Sugar cane juice clarification process pdf

Sugar cane juice clarification process ppt. Study of clarification process of sugar cane juice for consumption. Sugar cane juice clarification process pdf.

Field of the invention The invention relates to an advanced process for clarifying the raw sugar cane juice by the use of an anionic polymer or inorganic polymeric polyacrylamide, in particular together with a gabinatura process. BACKGROUND OF THE INVENTION The sugar cane juice is a liquid medium extremely complex, containing many organic and inorganic constituents in a soluble form, suspended / decantabile and suspended / colloidal. The cane sugar for human consumption is produced by clarification of sugar cane juice using an extraction process, which is then processed and concentrated to obtain sugar. The clarification is therefore an essential step to obtain high yields and high sugar quality. The clarification process must remove various components from sucrose and, at the same time, minimize the loss of sucrose and color formation. The solfita is currently the most used process to clear up the cane juice. The uptake SO_2 (sulfur anidruro of anidruro) by the juice, reducing its original pH levels between 3.7 and 4.2. The use of solfica process involves: a) inhibition of reactions causing the formation of color; (B) coagulation of suspended colloids; and (c) a precipitate of $CaSO_3$ (calcium sulfite). In addition, it also reduces the viscosity of the juice and consequently the syrup, of massacuiti and molasses, facilitating the operations of evaporation and baking. However, the process has problems that solfitation the sugar / alcohol industry would be solved, including (a) of sucrose inversion due to the low pH during the process; (B) potential environmental and external corrosion problems in the area, caused by any of SO_2 / SO_3; (C) fouling and corrosion of the evaporation equipment; and (d) the presence of sulfite in the final sugar. Another method to clarify the sugarcane juice is the carbonation, which generally employs treatment with lime and controlled addition of carbon dioxide (CO_2). However, this process results in (a) increase in sugar loss invert in the juice (fructose and glucose) due to the high alkaline pH (generally pH of about 10) and the high temperatures used for the process, negatively affecting the yield of Production of alcohol from the final molasses, and (b) difficulty in filtering the precipitates from clarifiers, which require a greater investment in equipment, increased operating costs and an operation more complex. Therefore, there is a desire to have a process of clarification higher than solfitation process but which avoids the problems with the carbonation. The present invention provides such a process. The silicate microgels are used in water purification and in the water flow processes. WO 99/61377 describes a process for clarifying water streams containing biosolids resulting from the treatment of food residues and organic, which include the flow contact with an anionic colloid, which can be a silicate and an organic polymer microgel for the floccare biosolids. For the clarification of sugar cane juice you want to minimize the accumulation of silica in the juice and in equipment for the production of heating. The process of the present invention solves this problem by avoiding problems with sulfate and the prior art carbonation processes. Summary of the invention The invention comprises a process of clarification of the sugar cane juice which comprises at least the steps of lime addition; Addition of anionic inorganic colloids, polymer poliacrizio or both said colloid and said polymer; and carbonation. Most specifically, the invention comprises an improved process for the clarification of sugar cane juice by means of gassing, comprising the addition of a polymer inorganic or polymeric in polyacrylamide, based on the following phases: a) heating of raw sugar cane juice to be clarified; b) add a source of lime; c) Adding an anionic inorganic colloid, a polyacrylamide polymer, both called colloid and polymer sequentially sequentially or a mixture; d) gassing adding carbon dioxide; and e) e) Precipated format to produce a supernatant containing sugar cane juice. Optionally, the addition to point c) can be the step d) carbonation, instead; I.E., downstream of the Pass Gibinatura. The process optionally further comprises: a) supernatant heating from point e) above; b) carbonation by adding carbon dioxide; and c) decant the precipitates formed to produce a further supernatant containing sugar cane juice. Detailed description of the invention according to a specific embodiment of the invention, the process of clarification of the present invention comprises the steps of: a) heating of raw sugar cane juice to be clarified; b) add a source of lime; c) add an anionic inorganic colloid or a polyacrylamide polymer, or both called colloid and polymer sequentially sequentially, or a mixture of said colloid and said polymer; d) gassing adding carbon dioxide; and e) i) decanting precipitated formats to produce a supernatant containing sugar cane juice. In particular, the present invention provides an improved process to clarify the raw sugar cane juice using the carbonation in which the improvement includes an addition of an anionic inorganic colloid, a polyacrylamide polymer, both called colloid and polymer sequentially, or one Mixture of said colloid and said polymer. The preferred anionic inorganic colloid is Microgel silicate. During transition to), the raw sugar cane juice is heated to a temperature between about 45 ° C. and about 90 ° C., preferably between about 50 ° C. and about 85 ° C., e even more preferably between about 55 Â ° C. And about 80 ° C. The heating