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PRODUCTION OF ORGANIC SUGAR EMPLOYING VEGETABLE CLARIFYING AGENT FOR SUGARCANE JUICE

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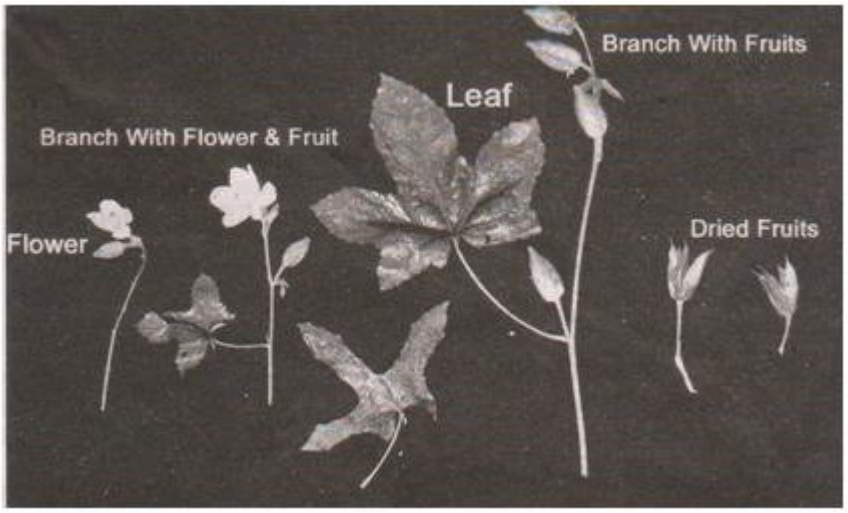
INTRODUCTION

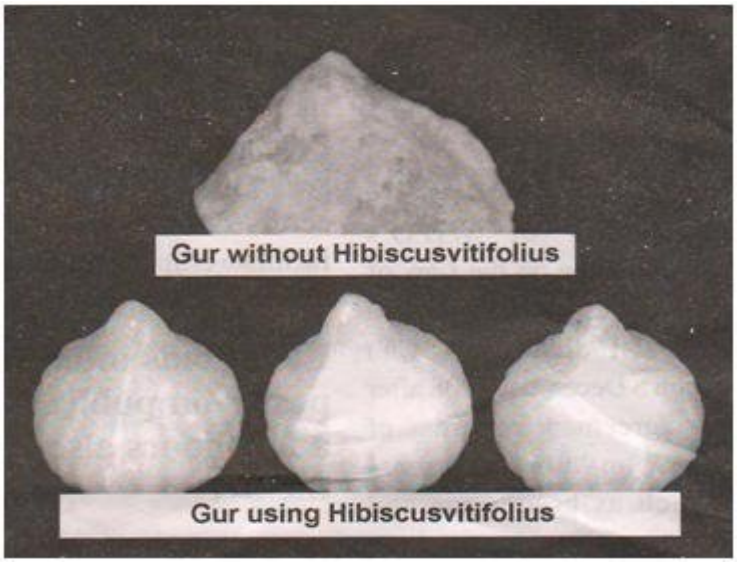
Most sugar mills import settling aids to improve clarity of cane juice and obtain white sugar. The settling agents are added in the heated juice at 120°C before it enters the clarifier. Since these imported chemical agents are expensive, the use of alternative substitutes that are eco-friendly, less expensive and easily adaptable was considered to bring down the cost of sugar production. In the manufacture of *khandssari* and *gur*[1] the cane juice is clarified using the mucilage of plants such as *Hibiscus ficulneus* (deola), *Hibiscus esculentus* (Bhindi), *Cadia celcina* (sukalai), *Bombax malabarium* (semal bark), *Grewia asiatica* (falsa), *Arachis hypogeal* (ground nut), *Recinus communis* (castor seed), *Aloe vera* (Indian aloe), etc. when extracts of such plants were tried out for clarification of cane juice in the sugar industry it was found that extracts of the plant *Hibiscus vitrifolius* gave better results and could be used in place of imported polyelectrolytes used as clarifier.



