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(54) **A process to obtain a molding pulp starting from short fiber cellulose.**

(57) A process to obtain a molding pulp starting from short cellulose fiber, being the fiber parallelized, cut into lengths of between 5 and 35 mm, alkali hydrated and subjected to a later cooking process within an alkaline environment to extract the lignin, being afterwards washed in multi-steps process to eliminate the lignin and the alkaline agents, returning the reaction waters to the hydratation tank, obtaining in this way an hydrated pulp suitable to be molded and dried, to be finally conventionally treated for the final surface looking.

EP 0 517 988 A1

OBJECT OF THE INVENTION

The object of the invention is a process to obtain a molding pulp starting from short fiber cellulose; and specifically, the invention is centred on the conversion of any grain straw into a molding pulp to allow the obtaining of castings with a plurality of applications to substitute the indestructible and non-disposable thermo-plastic materials.

The molding pulp object of this invention does not contaminate the environment at any using or conversion phase, and once in solid state it could be destructed by conventional means, as for example the incineration, resulting in a very scarce and dry waste and a heat release.

Another reclycling or destructing possibility of the pieces molded with the pulp object of this invention is its bacteria destruction within a digester, resulting in combustible gasses and organic material waste suitable to be used as fertiliziers.

RECORDS OF THE INVENTION

A possible prior art is the manufacturing of paper pulp to be later converted into sheets. In the manufacturing of paper pulp, short and long fibers, scrap paper, and practically everything is used in this process.

During the process to obtain the paper pulp, the raw materials are attacked and striped by chemical products, and later by bleachers, binders, dyes, brakers, retardants, brighteners and a large number of other products to bring it its final looking; but this additional charge does not prevent the paper of being bio-degradable and even suitable to be recovered, but it prevents its consumption as food for animals.

This is the most important difference between the paper pulp and the pulp proposed by this invention, since the viscosity, concentration and size of both products is similar.

According to the invention, the obtained pulp, already molded or before its molding, is 100% useful as direct food for animals; moreover, due to its digestability degree it results in a fast fattening and it is also possible the obtention of coarse or medium dirt, treated or not with vitamin additives, for the fattening of young animals.

DESCRIPTION OF THE INVENTION

The invention proposes a process using a cheap and abundant raw material. In fact, the grain straw, the material source for this process, is presently being destructed in a 60-70%, being this destruction not profitable, and being recycled only in the poorest areas of the planet for the manufacturing of earthen and straw adobes.

According to the invention, the said process starts from a longitudinal and a parallel cutting and striping.

Once the straw is cut and striped, it is hydrated at a temperature higher than the environment, and once hydrated it is cooked at a high temperature.

A forced draining separates the fiber from the water, proceeding to a final washing to eliminate the undesired rests from the reaction produced during the cooking.

The fiber pulp, with 80% of water content, is ready to be used by a normal molding process.

The cut straw has a length of not less than 5 mm and not more than 35 mm.

The striping is carried out by cutting, pressure or percussion, but never transversally.

The hydratation is carried out with water at a tempertarure between 70 ° C and 100 ° C, during a time that varies from one to two hours according to the average temperature. The hydratation water will be added with NaOH in a dosis from 2% to 5%.

The cooking is carried out in the same hydratation water, in a reactor adding heat to a maximum of 250 ° C and a pressure of 3 atmospheres during 2 hours.

Once the fiber is drained, the reaction waters are recycled to the hydratation tub, where the NaOH concentration is maintained between 2 and 5% in weight, and the lignin is concentrated to be later profitably extracted.

The lignin, as it is known, is part of the cellulose (lignin cellulose) and it contains up to 70% in carbon. Due to its properties as a fuel, a tanner product, and a base product for antiseptics, among others, it has a very good market valuation, and in this case, it results as a by-product form the process, financing part of it and making it more profitable.

The drained fiber is subjected to a multi-step washing process to eliminate any lignin or NaOH remains; a multi-step washing is preferred because the washing waters progresivelly increase their concentration of caustic soda and lignin, being this ideal to be used in the hydratation of the cut and striped straw.

