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EVALUATION OF PROMISING SUGARCANE VARIETIES FOR JAGGERY YIELD AND QUALITY

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ABSTRACT: Six promising sugarcane varieties were evaluated along with one check variety for yield and quality of jaggery suitable for southern zone of Andhra Pradesh. Among the varieties 97R272, 86V96 and 93A145 are classified as excellent jaggery varieties along with check Co 62175 which is known for better jaggery variety in the zone. All the quality parameters viz., sucrose %, color, reducing sugars, non reducing sugars and NRV were determined and classified the varieties. 97R272, 86V96 and 93A145 can be recommended for cultivation in jaggery area of Southern zone of Andhra Pradesh.
Key words: Jaggery quality, NRV, % color intensity, ash%

INTRODUCTION

Jaggery industry is probably the most wide spread cottage industry in India. At present about 40% of the total sugar production is used for manufacturing jaggery and khandasari products. India produces more than 70% of the total jaggery production of the world. From ancient times in Andhra Pradesh jaggery has been an important article of food and even today jaggery manufacture continues to be one of the most important cottage industries. Nearly 25 -30 % of cane growth in Andhra Pradesh is utilized towards jaggery manufacture. In Rayalaseema region though the number of sugar factories are more, an appreciable percentage of cane is being utilized for jaggery manufacture. Being an eco friendly sweetener with additional nutritional value, jaggery holds good export potential. To sustain the market and export potential of jaggery, it is imperative that the jaggery quality need to be sustained. The survey conducted during 1996 showed that improved sugarcane varieties are not being used and most of the area is under red rot susceptible variety Co 62175. Replacement of non recommended jaggery varieties with improved sugarcane varieties is most essential. In this connection, the present study was conducted to select suitable sugarcane varieties for yield and quality of jaggery.

MATERIALS AND METHODS

A field experiment was conducted during 2007–08 and 2008–09 at Agricultural Research Station, Perumallapalle to evaluate six promising varieties of sugarcane for yield and quality of jaggery. Co62175 was used as check variety which is known for jaggery. Trial was laid out in RBD with three replications. Varieties were planted during second fortnight of February and harvested at 11 months. At harvest jaggery was prepared by adding lime solution to bring the pH of juice to 6.8. Bhendi stem mucilage was added as clarificant during preparation and scum was removed with the help of strainer when ever necessary. Coconut oil was added to facilitate proper crystal formation and to prevent the sticking of mass to the bottom of pan. Jaggery samples were prepared and dried under shade for two days. Recovery percent of jaggery was estimated. Jaggery samples were collected and analyzed for its quality by following standard procedures (Meade & Chen, 1977). Moisture content is estimated on oven dry weight basis and expressed as %. Color intensity was measured by spectrophotometer at 540 nm. Net rendement values (NRV) were calculated as NRV= (Sucrose % - RS %) – (3.5 x ash%). Based on NRV the quality was considered as excellent >65, good between 60-65, medium between 45-60 and poor <45.

RESULTS AND DISCUSSION

All the varieties differed significantly in quality attributes of jaggery (Table 1). 97R272 had recorded significantly highest sucrose (89.96%) and purity (95.16%) and low reducing sugars and ash % compared to check Co62175. Where as varieties 86V96 and 93A145 recorded on par values with check Co62175. Low color intensity was recorded in 97R272 followed by Co62175 which indicates light color of jaggery. Dark color jaggery was obtained with 2005T89 followed by 2004T67. The other varieties viz 86V96 and 93A145 showed medium color jaggery. Lowest sucrose %, purity % and highest RS % were reported with 2005T89 which indicated poor jaggery quality followed by 2004T67. The other varieties had intermediate values for quality characters.

TABLE (1): QUALITY ATTRIBUTES OF JAGGERY OF PROMISING SUGARCANE VARITIES

Varieties	Brix %	Sucrose %	Purity %	Reducing sugars %	Ash %
1.86V96	91.86	85.16	92.70	6.89	3.73
2.93A145	92.89	85.65	92.21	6.54	3.92
3.2004T67	85.92	76.88	89.48	7.04	4.11
4.2004T68	88.11	81.73	92.75	6.69	3.85
5.2005T89	84.89	73.76	86.88	7.59	4.33
6.97R272	94.53	89.96	95.16	5.15	3.17
7.Co62175 (check)	92.68	88.40	95.38	6.11	3.31
CD 0.05	**3.08**	**2.15**	**3.28**	**0.85**	**0.52**

Varieties	%color intensity	NRV	pH	EC (dS/m)	Recovery %	Jaggery yield(t/ha)
1.86V96	51.9	65.26	5.80	0.12	10.08	8.86
2.93A145	50.6	65.39	6.21	0.10	10.85	8.54
3.2004T67	70.0	55.45	6.51	0.20	9.29	6.59
4.2004T68	62.9	61.56	6.19	0.13	10.57	7.41
5.2005T89	78.0	51.01	6.16	0.24	8.29	7.30
6.97R272	43.6	73.72	5.72	0.11	11.70	8.18
7.Co62175 (check)	46.8	70.70	5.75	0.13	11.50	7.91
CD 0.05	**4.35**	**-**	**-**	**-**	**-**	**1.52**

Highest NRV were observed with 97R272 (73.72) which can be classified as excellent jaggery quality followed by Co 62175, 93A145 and 86V96. Medium values were recorded in 2004T68 (61.56) and lowest values were recorded in 2005T89 (51.01) which indicated good and medium quality characters of jaggery, respectively.

Electrical conductivity of jaggery which shows salts content owing to its hygroscopicity is lowest in 97R272. This value imparts high storability character to jaggery. Highest values are recorded in 2005T89 which is more hygroscopic compared to other varieties. Higher values indicate the susceptibility of jaggery for moisture absorption.

Maximum jaggery yield was recorded in 86V96 (8.86 t/ha) followed by 93A145 and both were significantly superior to 2004T67 being at par with Co62175. 2004T67 produced low jaggery yield /ha due to poor cane yield compared to other test varieties. Highest gur recovery was recorded with 97R272 followed by Co62175 due to its high juice extraction% compared to other varieties. Similar results were reported by Mishra, 1991.

Higher NRV values determine better quality was found positively associated with sucrose, purity, and % color intensity (Table 2). Reducing sugars and ash content were detrimental to quality. Reducing sugars had higher significant positive association with ash. Sucrose is positively correlated with purity, color intensity and NRV and negatively correlated to ash content, reducing sugars (Sharma *at al* 1979).

TABLE (2): CORRELATIONS BETWEEN DIFFERENT PROPERTIES OF JAGGERY

	Purity coefficient	Reducing sugars %	Ash %	%Color intensity	NRV	EC
Sucrose %	**0.81****	**-0.54***	**-0.65***	**-0.43**	**0.82****	**-0.64**
Purity coefficient		**-0.45**	**-0.45**	**-0.61****	**0.71****	**-0.52**
Reducing sugars %			**0.82****	**-0.16**	**-0.84****	**0.81**
Ash %				**-0.41**	**-0.90****	**0.71**
%Color intensity					**0.33**	**0.62**

*** Significant at 0.01 and ** significant at 0.05**

Jaggery classified into different grades indicated that 97R272, 86V96 and 93A145 have excellent quality and is on par with Co 62175, a known variety for better jaggery quality. Variety 2004T68 has yielded good quality jaggery whereas 2004T67 and 2005T89 have medium quality jaggery.

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