Hibiscus vitrifolius belongs to Malvaceae family and is a herbaceous plant that grows to 2-3 m height. Common names in different languages are: Tropical rose mallow in English; Mantitutte in Tamil; Ban-kappas in Hindi; Karu patti Telgu; Jangli bjindo in Gujarati; Bharadwaji in Sanskrit; Adve-atti/ Mani tulhi balli in Kannada, Vellei-ooral in Malyanam; and Dukto kalo bhendo in Konkani. It is the albumin-like extract of the plant that acts as a coagulating and bleaching agent and is responsible for removing impurities from the juice. The fruits of plants look like bhindi (lady's finger), but are much smaller. Deeds are brown. The plant is cultivated from seeds and can also be propagated by stem cutting. It bears flowers and fruits within 30 days after planting. For extracting juice to be used for cane juice clarification, the leaves have to be

picked before 30 days. If entire leaves are plucked, secondary leaves develop within a few days. The entire plant can be used for the extraction of juice. The sticky juice of the leaves contains an albumin-like substance, which is responsible for coagulating and bleaching action[2].

For the study , mature leaves of the plant were collected and washed with water. the leaves were soaked in water and squeezed to extract the mucilagineous matter using Rapi Pol Extractor. The extract so obtained was taken for the experiment after filtering through a cloth. A 0.05 per cent solution of *H vitrifolius* extract was prepared by taking 0.5g of extract in a 100ml volumetric flask. 80ml of distilled water was added. The flask was stoppered and shaken well to dissolve the extract. The volume was then made up to 100ml using distilled water, and then diluted 10x with distilled water to give a 0.05 per cent solution. (2 ml of this solution when added to 1 litre of juice corresponds to 1ppm.) The raw cane juice obtained from the laboratory crusher was analysed for brix, purity and pH. It was heated to 70°C and then limed to 7.2 pH. The treated juice was reheated to 100°C.



A series of six measuring jars of one-litre capacity were taken. The *H vitifolius* extract was taken in the order of 1ppm, 2ppm, 3ppm, 4ppm, and 5ppm respectively. The sixth jar was kept as control. The boiled juice was treated with *H vitifolius* extract kept in the measuring jar and in the blank jar. The volume was made up to 1,000ml mark. The contents of the jars were stirred well. The settling rate in each jar was observed at regular intervals and recorded using a stop watch. The clarity of the clear supernatant liquid from all the measuring jars was measured and recorded. Similar experiments were conducted with sulphited juice.

From comparison data the optimum dosage of *H vitifolius* extract and chemical flocculant was found to be 3ppm and 2ppm respectively. The results showed that *H vitifolius* has remarkable settling characteristics; the settling was faster and the mud was more or less equal to that with chemical flocculant. The clarity analysis revealed that the supernatant juice obtained by the addition of *H vitifolius* extract was superior to that of the juice treated with chemical flocculant. The bleaching action was similar or more than that of sulphited juice. It was observed that gur made from cane juice treated with *H vitifolius* extract had better keeping quality than that made from chemical treated juice.

Studies are underway[3] to analyse the constituents of *H vitifolius* extract responsible for its remarkable settling characteristics and bleaching action. The effect of *H vitifolius* extract on cane juice at different stages of processing is also being studied. Attempts are also being made to crystallize *H vitifolius* extract to make it suitable for storage and marketing. Use of *H vitifolius* extract as a clarifying agent for gur manufacture in a unit Mandya district of Karnataka has shown that quality gur can be produced without the use of harmful chemicals and this can reduce the cost of production of gur. These merits make *Hibiscus* plant extract an ideal substitute for chemical settling aids in sugar mills. The plant was wider adoptability in terms of its agro-climatic requirements and can be grown as a sole crop or as an intercrop with sugarcane.

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