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International Society of Sugar Cane Technologists
Founded 1924

Bulletin

Welcome to the ISSCT Bulletin for October 2021, in which we continue to explore the impact of Covid-19 on various sugar cane industries across the world, as well as collecting latest news, research, along with past and upcoming events related to sugar cane technology.

Covid-19 Impact on Sugar Cane Industries

The Covid-19 pandemic has affected the sugar cane industry across the world, including production and research and development at various levels. The ISSCT Secretariat requested updates from sugar cane-producing countries, some of which were featured in the previous edition of the ISSCT Bulletin, and two of which are included in this edition below.

El Salvador

When COVID-19 was first detected in El Salvador in February 2020, the Salvadoran sugar industry was in the middle of the 2019-20 harvest and even with poor understanding of the virus that caused the pandemic; the sugar production process was not suspended.

There were complicated inconveniences for employees in the mill and in the field as documentation authorized by the employer or public health authorities and any symptoms of flu or discomfort necessitated presentation of the results of the PCR test. This caused logistical problems.
In El Salvador different industrial areas have been impacted by the virus. Perhaps the area that was the most affected was a 15% reduction in the efficiency of manual cutting, due to infection and death. Operations by mechanized harvesters decreased by 12% mainly through disease infection among operators of harvesters and loaders as well as in mechanics. Administrative staff was also affected.

Overall, the disease affected cane supply to the mills and the area harvested was reduced. Infection with Covid-19 occurred in all sugar mills and due to the country-wide quarantine, local consumption of industrial sugar decreased considerably. Logistics for the delivery of imported supplies and spare parts for the various needs of the mills were seriously affected.

The 2020-2021 harvest started under better conditions given the experience acquired in the past harvest and biosafety measures implemented were very effective in reducing infection.

The vaccination plan developed by the government has helped greatly to reduce the number of cases of infection and death.

Asociación de Técnicos Azucareros de El Salvador - ATASAL

Philippines

At the height of the Covid-19 pandemic in 2020, most industries suffered from the hard lockdown policy imposed by the government. Fortunately, the sugar industry was spared because it is deemed as an essential industry, particularly in Negros Island, which produces almost 70% of national production and where sugar is the backbone of the economy.

The Philippines has an estimated population of 111 million and at 18 September 2021, the country had logged 2,347,550 Covid-19 cases, with 36,583 fatalities. Of the 184,088 then active cases, 5% are asymptomatic, 90.5% display mild symptoms, 2.5% exhibit moderate symptoms, while 1.3% are severe and 0.6% are critical.

The government is pushing a speedy vaccination campaign, but its efforts are dependent on vaccine availability. Healthcare workers and medical frontliners were given top priority in the vaccination rollout, followed by those with comorbidities and senior citizens. Currently, the vaccine rollout is available to all except those aged below 18 years old.

As of 18 September, 41,247,552 doses have been administered using different available brands; 22,771,602 persons have received their first dose, while 18,475,950 have received their complete second or single dose.

The sugar industry complied with all the mandated health and safety protocols, such as the wearing of face masks and face shields, monitoring of temperature, frequent handwashing, maintaining physical distancing, and regular disinfection of workplace. Some industry employers worked with the government and vaccine suppliers to expedite the procurement and delivery of vaccines for their employees, and in some instances, including their dependents.

When government imposed a strict lockdown at the start of the pandemic, it issued passes to allow industry workers, including cane trucks and their drivers and helpers, to pass through the numerous checkpoints, and continue with the harvesting, hauling and milling of cane.

Whenever an industry worker tests positive for Covid-19, the person is immediately quarantined. Rigorous contact tracing with RT-PCR testing is conducted among their close contacts, particularly in the work place, and the work area of the affected worker is temporarily sealed off for thorough disinfection.

Isopropyl alcohol was in very tight supply due to its widespread demand at the height of the pandemic. Ethanol distilleries boosted production to full capacity, donating thousands of litres of the disinfectant to hospitals, local government and schools.

During the height of the pandemic, the closure of non-essential businesses for several months caused tremendous economic hardship to the marginalized sectors of society, particularly the daily-paid employees in non-essential businesses and those in the informal sector or underground economy, such as sidewalk vendors, hawkers, porters, and tricycle and jeepney drivers. The government subsidy was not sufficient. All sectors of the industry contributed by donating rice, canned goods, noodles and other food to help feed the marginalized families in their localities. The National Congress of Unions in the Sugar Industry of the Philippines (NACUSIP) teamed up with NACUSIP-affiliated labour unions and their employers to open community pantries offering rice, canned goods, noodles and vegetables to needy families within their immediate areas.

