PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Methods of Bleaching Crude Sago Flour

We, ALFRED BIRD & SONS LIMITED, a British Company, of Devonshire Works, Birmingham, 12, Warwickshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to methods of bleaching crude sago flour for use for example in the manufacture of custard powder.

Bleached sago is found to be a very suitable material for the production of custard powders because:—

(i) Its freedom from taste renders it an ideal base for flavouring.

(ii) Its gel structure in the cold gives it a smooth consistency and a good, clean, shining gel.

(iii) Its low temperature of maximum viscosity and maximum gellation make it unnecessary to reboil a custard made from it.

(iv) It has good keeping qualities which ensure a good shelf-life for the product.

(v) It is of free-flowing nature, which makes it possible for very fine sieves to be used during its manufacture.

At the present day sago flour is not used alone as the starch content of custard powders, because of a public demand for a custard powder that is thicker in the hot than could be obtained from sago flours refined by known methods.

The reason why bleached sago flour prepared by known methods is unsuitable for the preparation of custard powders of the consistency required by public ~~demand~~ demand is that the viscosity of the bleached sago was insufficient due to the effect of the chlorine bleaching agent on the sago starch in the known bleaching process for crude sago flour.

It is an object of the present invention to produce a custard powder wherein the whole starch content is introduced as sago flour, the resulting product being of such a stiff consistency as to meet the public demand for a stiffer custard than could previously be met by an all-sago flour custard powder.

It is also an object of the invention to provide a method of bleaching crude sago flour wherein the sago flour loses little of its viscosity during the process.

In the known methods of bleaching sago flour the crude flour is made into a slurry with water and is bleached with chlorine in substantially neutral conditions, i.e. the slurry is maintained at *p*H value of 6—8.

The method of the present invention consists in bleaching crude sago flour with small reduction of viscosity by treating a slurry of the flour in water with chlorine until the desired colour is attained, the slurry being maintained at a predetermined *p*H value dependent on the viscosity of the crude sago, the excess active chlorine being subsequently removed and the flour dried. Preferably the free chlorine is removed by the action of hydrogen peroxide.

It is found by testing samples of crude sago that they differ considerably as regards their viscosity and gel characteristics, but they may be classified roughly into two classes, namely (a) low viscosity sago flours having viscosities under 250 Brabender units (180 Brabender units on average) and (b) sago flours having viscosities of upwards of 250 Brabender units (of the order of 400 Brabender units).

The instrument used to make these viscosity measurements is the Brabender Amylograph as described in "Chemistry and Industry of Starch" by R. W. Kerr.

It was found that if crude sago flour made up into a slurry with water of low viscosity was treated with chlorine, whilst maintained at a *p*H value of

between 4 and 5 during the bleaching period, that there was never more than a slight decrease in the viscosity of the sago flour as a result of the treatment and in some cases there was even a slight increase in viscosity compared with the crude material. A *p*H value of between 4 and 5 was found to be the optimum with low viscosity crude sago flours.

The treatment of high viscosity crude sago flours with chlorine was however found to be most satisfactory from the present point of view when carried out under alkaline conditions, *p*H 11—11.5 being the optimum.

At the end of the bleaching process in each case the active chlorine is removed by the addition of hydrogen peroxide, after which the final *p*H is adjusted to be between 6 and 7. The final removal of the active chlorine is important, as otherwise loss of viscosity will result on adjustment of the final *p*H.

After the practical neutralisation of the slurry by the adjustment of the *p*H value to between 6 and 7, the batch of sago flour treated may be washed in any desired manner. For example, the batch may be treated with water several times on a succession of suitable filters. After washing the batch is passed to a dryer where it is treated until the dried product has a moisture content of some 14%. After drying the batch is dressed through a sieve or sieves, for instance through a combination of metal and silk sieves, the metal sieve being of the order of 60 meshes to the linear inch and the silk sieve being as fine as 200 meshes to the linear inch.

