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(54) **A WOOD DELIGNIFICATION CHEMICAL PROCESS USING AMMONIUM MAGNESIUM BISULPHITE AS THE ACTIVE REAGENT**

EIN HOLZDESIGNIFIZIERENDES CHEMISCHES VERFAHREN WOBEI AMMONIUM MAGNISEIUM BISULFIT ALS AKTIVES REAGENZVERWENDET WIRD

PROCEDE CHIMIQUE DE DELIGNIFICATION DU BOIS UTILISANT COMME REACTIF ACTIF LE BISULFITE D'AMMONIUM ET DE MAGNESIUM

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GB-A- 734 216 US-A- 4 141 787
US-A- 4 634 499

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Remarks:

The file contains technical information submitted after the application was filed and not included in this specification

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Description

[0001] Several sulphite wood delignification process with industrial application have been known for a number of years. The distinction between them is based on the active chemical present in the reagent solution (cooking acid).

[0002] The compounds used as active chemicals are all monocationic bisulphites, mainly of calcium, magnesium, sodium or ammonium. The pulping process with calcium bisulphite is an exception, when dolomite is used to prepare the acid.

[0003] In the last 30 years the bisulphite cellulosic pulps have been losing competitiveness to KRAFT pulps, which are obtained by a chemical process in an alkaline medium.

[0004] The major disadvantage of bisulphite pulps is the weaker mechano-physical characteristics of their cellulosic fibres when compared with those obtained by the KRAFT process.

[0005] The present innovation refers to a chemical process for wood delignification and consists of the use of a reagent solution where ammonium and magnesium bisulphites are together the active chemicals.

[0006] The combination of both ammonium and magnesium cations as bisulphite is the novelty of this application

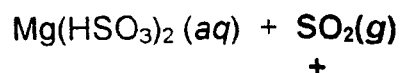
[0007] This new pulping process is particularly useful to those industrial plants where cellulose pulp is obtained by the magnesium acid bisulphite process.

[0008] The specific cooking acid of magnesium acid bisulphite pulping process is, physically, a gas-liquid system. The liquid phase is a magnesium bisulphite and sulphur dioxide aqueous solution in equilibrium with the SO₂ gas phase. The system is kept at temperature and pressure values of about 50°C and 2 Kg cm⁻², respectively.

This particular cooking acid will be referred further on this document as the **INITIAL COOKING ACID**.

[0009] The basis of the present innovation is the inclusion of the ammonium ion in the initial cooking acid, as described by the following equation:

INITIAL COOKING ACID:



+

Ammonium hydroxide addition:



||

Reaction product:



[0010] The cooking acid obtained by this reaction will be referred to in this document as the **FINAL COOKING ACID**.

FINAL COOKING ACID composition: $\text{Mg}(\text{HSO}_3)_2 + \text{NH}_4(\text{HSO}_3) + [\text{SO}_2 = f(\text{pH})]$

[0011] The amount of SO₂ stoichiometrically in excess is a function of pH.

[0012] The addition of ammonium hydroxide must drive the initial pH value of initial cooking acid (1.5) to a final value between 2 and 4, depending on the needs of the process. This operation could be performed in a tank with the initial cooking acid under pressure (accumulator) or in the reactor (digester).

[0013] In the FINAL COOKING ACID the percentage of total SO₂, free plus combined forms, must be kept within 4% to 7% , depending on the requirements of the process.

[0014] The pulping process operated at a higher pH value, such as that attained after ammonium hydroxide addition, decreases the wood degradation process, enables the production of cellulosic fibres with higher mechanico-physical index values, and decreases the specific consumption of wood.

[0015] On the other hand, the presence of ammonium ions accelerate the reaction process decreasing both wood chip impregnation time and percentage of uncooked material. This latter effect improves the wood yield of the process.

[0016] The experimental results obtained with hard wood, namely eucalyptus, show the superiority of the present innovation over the magnesium acid bisulphite pulping process, which is expressed by:

a - Production of cellulosic fibres with a higher mechanico-physical index values.

b - Decreased percentage of uncooked material.

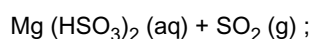
c - Increased wood yield.

d - Less environmental impact.

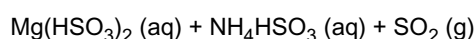
Claims

1. Wood delignification process, applied to eucalyptus wood, **characterized by** the utilisation of a mixture of magnesium and ammonium bisulphite salts as the active chemicals, as follows:

a) start from an initial cooking acid at pH 1.5, temperature of 50°C and pressure of 2 kg cm⁻², with the following composition:



b) add ammonium hydroxide in order to obtain a final cooking acid with the following composition:

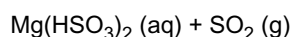


with a pH between 2 to 4 and a concentration of total SO₂ from 4% to 7%.

Patentansprüche

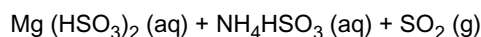
1. Entlignifizierung des Eukalyptusholzes **dadurch gekennzeichnet dass** als aktiver Wirkstoff eine Mischung von Magnesium- und Ammoniumbisulfitsalz verwendet wird, wobei

a) man zuerst, bei einer Temperatur vom 50°C eine Kochsäure mit der folgenden Zusammensetzung



mit einem pH 1.5, bei einem Druck von 2 Kg cm⁻², benutzt;

b) dann Ammoniumhydroxid hinzufügt um, als Endprodukt, eine Kochsäure mit der folgenden Zusammensetzung

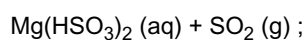


mit einem pH zwischen 2 und 4 und eine SO₂ Gesamtkonzentration von 4% bis 7%, zu bekommen.

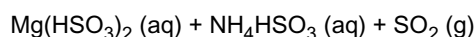
Revendications

1. Procédé de délignification du bois, appliqué au bois d'eucalyptus, **caractérisé par** l'utilisation d'un mélange de sels de magnésium et de bisulfite d'ammonium comme les produits chimiques actifs, selon ce qui suit :

a) commencer à partir d'un acide de cuisson initial ayant un pH de 1,5, une température de 50°C et une pression de 2 kg cm⁻², avec la composition suivante :



b) ajouter l'hydroxyde d'ammonium afin d'obtenir un acide de cuisson final avec la composition suivante :



ayant un pH de 2 à 4 et une concentration de SO₂ total d'entre 4% et 7%.