In addition, the National Federation of Sugarcane Planters, which operates an in-house technical skills training centre for farm workers and their dependents, continued to pay the salaries of instructors and staff, even though the training centre was closed for several months due to the government prohibition on the conduct of classes.

The industry suffered increases in the cost of inputs, particularly fertilizer which almost doubled in price, the cost of fuel and spare parts, delays in the shipment of needed mill parts and supplies, as well as the scarcity and high cost of labour to cut and load the canes during harvest.

Mechanization has been the goal of the industry, but the cost of the machinery and equipment is beyond the reach of most sugarcane farmers. Thus, farmers still mainly rely on manual labour for harvesting. These migrant workers mostly come from Antique in the neighbouring island of Panay. To ensure the smooth and safe transport of these migrant workers from Antique to Negros and vice-versa, the provinces of Negros Occidental, Negros Oriental, Iloilo and Antique devised a protocol which required the registration, RT-PCR testing and mandatory quarantine of the migrant workers.

Despite these challenges, the sugar industry continued production. In the crop year 2020-2021 (which ended 31 August 2021), national sugar production was only 2,138,147 tonnes, with average sugar recovery of 185.5 kg sugar per tonne of cane, slightly lower than 2,145,693 tonnes output and the 92.5 kg sugar per tonne of cane for 2019-2020. Sugar production was roughly 100,000 tonnes lower than the initial estimated production at the start of the previous crop year. The drop in production was primarily attributed to the onset of La Niña weather with higher rainfall.

For the crop year 2021-2022 (which started 1 September 2021), estimated sugar production is a modest 2.1 million tonnes, with estimated sugar recovery of 85.5 kg sugar per tonne of cane, due to the La Niña weather through to the peak of the milling season.

Overall, the Philippine sugar industry has displayed resiliency amid the Covid-19 crisis. With the economy slowly getting back on its feet and the government vigorously pursuing the vaccination rollout, sugar industry stakeholders view the present crop year with optimism.

Engr. Linley A. Retirado

Biographical Note – Dr. Anthony Kennedy

Following a Ph.D at the University of East Anglia in the UK, Dr. Kennedy joined the West Indies Central Sugar Cane Breeding Station in 1975 as Geneticist. Apart from joining in the practical work of the breeding programme he worked on genotype x environment interactions in the variety selection schemes of the Caribbean sugar producing countries. Along with the then Director of the Station, Ian Walker, he developed a first attempt at using computerized methods in the breeding programmes for these countries.

He was, for six years appointed Head of the Cocoa Research Unit of the University of the West Indies in Trinidad where he worked on germplasm conservation and characterization. He then returned full time to Barbados to continue work on sugar cane and was responsible for the introduction of Family Selection into the Caribbean selection procedures. He also worked on the genetics of sugar accumulation and the use of enhanced populations in the breeding programme. Dr. Kennedy has been a member of ISSCT for a large number of years and he has served on Germplasm & Breeding Section from 2005 to 2010. In November 2000 he organized the 6th ISSCT Breeding and Germplasm Workshop in Barbados.

Dr. Kennedy was responsible for steering the Station through the negotiation and execution of a project for the Caribbean within the ACP/EU Sugar Research Programme. He was appointed Director of the Station in 2008 and remained in this

post until his retirement in December 2020. He resides happily in Barbados with his wife and family of three children.

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Sugar Cane News

Why the sugarcane-crushing season is set to start on a bitter note [India]

BusinessLine	**The Hindu Business Line**	**October 6, 2021**	**https://www.thehindubusinessline.com/data-stories/data-focus/why-the-sugarcane-crushing-season-is-set-to-start-on-a-bitter-note/article36858583.ece**
	Sugar mills in India gear up to start the new crushing season this month with a concern. Sugar production has grown at an annual growth rate of 5.6 per cent over the past two decades, while consumption has grown at 2.4 per cent per annum. In the last five years, consumption of sugar has remained relatively static at about 25 million tonnes, while production has increased by about 2.4 per cent per year leading to surplus sugar stocks. *Excess production in the last few consecutive years has had an adverse impact on the market sentiments and resulted in a decline in domestic ex-mill prices of sugar. The ex-mill prices were at ₹31-32 per kg from October 2020 till July 2021, but improved slightly in the month of August. During the festival season, it would further go up.*		

Hectares of cane can provide plastic alternative [Australia]

MIRAGE	**Mirage**	**September 20, 2021**	**https://www.miragenews.com/hectares-of-cane-can-provide-plastic-alternative-635094/**
	Drive around Queensland's sugarcane regions and you're driving through untapped potential. It's a potential we're keen for investors and entrepreneurs to take notice of. *Sugar will always be our major product, exported to a growing world population but there's a lot more to the sugarcane plant than the juice which is extracted and converted into crystals for food in the state's sugar mills.*		