of the juice is intended to facilitate downstream processes by accelerating chemical reactions and improving the coagulation and sedimentation of colloids and other non-sugar. The football step b) is the addition of a source of lime (Cao) to raw cane juice. You can use any suitable lime source, but lime milk (CA (OH) 2) or soccer bags are preferred. Adding the source of lime increases the pH of sugar cane juice. The lime is added to a maximum concentration of about 2% by weight of the solid juice content. This addition aims to eliminate the dyes of the juice, neutralizing organic acids and the formation of the calcium phosphate precipitate, which on the sedimentation leads with itself the impure in the liquid. Among the passages b) and c), it is particularly advantageous that a time interval between about 0.5 and about 10 minutes is optionally observed. In point c) of the process of the present invention an anionic inorganic colloid is added. These useful colloids in the process of this invention include colloids and inorganic silica-based inorganic mixtures. Silica-based anionic inorganic colloids include, but are not limited to, colloidal silica, aluminum modified colloidal silica, polysilicated microgels, polyluminous microgels, polysilic acid and polysician acid microgels and their mixtures. For those colloids containing aluminum, the aluminum can be on the surface and / or inside the particles. Inorganic anionic colloids used in the present invention can be in the form of a colloidal silica that has a value S> 70%, generally> 75% and containing about 2 to 60% by weight of SiO_2, preferably about 4-30% in Si2 weight. The colloid can have particles with at least one superficial aluminum silicate layer or can be a modified silica aluminum silica. The alumina content of the silica sol modified by the surface can be between 2 and 25%. The colloidal silica particles in the sols commonly have a specific surface of 50 â,¬ "1200 m2 / g, Preferably about 200 Ã ¢ â,¬ "1000 m2 / g. The Silica Sol can be stabilized with Alkali in a Molar Report of SiO_2: M_2O from 10 to 1 to 300: 1, preferably 15: 1 to 100: 1, and more Preferably 6: 1 to 12: 1 (m is na, k, li or nh4). preferred for use in the process of the present invention are microgels silicate. The microgels are distinct from colloidal silica as the microgel microgel particles have surface areas of 1000 m2 / g or higher and microgel are constituted by small particles with a diameter 1a 2 nm silica linked together in chains and three-dimensional networks. polysilicate microgel, also known as active silica, have SiO_2: Na_2O ratios of 4: 1 to about 25: 1, and are discussed on pages 176 and 174a 225a 234 Ã ¢ ¢ The Chemistry of SilicaÃ Ralph K. Iler, published by John Wiley and Sons, NY, 1979. polysilicic acid generally refers to those silicic acids that have been formed and partially polymerized in the range of pH 4 and 1A comprise silica particles generally less than 4 nm in diameter, which thereafter polymerize in chains and three dimensional networks. polysilicic acid can be prepared according to the methods described in U.S. Pat. Nn. 5,127,994 and 5,626,721. Polyaluminosilicates are polysilicate microgels or polysilicic acid in which the aluminum has been incorporated into the particles, on the particle surface, or both. polysilicate microgel, polysilicic acid microgel and polyaluminosilicate can be prepared and stabilized at acidic pH. microgel size can be increased by any of the known methods such as the aging of the microgel, changing the pH, changing concentrations, or other methods, known to those skilled in the art. The use of silicate microgel offers the advantage of the process of the present invention to reduce scaling in equipment, and therefore equipment maintenance and cleaning problems. The polysilicate microgel and polyaluminosilicate microgel useful in the present invention are commonly formed by the activation of an alkali metal silicate in the conditions described in U.S. Pat. Nn. 4,954,220 and 4,927,498. However, other methods can also be employed. For example, polyaluminosilicates can be formed by acidification of silicate with mineral acids containing aluminum dissolved salts as described in U.S. Pat. No. 5,482,693. Microgel alumina / silica they can be formed by acidification of silicate with an excess of alum, as described in U.S. Pat. No. 2,234,285. In addition to conventional and microgel silica silica sol, silica sol such as those described in the European patents EP 491 879 and EP 502089 can also be used for the anionic inorganic colloid in the present invention. These are commonly referred to as low A sol S valueA. EP 491 879 describes a silica sol having an S value in the range of between 8 and 45% in which the silica particles have a specific surface area from 750 to 1000 m2 / g, which have been surface modified with 2 to 25% of alumina. EP 502089 describes a silica sol having a molar ratio of SiO_2 to M_2O, wherein M is an alkali metal ion and / or an ammonium ion of 6: 1 to 12: 1 and containing silica particles having a specific surface area 700 to 1200 m2 / G. Included in the scope of colloidal useful in the present invention are colloidal silica sol silica sol having a low S Ã ¢ valueA. S value is defined by Iler and Dalton in J. Phys. Chem., 1956, vol. 60, pp. 957 955A. S value is a measure of the degree of aggregate or microgel formation and a lower S-value indicates a higher microgel content and is determined by measuring the amount of silica, as a percentage by weight in the dispersed phase. The dispersed phase is constituted by anhydrous silica particles together with the water that is immobilized on the surface or inside the particles. In the process of the present invention, the silicate preferred microgel