b) occurs by spraying water containing anatase titanium dioxide in a percentage comprised between 0.1% and 10% by weight.

8. The method of claim 7, characterized in that it comprises a further step between steps a) and b) consisting of adding chopped paper to the chopped wood, in a percentage that can vary between 10% and 70% with respect to the

weight of the chopped wood.

9. The method of claim 7, characterized in that the humidification pursuant to step b) occurs by spraying water containing carboxymethyl cellulose in a percentage not greater than 20% by weight.

5 10. The method of claim 7, characterized in that it comprises a further step comprised between steps b) and c) consisting of adding, to the chopped material, carboxymethyl cellulose with high viscosity in a percentage not greater than 20% with respect to the weight of the chopped material.

10 11. The method of claim 7, characterized in that it comprises a further step comprised between steps b) and c) consisting of adding, to the chopped material, vegetable oil in a percentage that can vary between 0.1% and 5% with respect to the weight of the chopped material.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2012/000245

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01K1/015
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 941 090 A (FRY RAYMOND J) 2 March 1976 (1976-03-02) column 1, lines 5-10 column 2, lines 5-20 column 2, lines 48-51 column 2, lines 55,56 column 2, lines 60-68; claims -----	1-3,7,8
X	US 5 044 324 A (MORGAN WILLIAM M [US] ET AL) 3 September 1991 (1991-09-03) column 3, lines 33-58 column 4, lines 9-20; claims -----	1,2,6,7
X	US 2010/006035 A1 (SPITTLE KEVIN S [US] ET AL) 14 January 2010 (2010-01-14) paragraphs [0035], [0038], [0042]; claims -----	1,3-6

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Further documents are listed in the continuation of Box C.

☒

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

6 November 2012

Date of mailing of the international search report

22/11/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2012/000245

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3941090	A	02-03-1976	NONE	

US 5044324	A	03-09-1991	CA 2047558 A1	23-01-1993
			US 5044324 A	03-09-1991

US 2010006035	A1	14-01-2010	NONE	
