

crystallizable molasses, about seven per cent. 3. Acid. 4. Vegetable mucilage, or gum. 5. Coloring matter. 6. Water.

Our object is to separate the sugar and molasses.

The acid and mucilage prevent the sugar from crystallizing.

1. Our first step will be to neutralize the acid in the juice by combining it with an alkali (lime).

2. Our second step will be to remove the mucilage by the addition of liquid albumen (blood, eggs, or milk) to the cold juice, we then apply heat; the albumen, being heated, coagulates, and rising in the form of scum, carries the mucilage with it. This process is called *clarifying*, and should be *twice* repeated at least.

3. Having now got rid of the acid and most of the mucilage, our third step is to remove the *coloring matter*, by filtering the clarified juice through granulated bone black.

But a *peculiar mucilage* still remains, inseparable at a lower heat than about 225° Fahrenheit.

4. Our next step will be to boil the filtered juice to 225° Fahrenheit, and then to add lime water. This mucilage then rises as a scum, and is removed.

We now have left a solution composed of 1st, Sugar; 2nd, Molasses; 3rd, Water.

5. To crystallize the sugar, we must evaporate the excess of water, by boiling. Most of the sugar will crystallize when the solution grows cold. The uncrystallized part, we drain off as molasses.

These operations require the greatest exactness, for if we do not boil enough, the sugar contained in the solution will not crystallize when cold; or, if we boil too much, the molasses will become so thick when it cools, as to impair the crystallizing of the sugar, and cannot be separated from it.

But how shall we know when to stop the boiling?

*By the heat of the boiling liquid*, as marked by the thermometer.

Pure water boils at 212 degrees of Fahrenheit's thermometer. You cannot make it hotter without changing it to *steam*.

The Sorgho juice, being a solution of about fourteen per cent of sugar and molasses, &c., in water, become three degrees hotter before boiling, and boils at 215° Fahrenheit. As the water evaporates, a greater heat is required to keep the concentrated juice at a boil; in other words, the juice grows hotter and hotter. When it reaches the heat marked on the thermometer 238° Fahrenheit, there is just enough water left to enable the sugar to separate from the molasses when cold.

6. We now pour the concentrated juice into a mould, a keg, a barrel or other deep vessel, with a plug in the bottom, and allow it to cool.

7. When quite cold (say in twenty-four hours), we remove the plug. The liquid portion, being molasses with a little sugar and water, gradually drains out, leaving the sugar dry in from four to ten days.

It is also important to remember that the juice begins to ferment almost as soon as it leaves the cane, and therefore, should be neutralized, clarified, and boiled *without delay*. A very few hours' delay will spoil it.

A long continued exposure to heat gradually converts crystallizable sugar into uncrystallizable molasses, therefore, the evaporation should be *as rapid as possible*.