is added to the mixture of sugar cane and source lime juice in step c), preferably in quantities ranging from about 50 ppm to about 500 ppm, more preferably from about 50 ppm to about 200 ppm . microgel silicate are commercially available, such as ParticlearÃ Â® constituted by E.I. du Pont de Nemours and by Wilmington of the., and they are produced with any method known in the sector. U.S. PAT. No. 6.060.523 and in the US patent n. No. 6.274.112 Revealing processes allow reliable preparation of improved microgel. Microgel silicate is typically obtained from sodium sodium It is also designated as a microgel silicon or active silica dioxide, comprising between about 0.5% and 2% SiO_2, in particular about 1% SiO_2 solution. Alternatively, a polyacrylamide polymer is used in phase C) of the procedure of the present invention. A quantity of about 1 ppm to about 10 ppm is used, preferably from about 2 ppm to about 5 ppm. Polycrilamide polymers suitable for use here include mainly anionic polymers, which lead the same position as particles of the suspension to crude groove. Favorites are partially polyacrylemid hydrolysis having a moderate degree of hydrolysis (in about 15% and about 40% hydrolyzed). The molecular weights of the polymers are usually above 1,000,000. Suitable polyacrylamides are commercially available for example from Kemwater Brazil S.A., San Paolo, Brazil. Microgel silicate and polyacrylamide can both be used in the process of the present invention adding sequentially in any order or as a mixture. Using the silicate microgel is preferred due to faster dehydration during filtration resulting in better filtration. Applicant has developed a improved carbonation process for cane juices, including adding an anionic inorganic colloid, preferably silicate microgel, and its adaptation to the operating conditions of a modified and improved carbonation process, so solving industrial implementation problems and more pure sugar yields greater. The procedure of the present invention recovers the CO_2 fermenters and replaces SO_2 currently used in the process of clarifications with CO_2 recovered clarifications. But it also reduces the formation of evaporators and heat exchangers for the removal of compounds that form scale from the juice through the improved clarification process. Furthermore, the procedure of the present invention solves the problem of filtering the precipitates / sedimentation generated by traditional carbonation processes, and does not increase the loss of inverted sugar. Furthermore, the procedure of the present invention reduces the consumption of CAO compared to traditional carbonation processes. The procedure of the present invention reduces sucrose losses for reversal, obtains a better purification of the rod juice to removal of the most organic and inorganic impure, reduces the corrosion of the equipment for the absence of SO_2, lowers scaling in evaporators, and provides production of improved sugar. According to a preferred embodiment of the invention, Microgel is activated by an acid, in particular by CO_2, because the CO_2 is abundant in cane sugar treatment plants that produce ethanol from the fermentation of juice and / or molasses. A time interval between passage C) and the next is advantageous and this time interval is typically between 0.5 and about 10 minutes. In phase d), CO_2 is added, preferably in sufficient quantities to form carbonate calcium precipitates. The CO_2 flow is regulated to foaming control and reaction time. In a preferred embodiment of the present invention, the CO_2 is added through a carbonation column, in countercurrent with the bleached raw sugar juice source powered at the top of the column. Optionally the inorganic anionic colloid, or polyacrylamide, or each of the first, or a mixture of their own, can be added after the gazing phase instead of before the carbonation phase in the previously described quantities. After the carbonation phase, the decantation phase e) is undertaken. In phase e), the cane juice is purified by removing the impure precipitated as solids. The sedimented juice removed from the upper part of the decanter and delivered to an evaporator, It is concentrated. The precipitated and sedimented materials have a solid concentration of about 10 Ã ° Â © and are usually taken from the bottom of the decanter and sent to a filtering sector where materials are subsequently filtered to recover sugar. According to the invention, the requested decantation time is lower lower Now, usually about 30 minutes. The PH of the Supernatant, after this first carbonation, is usually between about 8 and 10, preferably about 9. The carbonation process of the present invention is particularly advantageous when it was conducted using the final supernatant as a starting material in A second carbonation. Therefore, the present invention also includes a carbonation process which, in addition to the above measures, also includes the following phases: a) supernatant heating deriving from the process described above; b) carbonation by adding carbon dioxide; and c) decant the solids precipitated to produce a further supernatant containing sugar cane juice. During transition to), the supernatory is heated to temperatures between about 60 ° C. and 90 ° C., preferably about 70 ° C. The heating followed by a carbonation step. The operating conditions are used that avoid excessive foam formations and generate the neutral pH foreseen for juice. In a preferred embodiment, the CO_2 is added through a second carbonation column, in the bench flow with the clarified juice powered in the upper part of that column. This column adjusts the final pH of the treated juice. The final pH is typically about 6.5 â €

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