It is important to point out that during the reaction of the straw, first in the hydratation step and later in the cooking step, the adequate phenomenons take place, releasing the alkali celluloses, which being hemicelluloses and α-celluloses provide the adherance capacity in the molding process, and the mechanic resistance to maintain the adopted shapes.

Consequently, the invention essentially consists of an alkali hydratation of cut, triped and parallelized grain straw, to extract later the lignine of the fiber by means of a cooking process within an alkaline environment and within a reactor, to be

finally washed to eliminate the lignine and the alkali, resulting in an hydrated pulp suitable to be molded by molding or drying, to receive finally a conventional surface treatment.

EXAMPLES

It is started from bales of straw, which are unpacked and extented on a conveyer to be transported to a feeder, where the straw is first longitudinally aligned to be transversally cut into strips, maintaining its alignation to be striped by a plate train.

The striped straw, with a lenght up to 35 mm, is transported to an endless belt to a tub provided with mulling means.

The tub is prepared with a liquid formed by water and caustic soda or sodic hydroxid, in a concentration of 3.5% in weight. The temperature is raised to 80 ° C, and the mulling is maintained in a continuous way at ±5 ° during 40 minutes.

The pulp, straw plus liquid, is dumped to be poured into a reactor, to be objected there to a pressure of 2.8 bars at a temperature of 230 ° C within 120 minutes. Afterwards, the mother waters are elutriated and pumped to the hydratation tank. The alkali hydrated fiber is drained by filtering and washed, at the environment temperature, in a multi-step process to eliminate the alkaline wests.

Physical characteristics:

- Grain yellow straw: Striped length of 5 and 35 mm.
- Thickness: 0.116
- Density: 0.550
- Breaking length: 5050

Chemical characteristics:

- H_2O and straw.
- Lignin 14.2
- Holocellulose 66.1
- Cellulose 50.00
- Pentosames 31.7

It is finally obtained a colorless product due to the alkaline action, a round and very brighty fiber suitable to be dyed, with an 80% of water content, suitable to be used by suction and molded to acquire shape and resistance, eliminating part of the water. The molding is obtained with counter-molding by blowing and drying, admitting posterior preservation and waterproofing treatments.

Claims

1. A process to obtain a molding pulp starting from short fiber cellulose, essentially characterized in that a cut grain straw pulp is alkaline hydrated, longitudinally striped and parallelized, to be later extracted the lignin from the fiber by cooking it in an alkaline environment within a reactor and finally washing the fiber to eliminate the lignin and the alkali, resulting in an hydrated pulp suitable to be molded and dryed.

2. A process according to the previous claim, characterized in that the hydratation is carried out inmerging into a tank contaning water at a temperature of 70-100 ° C during one to three hours.

3. A process according to the previous claims, characterized in that the alkalinization of the hydratation water is produced adding caustic soda in a proportion of 0.5 to 3% in weight.

4. A process according to the previous claims, characterized in that the extraction of lignin is carried out at a temperature of 230 ° C and a pressure of 2 to 3 atmospheres and during 2 hours.

5. A process, according to claims 1 and 5, characterized in that the cooking liquid is separated from the cooked fiber and this fiber is subjected to a multi-step washing process to eliminate lignin and alkaline agents.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 50 0064

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-663 917 (BERNARDINO OGLIETI) * page 2, line 39 - line 55 * * page 3, line 32 - line 83 * ---	1,2,3,5	D21C5/00 D21B1/00
A	LU-A-65 068 (GARCIA CUCURULL ET AL.) * claims * ---	1,3	
A	WORLD PATENTS INDEX Week 7730, 10 June 1977 Derwent Publications Ltd., London, GB; AN 77-52780 & JP-A-52 069 774 (SASAKI NOKI KK) * abstract * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D21C
D21B
D21J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 FEBRUARY 1992	BERNARDO NORIEGA F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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