

Studies on Maturity Behaviour and Varietal Suitability for Gur Manufacture

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The production of sugar in Bangladesh is much less than other developed cane sugar producing countries due to low cane yield and recovery percentage of sugar. One of the major factors responsible of low sugar recovery in Bangladesh is crushing of immature and over matured cane by the mills. Crushing of cane at its peak maturity phase is very important to obtain higher recovery of both white sugar and gur. Maturation phase is regulated largely by varietal features subject to improvement by sugarcane breeders, and by soil and ecological factors. Among external factors, temperature is very important. Cool and dry weather promote maturation of cane plants. At temperature 20°C (69°F) or below helps in stoppage of vegetative growth, and diversion of photosynthate towards accumulation.

Sunlight is another important factor which generally influence the formation of sugar in cane plants. The ripening of cane can be brought about by nitrogen starvation and drought condition. As maturity of cane depends on many factors, it is not surprising if the maturity of cane vary widely. The varieties suitable for gur making are found to be equally good for sugar production. However, a variety suitable for sugar production may not be equally suitable for gur making (Singh *et al.* 1975). The chemical composition of gur and its quality depends on varietal characteristics. The characteristics of a variety for good quality gur making are softness, low fibre % cane, medium stalk diameter, easily clarifiable juice, low mineral content and high sucrose with low invert sugars. Gur is normally praised in market for its colour. Bright golden yellow coloured solid or semi-solid gur is preferred by consumers and get higher market price. At present gur manufacturers use Sodium Hydro Sulphite (NaHSO_3) locally known as hydrose which is not desirable in gur for consumption. Considering the above characters, a trial was conducted to screen sugarcane clones for early maturing behaviour and quality gur manufacture. During 1992-93 harvesting season, six advanced promising sugarcane clones such as I-87/85, I-251/85 I-308/85, I-525/85, I-457/85 and I-543/85 were chemically analysed for Brix, Pol, purity and reducing sugars content starting from August '92 once in a month and continued upto March '93. Gur was prepared from the same clones by open pan-boiling method. The physico-chemical properties of gur were analysed within two days of its preparation. Early maturing clones were screened on the basis of higher percentage of pol, purity and low reducing sugars content in cane juices in October. Based on higher gur recovery and good physico-chemical properties of gur, suitable clones for

gur manufacture were screened out. Sugarcane is considered to have obtained maturity when it contains minimum of 16% sucrose and 85% purity in juice (Rao, 1986). At peak maturity, the sucrose level will be at its maximum. The results of the experiments are shown in Tables 1, 2, 3 and 4.

Table 1. Sucrose percent juice in different sugarcane clones.

Sugarcane clones	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
I - 87/85	10.3	10.1	14.3	14.3	15.3	15.9	18.0	17.4
I - 251/85	11.6	13.2	14.5	14.9	15.0	17.1	18.1	16.9
I - 308/85	10.4	14.2	14.6	15.0	14.9	17.1	18.1	16.9
I - 457/85	11.9	16.2	16.3	16.9	17.2	18.1	17.1	16.9
I - 525/85	8.5	12.7	13.3	15.0	15.6	16.7	18.5	17.5
I - 543.85	11.3	14.3	16.1	16.8	17.2	15.8	15.8	15.5

Table 2. Purity percent juice in different sugarcane clones.

Sugarcane clones	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
I - 87-/85	74.3	80.2	82.7	83.4	84.9	86.4	90.2	88.8
I - 251/85	81.7	81.7	83.8	84.4	84.4	86.3	88.8	86.4
I - 308/85	69.7	81.3	82.4	82.9	83.3	85.4	89.3	85.5
I - 457/85	77.3	85.1	85.0	85.5	85.9	89.8	89.6	87.7
I - 525/85	72.0	81.9	83.4	83.9	86.3	89.0	89.9	89.1
I - 543/85	76.5	81.8	85.4	87.2	87.8	88.1	88.5	87.3

Table 3. Reducing sugars percent in different sugarcane clones.

Sugarcane clones	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
I-87-/85	1.97	1.14	0.92	0.77	0.61	0.47	0.23	0.42
I-251/85	1.77	1.10	1.17	0.83	0.39	0.29	0.19	0.33
I-308/85	2.13	1.49	1.19	0.85	0.45	0.44	0.28	0.32
I-457/85	1.68	0.96	0.81	0.44	0.33	0.23	0.18	0.29
I-525/85	1.86	0.78	0.67	0.42	0.24	0.13	0.14	0.19
I-543/85	1.90	0.95	0.99	0.43	0.46	0.40	0.31	0.32

The sugarcane clones I-457/85 and I-543/85 showed 16.3 and 16.1% sucrose content in juice in October respectively. Similarly the same clones having higher percentage of juice purity (Table 2) and lower reducing sugars content were found in October (Table 2) than other tested clones.

Table 4. Physico-chemical properties of gur in different sugarcane clones.

Sugarcane clones	Texture	crystalline nature	Colour in solid state	Taste	Recovery (%)	Sucrose (%)	R.S (%)	pH	Colour	Moisture (%)
Isd-16	Hard	Good	Golden yellow	Good	92	75.6	7.1	5.4	68.5	9.5
I-87/85	Hard	Medium	Radish brown	Medium	7.4	63.9	17.1	5.3	73.0	6.9
I-251/85	Soft	Medium	Golden yellow	Medium	82	67.0	9.6	5.4	54.5	8.7
I-308/85	Soft	Medium	Brown	Slightly saline	88	68.1	13.3	5.3	58.5	8.7
I-457/85	Hard	Medium	Reddish brown	Good	9.9	70.4	8.8	5.4	69.5	8.8
I-525/85	Soft	Medium	Deep brown	Slightly saline	6.9	70.1	13.7	5.3	69.5	9.2
I-543/85	Soft	Good	Golden yellow	Good	102	69.6	8.5	5.3	76.5	8.2

The results revealed that the clones I-457/85 and I-543/85 were early maturing potential. Good quality gur was obtained from the clone I-543/85, and showed higher gur recovery (Table 4). Preharvest maturity test, and selected harvesting of sugarcane according to the maturity have yielded 0.5 to 1.0 unit higher sugar recovery in India (Islam, 1984). If we can adopt same technique in harvesting cane in Bangladesh, it should give similar beneficial result. This practice is now universal in Indian sugar industry should be given a fair trial here. In conclusion, it can be stated that the clones I-543/85 and I-457/85 were recorded as early maturing, and I-543/85 was found suitable for quality gur manufacture.

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