Development of a sweet sorghum juice clarification method in the manufacture of industrial feedstocks for value-added fermentation products

In recent years, there has been a dramatic increase in interest of sweet sorghum (Sorghum bicolor L.) for small to large-scale manufacture of renewable, biobased fuels and chemicals. New fermentation organisms hold tremendous potential for the production of biobased fuels, chemicals, and materials from industrial sugar feedstocks, in particular syrups. Clarification of sweet sorghum juice will be critical to the production of stable, intermediate syrup feedstocks for efficient transport, storage, and year-round supply. Juices extracted from mature sweet sorghum hybrids and immature cultivar Topper 76-6 (Topper), were clarified using heat, heat-milk of lime, and heat-milk of lime-polyanionic flocculant at various temperatures and target limed pHs, and compared to the clarification of sugarcane (Saccharum spp. hybrids) juice. There was no significant loss of fermentable sugars (sucrose + glucose+ fructose) across clarification by temperature and only a slight decrease in fermentable sugars when clarified by pH. Preheating the sweet sorghum juice from 85 to 100°C not only produced clarified juices of low turbidity, but also with excellent turbidity control. For the cultivars studied, a minimum limed juice pH of ~6.3–6.5 was optimum for the clarification of sweet sorghum juice preheated to ~80–85°C with 5 ppm polyanionic flocculant addition with respect to clarified juice turbidity, protein, calcium, starch, and to a lesser extent phosphate levels. There was a strong effect of cultivar on juice quality, clarification performance, and clarified juice quality, which warrants further research (Brett Andrzejewski*, Gillian Eggleston, Sarah Lingle and Randall Powell (USDA-ARS Southern Regional Research Center, 1100 Robert E. Lee Blvd., New Orleans, LA 70124, USA), Industrial Crops and Products, 2013, 44, 77-87].

LC-MS/MS analysis of sugarcane extracts and differentiation of monosaccharides moieties of flavone c-glycosides

LC-MS/MS data of the flavones from extracts of nonmodified and transgenic sugarcane (“Bowman-Birk” and “Kunitz”) led to the proposition of characteristic fragmentations that can be applied to identify the monosaccharides glucose, arabinose, and rhamnose in C-glycosylflavones. Collision-induced dissociation (CID) MS/MS generated diagnostic ions for different linked sugars in C-glycosylflavone–O-glycoside and C-glycosylflavone–O-acid derivatives, and the combination of MS data with postcolumn derivatization using UV shift reagents (which provide complementary information to determine the substitution patterns in the flavone skeleton) allowed for the identification of seven flavones not previously reported in sugarcane: 6-methoxyluteolin-8-C-arabinosyl-7-O-glucoside; diosmetin-8-C-arabinosyl-7-O-arabinoside; vitexin-7-O-rhamnoside; diosmetin-8-C-rhamnosyl-7-O-glucoside; tricetin-8-C-(6′O-sinapoylg glucoside); 7,4′ di-O-methylapigenin-8-C-arabinosyl-rhamnoside; and luteolin-8-C-rhamnosyl-7-O-rhamnoside [Renata Colombo*, Janete Harumi Yariwake, Emerson Ferreira Queiroz, Karine Ndjoko and Kurt Hostettmann (Instituto de Química de São Carlos, Universidade de São Paulo , São Carlos , São Paulo, Brazil), Journal of Liquid Chromatography & Related Technologies, 2013, 36(2), 239-248].

Energy losses in traditional jaggery processing

Jaggery is a traditional Indian sweetener prepared using sugarcane. Farmers make jaggery
in their own farms using juice obtained after crushing sugarcane with a crusher. The settled juice is boiled in open pans with continuous stirring and, simultaneously clarificants are added in required quantity. The consistency of the juice becomes thick on concentration by boiling and then it is poured into moulds to make jaggery blocks on cooling. The efficiency of crushing and concentration process is 60% and 14.75%, respectively. The low efficiency is due to the use of open pans for concentration and using moulds for cooling. Adopting alternative technologies like a steam jacketed vessel which will get preheated water from the cooling and moulding section. Hot water can also be used in improving the crushing efficiency thereby making the jaggery processing energy efficient [M Esther Magdalene Sharon*, CV Kavitha Abirami and K Alagusundaram (Indian Institute of Crop Processing Technology, Thanjavur-613 005, India), Indian Food Industry Mag, 2013, 32(3), 22-25].

NPARR 4(2), 2013-0214 Comparative economics of organic and inorganic jaggery preparation in Mandya district

The study was undertaken in Mandya district of Karnataka during the year 2010-2011. Based on the primary data obtained from 30 processors and 64 consumers each of organic and inorganic jaggery was elicited through survey method. The result revealed that average investment of Rs. 933255 and Rs. 988081 were required to set up organic and inorganic jaggery processing unit with a capacity of nine quintals per day. The average per quintal cost of inorganic jaggery preparation was more (Rs. 2392.24) when compared to organic jaggery units (Rs. 2187.00). Per quintal income from organic jaggery was found to be higher (Rs. 3450.84) than that of inorganic jaggery (Rs. 2990.47). Net return in organic jaggery was higher than inorganic jaggery at Rs. 1411.40 and Rs. 725.50 per quintal, with B:C ratio of 1.41 and 1.11, respectively [Swamy, P. S. D.; Honnaiah, Mysore Journal of Agricultural Sciences, 2013, 47 (2), 374-378].

NPARR 4(2), 2013-0215 Operational efficiency and profitability measurement of Indian gur (jaggery) manufacturers

Gur (jaggery) is a natural, traditional product of sugarcane. Kushinagar1 district of Uttar Pradesh has a large number of gur manufacturing units, mostly located in the rural areas and manufacturers are following conventional methods for producing this, although, there is no R&D assistance or marketing institutions for support. It is found that the manufacturers are producing mainly for distilleries and local liquor producers, not for the foodplate or common man's consumption. The paper examines the cost–return analysis, profitability and operational efficiency of gur manufacturing units in the study area. The study revealed that units of medium and large sizes were able to cover their operating expenses with a significant level of profit but small size units were earning a marginal profit. The profit earned by this category was very low as compared to the other two sizes. This research will urged the policy–makers to streamline strategies that promote stabilisation of sugarcane economy [Amit Kumar Dwivedi*, Nivedita T. Dwivedi, Bittu Sah, G.S. Dangayach (Entrepreneurship Development Institute of India, P.O. Bhat–382428, Gandhinagar, Gujarat, India), International Journal of Procurement Management, 2013, 6(4), 466-480].