In order that the invention may be more clearly understood a form of apparatus for carrying the invention into effect is shown diagrammatically in the accompanying drawing. Crude sago flour is fed from storage to the hoppers 1, from whence it is travelled by screw conveyor 2 and elevators 3 to one of the charging tubs 4, in which the required amount of water is added to it to form a slurry. The charging tubs 4 are provided with stirrers of any conventional kind (not shown). Where the bleaching is to be carried out under acid conditions (for low viscosity crude sago) the tubs 4 are suitably constructed of wood, whereas in the alkaline conditions treatment (for high viscosity crude sago) the tubs 4 may be either wooden or concrete containers.

The required quantity of chlorine in the form of sodium hypochlorite is then added to the batch of crude sago flour in the tub 4 and the *p*H is adjusted to the required value (by the addition of hydrochloric acid for low-viscosity flours or sodium hydroxide for high-viscosity flours). The bleaching action of the active chlorine contained in the sodium hypochlorite is then allowed to proceed for four hours, at the end of which time the remainder of the active chlorine is removed by the addition of the required amount of hydrogen peroxide.

After the removal of the active chlorine the *p*H of the slurry is adjusted to a value of *p*H 6—7, by the addition of either sodium hydroxide or hydrochloric acid as the case may require.

The neutralised slurry is then passed over a vacuum filter 5 which removes the liquid from the bleached flour and discharges the flour onto a conveyor 6, from whence it is discharged to a washing tub 7, where water is added and stirred up with the flour for a minimum of ten minutes.

From the washing tub 7, the flour is passed via a second vacuum filter 8 and conveyor 9 to a second washing tub 10, where again it is stirred with water for at least ten minutes from whence it is pumped to a final washing tub 11 and thence to a third vacuum filter 12, from which the cake is passed by conveyor 13 to a measuring hopper 14, leading to vacuum dryer 15. In the vacuum dryer the refined bleached sago flour is dried at maximum temperature of 48° C. and a minimum vacuum of 26″ until it is reduced to a moisture content of approximately 14%.

The dried batch of refined sago flour then passes by way of hopper 16, screw conveyor 17 and elevator 18 to a 60 mesh to the inch metal screen 19, from whence it passes to a 200 mesh to the inch silk screen 20, from whence it is weighed and bagged.

The sago flour prepared by this method has the following characteristics, which make it excellent for the preparation of custard powders:—

(i) It is free flowing.

(ii) It is free from objectionable taste which will mean that the flavouring ingredients may be used to the maximum advantage.

(iii) It is of satisfactory viscosity for the preparation of relatively thick custards without addition of other forms of starch.

(iv) It has good gel strength and viscosity which will mean that the cold custard made from this flour (with the addition only of colouring and flavouring matters) will set satisfactorily and will leave the basin or other container cleanly.

(v) It has good keeping qualities.

(vi) A custard made from such powder will not require reboiling. A custard may

be made from such powder by the mere addition of boiling water or milk to a slurry of the powder made up in a little water or milk and will require no further heating to augment the gelling of the starch of the sago flour.

It is thus seen that the ultimate object of the invention of providing a custard powder, using sago flour alone as the starch content, with a greater viscosity than could previously be attained without the addition of other starches has been achieved.

What we claim is:—

1. A method of bleaching crude sago flour with small reduction of viscosity in the resulting product comprising treating crude sago flour in water with chlorine until the desired colour is attained, the slurry of crude sago flour being maintained at a *p*H value dependent on the viscosity of the crude sago, subsequently removing the excess active chlorine and drying the bleached flour.

2. A method of bleaching crude sago flour as claimed in claim 1, including removing the excess active chlorine by treatment with hydrogen peroxide, adjusting the *p*H value of the slurry to a value between 6 and 7, washing the bleached flour and subsequently drying it to a predetermined moisture value.

3. A method of bleaching crude sago flour according to claim 1 or 2 wherein a *p*H palue of 11—11.5 is maintained during the treatment of crude sago flours of a viscosity of more than 250 Brabender units.

4. A method of bleaching crude sago flour according to claim 1 or 2 wherein a *p*H value of 4—5 is maintained during the treatment of crude sago flours of a viscosity of less than 250 Brabender units.

5. A method of bleaching crude sago flour according to any of claims 1 to 4 wherein the product is finally dried to a moisture content of about 14%.

6. A method of bleaching crude sago flour according to any of claims 1 to 5 wherein after drying the product is sieved through one or more fine sieves having a mesh of the order of 200 meshes to the linear inch.

