

AN INVESTIGATION INTO THE ROLES OF

PHOSPHATE AND SILICATE FRACTIONS IN CANE JUICE CLARIFICATION

FOR RAW SUGAR MANUFACTURE.

I. INTRODUCTION.

Not very long ago the process of clarifying Raw Sugar Cane Juice was merely a matter of adding an arbitrary quantity of Milk of Lime to the juice, heating it, and allowing the precipitate formed to settle. Today however, with the introduction of new varieties of cane possessing vastly superior agricultural qualities, the problem of clarification has been considerably intensified.

Attempts have been made by various factories to solve the problem of clarifying these refractory juices, and methods have been evolved, by means of which their inconveniences can be lessened. It remains to be discovered however, what particular constituent or constituents or lack of these, is responsible for their low claribility, in the hope that some simple, cheap and efficient method may then be evolved for dealing with them.

In view of the importance of the problem the Sugar Technology Department of the Imperial College of Tropical Agriculture has conducted research on it for some years now. As a result a very successful method of clarifying the juice of P.O.J.2878 - perhaps the most refractory variety, has been developed, and it has been shown that low claribility cannot be accounted for by either its total Ash or its total Colloid contents, since these are perfectly normal.

Gomez³ has shown that the residual Phosphate content of clarified P.O.J.2878 juice was higher than that of high claribility varieties such as B.H. 10/12. Further, not only was the total Silica content of P.O.J.

2878 juice higher than that of B.H. 10/12, but a higher percentage of it was colloidal.

It would appear from the previous work in this series, that whether the refractory nature of these juices can be accounted for in their inorganic or their organic constitution, it will be in the nature rather than in the total content of either of these classes of constituents.

Duncan and Yearwood²⁰ have put forward the suggestion that the colloids of P.O.J.2878 juice seem to be more highly hydrated than those of high claribility juices. Unfortunately, an attempt by Gomez³ to measure the degree of hydration of cane juice colloids, made as a result of this suggestion, was unsuccessful, and research along this line had to be abandoned.

The present investigation is mainly concerned with a fractionation of Phosphates and Silicates in juices representing both classes of claribility, in order to observe their behaviour during clarification.

Before any work could be done on the problem a method of analysis had to be developed for estimating organic Phosphate, and this together with a preliminary laboratory investigation, occupies the first part of this work. The second part is devoted to the main investigation on the effect of clarification on the Phosphate and Silica fractions, and the final part deals with an investigation of the behaviour of these substances during the process of Milling.