Reimagining Thailand with a BCG Economy

Bangkok Post	**Bangkok Post**	**September 10, 2021**	**https://www.bangkokpost.com/business/2179811/reimagining-thailand-with-a-bcg-economy**
	Faced with the challenges posed by uncertainty in the world economy, technology disruption and impacts from the global pandemic, the Thai government is focusing its efforts on enhancing the country's technology capacity to develop targeted industrial sectors under the Bio-Circular-Green (BCG) Economy model. *Under a framework that will be effective from 2021-2026, the Thai government will sharpen the country's capacity in science, technology and innovation to boost competitiveness of players*		

across farm & food, healthcare & pharmaceuticals, bioenergy & biomaterials, and tourism & creative economy sectors.

As a leading global supplier of sugarcane and cassava, Thailand is also attracting investment for biodiesel and bioethanol as well as biochemicals, especially at the Eastern Economic Corridor3, the country's pilot high-technology special economic zone which offers cutting-edge R&D complexes and facilities.

To promote the circular economy, the government will provide support to recycling waste such as sugar cane leaves and rice straw in each region.

The growing dilemma of oil refiners: Move to biofuels or stick with what they know? [USA]

HOUSTON CHRONICLE	**Houston Chronicle**	**September 27, 2021**	**https://www.houstonchronicle.com/business/energy/article/Refiners-growing-dilemma-Move-to-biofuels-or-16480964.php**

Sugar Land refiner CVR Energy proclaimed in May that it was shifting from crude refining to the growing demand for renewable fuels.

CVR planned to convert its Wynnewood, Okla., refinery to produce renewable diesel. Just three months later, severe February weather and a summer drought sent agricultural feedstock prices soaring and forced the company to postpone its $100 million conversion project.

Sugar output may drop to 30.5 million tonne next season with more cane diversion to ethanol [India]

ET Auto.com From The Economic Times	**ET Auto**	**September 7, 2021**	**https://auto.economictimes.indiatimes.com/news/oil-and-lubes/sugar-output-may-drop-to-30-5-million-tonne-next-season-with-more-cane-diversion-to-ethanol/86000380**

"We are expecting diversion of more cane for ethanol making and as a result sugar production will be slightly lower at 30.5 million tonne during 2021-22 season," Joint Secretary in the Food Ministry Subodh Kumar Singh said.

India's sugar production is likely to decline marginally to 30.5 million tonne in the next 2021-22 season as more sugarcane will be diverted for ethanol making, a senior government official said on Monday. Sugar production is estimated to have reached 31 million tonne in the 2020-21 season (October-September), he said.

EID Parry India Ltd to set up 120 KLPD distillery at Sankili unit [India]

EQUITY BULLS	**Equity Bulls**	**September 7, 2021**	**https://www.equitybulls.com/admin/news2006/news_det.asp?id=298131**

The Board of Directors of EID Parry India Ltd at their meeting held today (September 7, 2021), have approved the setting up of a 120 KLPD Grain / Sugar Syrup / Molasses based Distillery at the Company's Sankili unit in Andhra Pradesh.

The existing capacity of the company is 297 KLPD and the capacity utilization is 90-95%. The new capacity at an outlay of Rs. 92.50 crore is expected to be added by November 2022.

EID Parry board approves sale of the plant & equipment of the Sugar Factory at Pettavaithalai, Tamil Nadu; Stock up 1% [India]

	IIFL Securities	**October 5, 2021**	**https://www.financialexpress.com/industry/commission-of-agricultural-cost-and-price-wants-sugarcane-farmers-dues-to-be-paid-in-instalments/2323561/**
IIFL SECURITIES	*EID Parry India Limited board of Directors has approved the Sale of the Plant & Equipment of the Sugar Factory at Pettavaithalai in Tamil Nadu, which is not in operation.* *The company's Board of Directors in a meeting on Monday also approved the investment of Rs19cr in the share capital of the Joint Venture Company - Algavista Greentech Pvt Ltd.*		

'Carbon negative' hydrogen & ammonia hub plan partially unveiled for Bundaberg [Australia]