7. A method of treating crude sago flour substantially herein described.

8. A custard powder consisting wholly or in part of sago flour bleached by the methods claimed in any of Claims 1 to 7.

9. A custard powder wherein the whole of the starch content is derived from bleached sago flour prepared substantially as herein described.

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PROVISIONAL SPECIFICATION

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We, ALFRED BIRD & SONS LIMITED, of Devonshire Works, Birmingham 12, Warwickshire, a British Company, do hereby declare this invention to be described in the following statement:—

The present invention relates to methods of refining crude sago flour by the use of chlorine for use for example in the manufacture of custard powder.

Crude sago flours from different sources vary considerably as regards their viscosity and gel characteristics, but they may be classified roughly into two classes, namely (a) low viscosity sago flours having of viscosities under 250 Brabender Units and (b) high viscosity sago flours having of viscosities well above 250 Brabender Units, and it is found that when such crude sago flours are refined by known methods their viscosities are materially reduced.

The chief object of the present invention is to provide a method of refining crude sago flours such that there is a minimum reduction in the viscosity of the starch.

A further object of the present invention is to provide an improved custard powder made wholly or in part from refined crude sago flour.

With this object in view the present invention in one of its aspects provides a method of refining crude sago flours which comprises effecting bleaching of a batch of the flour in water whilst maintaining the *p*H thereof at from 4 to 5 in the case of crude sago flours having a viscosity of under 250 Brabender units, or at a *p*H of from 11 to 11.5 in the case of crude sago flours having a viscosity of 250 Brabender units or more.

The present invention also provides a custard powder made wholly or in part from crude sago flour refined by the method defined in the preceding paragraph.

be made from such powder by the mere addition of boiling water or milk to a slurry of the powder made up in a little water or milk and will require no further heating to augment the gelling of the starch of the sago flour.

It is thus seen that the ultimate object of the invention of providing a custard powder, using sago flour alone as the starch content, with a greater viscosity than could previously be attained without the addition of other starches has been achieved.

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2. A method of bleaching crude sago flour as claimed in claim 1, including removing the excess active chlorine by treatment with hydrogen peroxide, adjusting the *p*H value of the slurry to a value between 6 and 7, washing the bleached flour and subsequently drying it to a predetermined moisture value.

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The chief object of the present invention is to provide a method of refining crude sago flours such that there is a minimum reduction in the viscosity of the starch.

A further object of the present invention is to provide an improved custard powder made wholly or in part from refined crude sago flour.

With this object in view the present invention in one of its aspects provides a method of refining crude sago flours which comprises effecting bleaching of a batch of the flour in water whilst maintaining the *p*H thereof at from 4 to 5 in the case of crude sago flours having a viscosity of under 250 Brabender units, or at a *p*H of from 11 to 11.5 in the case of crude sago flours having a viscosity of 250 Brabender units or more.

The present invention also provides a custard powder made wholly or in part from crude sago flour refined by the method defined in the preceding paragraph.

* C L M S *

At the end of the bleaching process in each case the chlorine is removed by the use of hydrogen peroxide and the final *p*H is adjusted to between 6 and 7. The final removal of the chlorine is important as otherwise loss of viscosity will result on adjustment of the final *p*H.

After *p*H adjustment the batch may be washed in any desired manner. For example, the batch may be treated with water several times on a suitable type of filter. After washing the batch is passed to a dryer where it is treated until the dried product has a moisture content of some 14%. After drying the batch is dressed through a sieve or sieves, for instance, through a combination of metal and silk sieves, the silk sieves being of 200 meshes to the linear inch.

The resulting refined sago flour is (a) free-flowing, (b) free from objectionable taste, (c) of satisfactory viscosity as compared with that of the crude material, (d) of a good gel texture, (e) with admirable keeping qualities, and (f) forms with liquid a paste of maximum viscosity. These desirable characteristics render the refined sago flour very suitable for use, with or without the addition of other ingredients, such as colouring or flavouring agents, as a custard powder since a custard having great similarity to an egg custard can be made therefrom merely by the addition of a hot liquid, e.g., boiling milk.

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