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PROCESS FOR DECOLORIZING SUGAR JUICES

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The invention relates to the decolorizing of sugar juices of different kinds, for instance, raw sugar beet juice, cane sugar juice and the like.

It is well known that sugar juices or solutions of sugar are unstable at higher temperatures and decompose with generation of acid products. This decomposition is accelerated by contacting substances with great surfaces, even active charcoal acting as such. Hydrogen peroxide also acts in the same direction. Sugar solutions to which hydrogen peroxide has been added become yellow on heating and soon show strong acid reaction. On the other hand, the addition of hydrogen peroxide to colored sugar solution at ordinary temperature shows a progressing decolorization with time so that after standing for several days a complete colorlessness of the solution may be obtained.

In consequence, it has been suggested, to purify sugar solutions by treating them at a low temperature, for instance, in a cooled mash tub with hydrogen peroxide. After the hydrogen peroxide has reacted for some time and has been used up either completely or to a greater part which may be judged by the progressing decolorization the solution containing sugar is heated almost to boiling point. This working method, therefore requires a considerable length of time and for this reason cannot be carried into effect technically and economically.

Furthermore it has been suggested to utilize activated charcoal simultaneously with the hydrogen peroxide for the decolorization of sugar juices. This treatment, however, had to be carried out at room temperature in order to avoid decompositions, and in consequence necessitates the considerable time of from 5 to 6 hours. Only after the oxidation was finished the syrup was heated to temperatures of 80 to 90° centigrade. The effect obtained by this process, although in itself a very satisfactory one required a considerable time and therefore also was of no practical value.

The processes mentioned above for the purification and decolorization of sugar juices by utilizing hydrogen peroxide alone or simultaneously with activated charcoal were found on the consideration that hydrogen peroxide reacts at higher temperatures unfavorably upon sugar and therefore gave the prescription that the solutions should not be heated before the oxidation is finished that means until the hydrogen peroxide had been used up.

I have found to my surprise that sugar juices may be decolorized in a very short time by the simultaneous application of hydrogen peroxide and substances of great surface such as activated charcoal, bone charcoal, activated silica or the like by working at elevated temperatures. For this purpose the sugar juice is heated, for instance, to a temperature of 60 to 90° centigrade and then passed through a filter consisting of, or containing activated substances, for instance, an activated carbon filter, after a small quantity of hydrogen peroxide has been added to the juice before entering the filter.

My new process may be applied to juices of various origin as long as they are suitable for refining purposes. Thus, cane sugar, beet sugar, wood sugar juices and others may be purified in accordance with my invention. The concentration of the sugar juices utilized may also vary within wide limits. Thin juices as well as syrups of a thick consistency can be decolorized by the process of this invention. I regulate the quantity of the hydrogen peroxide to be added advantageously in such a manner that the hydrogen peroxide has been used up after the juice leaves the carbon filter. Otherwise, the juice may turn yellow on being further evaporated. The most favorable consumption of hydrogen peroxide when purifying thickened raw sugar juice, starch sugar syrup and the like at about 0.1 to 0.15% of hydrogen peroxide (30% by weight) to the weight of the juice. When more hydrogen peroxide is used its efficiency is only slightly increased. My new process not only shortens considerably the time of reaction but also increases the efficacy of the carbon as regards decolorization. In this way it is possible to prolong the efficiency of the activated charcoal.

The process according to my invention may also be carried out by mixing the substances of large surface action such as activated charcoal with the hydrogen peroxide solution adding the mixture to the sugar juice, for instance, by stirring it into the latter and filtering off the charcoal from the sugar juice after some time.

Examples

Example 1.—The juice of starch sugar syrup coming from the thin juice filter presses at a temperature of about 70° centigrade, after it has been thickened, is mixed before it enters the second bone charcoal filter with .1 to .15% of 30% hydrogen peroxide solution calculated to the weight of the juice. The efficacy of the carbon filter is increased to double or three times its value before regeneration of the filter becomes necessary.