	PV Magazine	**October 6, 2021**	**https://www.pv-magazine-australia.com/2021/10/06/carbon-negative-hydrogen-ammonia-hub-plan-part-unveiled-for-bundaberg/**
pv magazine	*A new joint venture between Australian company Clean Holdings proprietary limited and Singapore-based CAC-H2 will see hydrogen and ammonia produced in the Queensland agricultural hub of Bundaberg. The plan is to produce enough of the green fuel for domestic use and export, with Clean Holdings' chief executive Ken Mathews telling **pv magazine Australia** the longterm vision is to replicate the project's model at multiple deep-water ports along the country's east coast.* *The companies are aiming to attract more than $400 million worth of investment into the project, which at this stage will involve using agricultural waste as a feedstock (Bundaberg is one of Australia's largest sugar cane growers) to be gasified and thereby produce hydrogen.*		

Sugar industry exploring use of drone technology to boost productivity [Guyana]

	Guyana Chronicle	**September 17, 2021**	**https://guyanachronicle.com/2021/09/17/sugar-industry-exploring-use-of-drone-technology-to-boost-productivity/**
GUYANA CHRONICLE The Nation's Paper	*The Guyana Sugar Corporation (GuySuCo) has commenced an evaluation of the use of drone technology, an e-smart agricultural initiative, as part of its strategy to modernise the operations of the sugar industry.* *This move by GuySuCo is aimed at advancing the efficiency and cost-effectiveness of its operations in wake of the numerous challenges as a result of the rapid labour force attrition, and climate and demographical changes which the industry is experiencing.*		

Latest and greatest ag tech innovations on display at Westech 2021 [Australia]

ABC NEWS	**ABC News**	**September 9, 2021**	**https://www.abc.net.au/news/2021-09-09/westech-field-days-barcaldine-2021/100445958**

It might not be everyone's idea of excitement, but for crowds at this year's Westech Field Days in Barcaldine there was awe and amazement as they watched a machine make water tanks from scratch in just three hours.

It was one of the many innovations at the western Queensland event, which celebrates the latest and greatest in Australia's agricultural industry.

Nearly 200 exhibitors showcased their wares from drones to drainage systems and feedlots to farm fashion.

A Tiny Piece of Plastic Is Helping Farmers Use Far Less Water

Bloomberg	**Bloomberg**	**September 23, 2021**	**https://www.bloomberg.com/news/features/2021-09-23/how-microdrip-irrigation-systems-use-less-water-and-could-change-farming-forever**

On the bone-dry western flank of Arizona, where the Colorado River Basin meets the Mojave Desert, sit 11,000 acres of alfalfa, sorghum, wheat, and Sudan grass belonging to the Colorado River Indian Tribes (CRIT), all destined to be harvested and sold for animal feed. For anything to grow here, irrigation is a must. Less than a quarter inch of rain has fallen so far this year, according to Josh Moore, who manages the farm on behalf of his tribe…

… The microdrip setup being used by CRIT Farms, however, cost less than $400 an acre to install, and the required pressure is supplied entirely by gravity, which has the advantage of being free and carbon-neutral. To the casual observer, the system doesn't look like much. But to Moore, the idea of drip irrigating crops for animal feed is nothing short of revolutionary.

A Cheap, Low-Tech Method That Could Slash Farm Carbon Emissions

Mother Jones	**Mother Jones**	**September 13, 2021**	**https://www.motherjones.com/environment/2021/09/cheap-low-tech-rock-dust-method-could-slash-farm-agricultural-carbon-emissions/**

On a hot and humid August day near Geneva, New York, Garrett Boudinot stands in a field of hemp, the green stalks towering a foot or more over his 6-foot, 4-inch frame. Today, the mustached Cornell University research assistant will harvest six acres of the crop, weigh it in red plastic garbage bins, and continue to analyze the hundreds of water samples taken with measuring devices called lysimeters that have been buried in the field over the last three months.

Boudinot, part of a research team at Cornell University, will sweat through the next two days of field work to see whether an unusual component added to the soil earlier in the year helped increase

yields and sequester carbon. This soil amendment "we just call lovingly 'rock dust,' which isn't very descriptive," says Boudinot. "But it's really silicate rocks that have been pulverized to a fine powder."

The hemp field trial is just one of the projects being led by Ben Houlton, dean of Cornell's College of Agriculture and Life Sciences. For the last two years, he and colleagues at the Working Lands Innovation Center, a research consortium based at the University of California, Davis, have been testing various soil amendments that grab carbon from the air and trap it below ground. They've tested biochar, manure, and rock dust used on the New York land and California farm plots, and so far, the most effective soil treatment is basalt pulverized into dust.

Digitizing agriculture [India]

THE TIMES OF INDIA	**The Times of India**	**September 16, 2021**	**https://timesofindia.indiatimes.com/blogs/agyeya/digitizing-agriculture/**

At present around 58% Indian population is engaged in agriculture as primary source of income. With the aim of becoming global economic powerhouse by 2024-25, increasing income of this large chunk of population becomes inevitable.

The government of India has drafted a policy to double farmer's income and also announced budget for the same. With highest yield of pulses, milk, jute and second highest yield of groundnut, vegetables, rice, wheat, fruits, sugarcane, and cotton; production is not a matter of concern for Indian agricultural sector. But the major concern lies in small size of land owned by many of farmers which do not provide sufficient income to them. And above all, negative impact of pollution, increasing population density, urbanisation and global warming in forms of flood, drought, over or under rain, locust attacks ruin the crops ruthlessly.

Researchers are trying to find solution of all these problems in Digital Agriculture, also known as smart farming or agriculture 4.0. It is a modern way of practicing agricultural activities with support of technology to upsurge quantity and quality of agricultural yield.

Agricultural drone makers eye overseas markets [China]

CHINADAILY.COM.CN	**China Daily**	**September 28, 2021**	**https://www.chinadaily.com.cn/a/202109/28/WS61524fdfa310cdd39bc6be8f_2.html**

With the modernization of agriculture, demand for advanced farming devices has grown significantly. According to experts, agricultural drones are widely used for sowing seeds and spraying fertilizers and pesticides, increasing the efficiency and management of plant protection and grain production.

Justin Gong, co-founder of XAG, said: "A shortage of agricultural labor has become a long-term problem for many countries, who are making stronger demands for autonomous drones and robots. We hope to bring more unmanned farming devices to overseas markets through working with local partners and distributors."

Gong said farmers in Brazil, Ecuador, Chile and other South American countries with complex terrain attach more importance to the flexibility and precision of spraying, and farm drones are mainly used in banana, cocoa, coffee and sugar cane plantations.

Uganda: Sugarcane Growing - Is It a Raw Deal for Farmers?

	AllAfrica	**September 7, 2021**	**https://allafrica.com/stories/202109090237.html**

Despite government earmarking sugarcane as one of the 14 strategic cash crops, it has not really transformed livelihoods and household incomes of the farmers who are commercially engaged in it.
This is a consensus that most key stakeholders apart from some manufacturers of this commodity, largely concur with.

According to an in-depth analysis of the sugar sub-sector, there is a massive variance between the livelihood and the income levels of the people engaged in sugarcane growing, raising the question whether this economic activity is worth farmers' time or it is about time they ditched it for another viable venture.

Brazil's Bolsonaro threatens to reduce ethanol blend

	Argus	**September 24, 2021**	**https://www.argusmedia.com/en/news/2257412-brazils-bolsonaro-threatens-to-reduce-ethanol-blend**

President Jair Bolsonaro blamed Brazil's anhydrous ethanol blend for high gasoline prices, hinting that he could push to reduce the blend, in yet another potential blow to the biofuels industry.
In his weekly broadcast on social media, Bolsonaro said that "the price of gasoline could fall a little if the level of ethanol in gasoline is lowered."

Under current legislation, the government's inter-ministerial committee for sugar and ethanol (Cima) has the authority to establish the anhydrous blend at 18-27pc.

Brazilian fuel retailer association Fecombustiveis, which represents over 40,000 filling stations, urged the government to lower the anhydrous blend earlier this year, arguing that the smaller sugarcane harvest would reduce supply of the biofuel.

Sugar Master Plan can save Nigeria up to $700 million as forex – Dangote

	Daily Monitor	**August 30, 2021**	**https://nairametrics.com/2021/09/21/sugar-master-plan-can-save-nigeria-up-to-700-million-as-forex-dangote/**

Aliko Dangote, Africa's richest man and Chairman of Dangote Sugar Refinery says that the strict compliance to Nigeria's sugar master plan can save the country up to $700 million annually in foreign exchange.

Dangote disclosed this in a statement on Monday during a facility tour by some businessmen. He added that proper backward integration is needed to follow the country's sugar plan, creating jobs through local manufacturing.

Climate change and sugar cane [Fiji]

The Fiji Times	**The Fiji Times**	**September 20, 2021**	**https://www.fijitimes.com/climate-change-and-sugar-cane/**
	AN increase in fertiliser use by farmers to boost dwindling sugarcane crops in Yaladro Sector, Tavua, is having a detrimental impact on the cane and waterways, according to the local farming association. *Yaladro Farmers Cooperative president Rajendra Raglu said the region, which used to harvest more than 16,000 tonnes of sugarcane about 20 years ago, now struggles to produce 9000 tonnes of what was once considered "green gold".* *While escalating labour, cultivation, harvesting and transport costs are among the reasons for the decline in production, Mr Raglu said climate change and soil degradation top the list.*		