In the same way raw juice coming from the filter presses may be mixed with small quantities of hydrogen peroxide solution before entering the first carbon filter. I prefer to carry out my process in such a way that the whole quantity of hydrogen peroxide necessary for the complete decolorization is distributed upon the juice before the first and the second carbon filter so that both filters may be exhausted at the same time.

Example 2.—Raw juice of beet sugar having a dry content of 70% are mixed at a temperature of 70 to 90° centigrade with small quantities of hydrogen peroxide (30% by volume) the quantity being about .1 to .15% of the weight of the juice, adding simultaneously such activated carbons as are known as decolorizing carbons. The duration of the action is about 15 minutes. The decolorizing action obtained when applying .5% of the said carbons and .1% of hydrogen peroxide solution 30% is a better one than when working with 2% of carbon without the addition of hydrogen peroxide. By the application of .5% of the decolorizing carbon simultaneously with .05% hydrogen peroxide solution the action as regards decolorization is approximately the same as when applying 2% of the carbon alone.

What I claim is:

1. A process of decolorizing sugar juices which comprises subjecting said juices to the simultaneous action of hydrogen peroxide and a substance of increased surface action selected from the group which consists of activated charcoal, bone charcoal and silica gel at a temperature within the range 60–90° C., the quantity of hydrogen peroxide present being such that the sugar juices, at the termination of the decolorizing process are substantially free from undecomposed hydrogen peroxide.

2. A process for decolorizing sugar juices which comprises subjecting said juices to the simultaneous action of hydrogen peroxide and a substance of increased surface action selected from the group which consists of activated charcoal, bone charcoal and silica gel at a temperature of approximately 75° C., the quantity of hydrogen peroxide present being such that the sugar juices, at the termination of the decolorizing process are substantially free from undecomposed hydrogen peroxide.

3. A process for decolorizing sugar juices which comprises subjecting the juices simultaneously to the conjoint action of hydrogen peroxide and activated carbon at an elevated temperature, within the range 60–90° C., the quantity of hydrogen peroxide which is added to said sugar juices being such that at the termination of the decolorizing process said sugar juices are substantially free from undecomposed hydrogen peroxide.

4. A process for decolorizing sugar juices which comprises subjecting said juices simultaneously to the conjoint action of hydrogen peroxide and bone charcoal at an elevated temperature, within the range 60–90° C., the quantity of hydrogen peroxide which is added to said sugar juices being such that at the termination of the decolorizing process said sugar juices are substantially free from undecomposed hydrogen peroxide.

5. A process for decolorizing sugar juices which comprises subjecting said juices simultaneously to the conjoint action of hydrogen peroxide and silica gel at an elevated temperature, within the range 60–90° C., the quantity of hydrogen peroxide which is added to said sugar juices being such that at the termination of the decolorizing process said sugar juices are substantially free from undecomposed hydrogen peroxide.

6. A process for decolorizing sugar juices which comprises adding hydrogen peroxide thereto and passing the mixture through a filter containing a substance of increased surface action selected from the group which consists of activated charcoal, bone charcoal and silica gel, said mixture of hydrogen peroxide and sugar juices being maintained at an elevated temperature, within the range 60–90° C., the quantity of hydrogen peroxide which is added to said sugar juices being such that at the termination of the decolorizing process said sugar juices are substantially free from undecomposed hydrogen peroxide.

7. A process for decolorizing sugar juices which comprises the steps of adding hydrogen peroxide to said juices, and passing said juices through a filter which contains a substance of increased surface action selected from the group which consists of activated charcoal, bone charcoal and silica gel, the temperature of the sugar juices being maintained within the range 60–90° C. during the decolorizing process, and the quantity of hydrogen peroxide added being substantially 0.1% to 0.15% by weight of 30% hydrogen peroxide solution, this amount being based on the weight of the sugar juices treated.

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