Industry fears sugar mills 'sealing' may affect payment to farmers [Pakistan]

DAWN	**Dawn**	**September 27, 2021**	**https://www.dawn.com/news/1648700/industry-fears-sugar-mills-sealing-may-affect-payment-to-farmers**
	LAHORE: The sugar industry claims that the government has sealed mills and their storage facilities and fears that the action will damage sugarcane growers when many mills will fail to pay them for the next crop. However, Punjab Cane Commissioner Muhammad Zaman Wattoo has denied the industry's claim, saying the mills or their storages have not been sealed rather sugar is being lifted from there at the price notified by the Ministry of National Food Security and Research (MNFS&R) the other day. He justifies the action taken under the Punjab Sugar Supply-chain Management Order 2021 through deputy commissioners as the millers have been allegedly selling the sweetener at exorbitant rates in violation of the officially notified prices.		

Oxfam: Belgian biofuel policy violates human rights in Peru

The Brussels Times	**The Brussels Times**	**September 28, 2021**	**https://www.brusselstimes.com/news/belgium-all-news/186966/oxfam-belgian-biofuel-policy-violates-human-rights-in-peru/**
	A report from the nonprofit Oxfam says that Belgium's biofuel policy is violating human rights in Peru. The report, titled "Fueling human rights violations: Consequences of EU and Belgium's biofuel policies in northern Peru," focuses on Belgium's investment in a sugarcane plantation in the north of Peru, from which it purchases biofuels. According to Oxfam, the people living in the Chira River valley where the plantation is located are being deprived of their land, cut off from their water and saddled with air pollution as a result of the plantation's activities.		

Déjà vu: but which season? [Pakistan]

BUSINESS RECORDER Founded by M.A. Zuberi	**Business Recorder**	**October 1, 2021**	**https://www.brecorder.com/news/40123713/deja-vu-but-which-season**
	Commenting on the spectacular performance of major crops in the ongoing kharif season, the Special Assistant to the PM noted that sugarcane crop is set to chart new heights, "and may touch 102		

million tons". If true, this performance will at least be a quarter higher not only than last year, but also 22 percent higher than highest ever crop witnessed in 2017-18. Are we there yet?

SAPM's claim is not entirely without basis. According to provincial Crop Reporting Services, national area under cane cultivation – which swings between 1.05 – 1.35 million hectares every three to four years – is trending upwards for a second year in a row. Moreover, it appears that yields have been helped not only due to favourable weather, but also thanks to higher profits for growers over the past two seasons which usually enables farmers to invest in productivity enhancing factors.

Latest Research

Simplified configuration for conversion of sugars from sugarcane bagasse into ethanol

The biochemical production of second generation ethanol involves pretreatment, enzymatic hydrolysis and fermentation, which can be carried out using different configurations.

In the present study, sugarcane bagasse was pretreated with dilute H_2SO_4, saccharified (enzymes), and fermented (Scheffersomyces stipitis). Two configurations, fermentation of hemicellulosic hydrolysate (FHH) separated from separate hydrolysis and fermentation of pretreated solids (SHF), in fractions obtained after filtration of the slurry, and integrated hydrolysis of pretreated solids separated from co-fermentation of cellulosic and hemicellulosic hydrolysates (IHSCF), in whole slurry, were evaluated for ethanol production. Washed or non-washed pretreated solids, and neutralized (NaOH) or detoxified (laccase) hemicellulosic hydrolysates, were evaluated in the first configuration. Neutralized (NaOH), pre-supplemented (nutrients), or detoxified (laccase) slurries in non-hybrid and hybrid systems, in the second configuration.

Detoxification improved conversions in both configurations. Maximum efficiency in SHF + FHH configuration was 28.4% in 168 h, while, in IHSCF configuration, 38.9% was obtained in 96 h.

Published: December 2021

> **Link**

Continuous Sugarcane Planting Negatively Impacts Soil Microbial Community Structure, Soil Fertility, and Sugarcane Agronomic Parameters

microorganisms

Continuous planting has a negative impact on sugarcane plant growth and reduces global sugarcane crop production, including in China. The response of soil bacteria, fungal, and arbuscular mycorrhizae (AM) fungal communities to continuous sugarcane cultivation has not been thoroughly documented. Using MiSeq sequencing technology, we analyzed soil samples from sugarcane fields with 1, 10, and 30 years of continuous cropping to see how monoculture time affected sugarcane yield, its rhizosphere soil characteristics and microbiota.

The results showed that continuous sugarcane planting reduced sugarcane quality and yield.

Continuous sugarcane planting for 30 years resulted in soil acidification, as well as C/N, alkali hydrolyzable nitrogen, organic matter, and total sulfur content significantly lower than in newly planted fields.

Published: 23 September 2020

> **Link**

Enzymatic Hydrolysis Intensification of Lignocellulolytic Enzymes Through Ultrasonic Treatment

Ultrasound technology is often associated with harmful effects on enzyme reactions, although it is possible to improve the productivity of bioprocesses when suitable conditions are employed. Sugarcane bagasse and straw are the feedstocks widely used in Brazil for second-generation (2G) ethanol production; however, the lignocellulose biomass conversion into fermentable sugars through the enzymatic route is not yet fully optimized. Lignocellulolytic enzymes represent a significant part of the costs related to 2G ethanol production. Nonetheless, they exhibit great potential for cost reduction due to improved enzyme features: mainly increment of its activity and an increase of hydrolysis yield.

This enzymatic hydrolysis of feedstock can be enhanced by green technology ultrasound application's combined action on the enzymes and their substrates. The mixed action increases the lignocellulose saccharification; hence, it is considered a promising alternative for fermentable sugar release. The process optimization using green approaches, such as ultrasound and enzymatic treatment, can boost the sugar yield, thus emphasizing the importance of steps integration towards biomass conversion. This review attempts to provide an overview of the effects of ultrasound treatment on lignocellulolytic enzymes used in the 2G ethanol production and those of the process intensification through an unprecedented bibliometric search.

Published: 21 September 2021

> **Link**

High yield biorefinery products from sugarcane bagasse: Prebiotic xylooligosaccharides, cellulosic ethanol, cellulose nanofibrils and lignin nanoparticles

An integrated biorefining strategy was applied to fractionate Sugarcane bagasse (SCB) into its major constituents, enabling high-yield conversion of the fractionated materials into high-value coproducts alongside cellulosic ethanol. Pilot-scale steam explosion produced a hydrolysate rich in low molecular weight xylooligosaccharides that had a high in vitro efficacy as a prebiotic towards different bifidobacteria. Lignin recovered after alkaline treatment of the steam-exploded SCB was converted into uniform spherical lignin nanoparticles (11.3 nm in diameter) by a green mechanical method. The resulting cellulose was hydrolyzed at 17.5% (w/v) consistency and low enzyme loading (17.5 mg/g) to yield a pure glucose hydrolysate at a high concentration (100 g/L) and a cellulosic solid residue that was defibrillated by disc ultra-refining into homogeneous cellulose nanofibrils (20.5 nm in diameter). Statistical optimization of the cellulosic hydrolysate fermentation led to ethanol production of 67.1 g/L, with a conversion yield of 0.48 g/g and productivity of 1.40 g/L.h.

To be published: December 2021

> **Link**

Bioproducts From Agro-Industrial Plant Residues: Opportunities for Sustainable Reuse

The expansion of agricultural production is increasingly accelerated, as a result of the greater need for food caused by population growth and, consequently, this growth results in the generation of greater amounts of waste. In general, the inspection of public environmental agencies and society demand from agribusinesses actions that increasingly seek the use of new environmental technologies for the destination of production residues, which can drastically reduce the impacts caused to the environment, in addition to add commercials values and increase the profitability of the projects. This study aimed to analyze the potential of the elaboration of bioproducts with agro-industrial residues for agricultural crops and that have the potential application for the Extreme South of Bahia region, Brazil, by conducting a descriptive survey of the generation that occurred in other regions. This systematic review was carried out by searching for scientific articles in the SciELO, Scopus and Web of Science databases, using the keywords "bioproduct" and "waste", in the years 2015 to 2021. The articles reported 93 agro-industrial residues derived from 48 agricultural products that generated more than 200 bioproducts, which demonstrates the potential of the theme for the creation of several bioproducts in the region, mainly with sugarcane residues. Considering the high production of sugarcane and the consequent generation of residues from this cultivation in the Extreme South of Bahia, this study indicates several opportunities for returning these discarded goods to a new productive cycle (Reverse Logistics), which can provide environmental, economic and environmental benefits. for the region.

Published: 1 September 2021

> **Link**

3D Data Processing to Characterize the Spatial Variability of Sugarcane Fields

The adoption of precision agriculture involves a demand for equipment and solutions to create an accurate diagnostic of the spatial variability to be managed at the field level. Sugarcane has faced some challenges due to the limited solutions adapted to the crop, which develops throughout the year and involving a large-scale harvest. LiDAR (Light Detection and Ranging) technology is a high-resolution tool that permits the measurement of vegetative growth in a non-destructive way, assisting, for example, in harvest planning. The objective was to describe the three-dimensional (3D) data processing to characterize the spatial variability of sugarcane fields in the pre-harvest period. An aerial platform was used for data acquisition 10 days before and after harvesting. The digital models of surface, of terrain, and the canopy height model (CHM) were generated to spatialize plants height based on point cloud. The LiDAR-derived metrics extracted were percentiles (P50th; P90th–P99th), with the highest value of the coefficient of variation observed for the P50th (59%), indicating that there is high spatial variability in plant height. The RMSE (Root Mean Squared Error) among field measurements and sugarcane stalk height from CHM was 0.47 m. This study demonstrates that 3D sensing data can provide relevant information for the assessment of the crop height and, potentially, to consider it as an indicator of the field regions with distinct levels of production.

Published: August 2021

> Link

Sustainable Opportunities for Sugar Industries Through Potential Reuse of Sugarcane Bagasse Ash in Blended Cement Production

Sugarcane bagasse ash is available in abundance and it has significant pozzolanic reactivity. However, bagasse ash is currently disposed of as a waste in the major sugar-producing countries and its use in industrial-scale blended cement production is highly limited. A systematic review of the potential of bagasse ash for use as a pozzolan in concrete and the translation of the all-inclusive research outcomes from earlier research studies to the industry can enable its wider acceptance. Hence, this study undertakes a comprehensive review on the use of sugarcane bagasse ash in concrete. The physical, chemical and pozzolanic characteristics of sugarcane bagasse ash and their effects on the properties of concrete are reported. The use of bagasse ash is found to result in a notable increment in the compressive and tensile strengths up to 20% replacement. Nevertheless, delay in setting times and reduction in workability are widely reported. The resistance of bagasse ash blended concrete against chloride ion penetration, water permeability and air permeability were also reviewed, and a considerable drop in the permeability was reported over the conventional cement concrete. Opportunities for the effective recycling of bagasse ash and their benefits in India, the second-largest sugar producer in the world, are presented.

Published: October 2021

> Link

Circular Sustainability of Sugarcane: Natural, Nutritious, and Functional Unrefined Sweeteners That Meet New Consumer Demands

Sucrose has been greatly scrutinized in the past decade mainly for its calories, even though sales have increased globally and it still remains sustainable as the gold standard of sweeteners as well as the most widely used sweetener. Ironically, the present and accelerating consumer-driven trend toward healthier, sustainably produced, and more natural foods and ingredients has started to further redeem sucrose and less refined sugars from sugarcane as natural sweeteners. Natural sweeteners, as compared to artificial and highly processed calorie sweeteners, are the least processed and contain a greater range and higher quantity of nutrients, including antioxidants, minerals, and vitamins. Unrefined, brown sugars from sugarcane are having huge growth as natural sweeteners. They include centrifuged and non-centrifuged cane sugars that are markedly less expensive yet equally if not more nutritious than other natural sweeteners, including solid sugars from coconut palm, honey, maple, date, stevia, and monk fruit. In response to these new consumer demands, the sugarcane industry is increasingly implementing sustainable practices to supply natural cane sugars, following a circular (evergreen or 360-degree) approach which spans the entire product life cycle.

Published: October 2021

> Link

Events

Thailand Sugar Conference / SUGAREX Thailand 2021

Fireworks Exhibitions and Conferences

~~9–10 September 2021~~ 2-3 November 2021 (Rescheduled)

Khonkaen International Convention & Exhibition Center (KICE)
Khonkaen, Thailand

> Link

World Ethanol & Biofuels

F.O. Licht

2-4 November 2021

Steigenberger Wiltcher's Hotel
Brussels, Belgium

> Link

30th ISO International Seminar

International Sugar Organization

23-24 November 2021

East Wintergarden, Canary Wharf, London

> Link

11th Annual Africa Sugar Conference

Informa Connect

7-9 December 2021

Uganda

> Link

2022 S.I.T. ORLANDO CONFERENCE

Sugar Industry Technologists

17-19 April 2022

Orlando, Florida, USA

> Link

ASSCT Annual Florida and Louisiana Joint meeting

American Society of Sugar Cane Technologists

14-16 June 2022

Hyatt Regency Coconut Point Bonita Springs FL USA

> Link

American Sugar Alliance Symposium, Seattle, WA

American Sugar Alliance

29 July- 3 August 2022

Seattle, WA, USA

> **Link**

28ª Feira Internacional da Bioenergia

Fenasucro & Agrocana

16-19 August 2022

Centro de Eventos Zanini, Sertãozinho, Brazil

> **Link**

Sugar & Ethanol Asia

Informa Connect

1 – 3 December 2021

Bangkok, Thailand (and online)

> **Link**
