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International Society of Sugar Cane Technologists
Founded 1924

Bulletin

Welcome to the ISSCT Bulletin for August 2023, in which we collect latest ISSCT updates, along with news, research, and past and upcoming events related to sugar cane technology.

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ISSCT News

A summary of Factory Commission activities at the XXXI ISSCT Congress in Hyderabad

The Factory Commission had a full programme of 33 technical papers for oral presentation. Unfortunately, there was no opportunity for authors of the eight poster papers to provide oral overviews of their work because the usual time slots were allocated to panel discussions. The Commissioner and the Chair of the Processing Section also participated in the first scheduled Plenary during Congress.



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Plenary - Sugar and Health told differently

Three invited speakers presented research and evidence-based information on the effects of sugar and artificial sweeteners on the health of consumers. Ms Anna Denny, Director General, World Sugar Research Organisation UK, spoke about what the latest evidence tells us.

Science supports that sugars can be consumed in moderation as part of a healthy, balanced diet and active lifestyle. However, sensational and sometimes poor media reporting of science has led to rising consumer confusion and misunderstanding about the health effects of dietary carbohydrates, including dietary sugars.

The sugar alternatives and high intensity sweetener markets are forecast to grow. Yet consumer understanding of sugar alternatives, such as plant-based syrups and nectars, and low-calorie sweeteners, remains low. The recent Draft Opinion on non-sugar sweeteners (NSS) from the World Health Organization has cast further doubt on the efficacy of NSS as a means of achieving weight control or reducing risk of noncommunicable diseases.

Her talk summarized the current sugars and health landscape, including the relationship between energy intake and obesity-related non-communicable diseases such as diabetes, cardiovascular diseases, and obesity-related cancers. 'Hot topics' in sugars and health research were explored, including current research questions on ultra-processed foods, the gut microbiome and immune

function. A brief overview of the global sugars and health policy landscape was also given.

It is important that the sugar industry possesses the expertise and skills set to understand and evaluate the global scientific evidence on sugar and health and, where appropriate, to communicate scientific consensus to consumers in an understandable format. Evidence-based, objective research into sugar and health, to address the knowledge gaps in this research field, is fundamental to ensuring sustainable businesses and healthy consumers and employees for the future.

Professor Julian Cooper, School of Chemistry, Food & Pharmacy, University of Reading spoke of the challenge of sugar reformulation with examples from the UK. The success in the reduction of sugar in soft drinks is seen as the template for ongoing reformulation and sugar reduction in the diet. However, his paper highlighted the multifunctionality of sugar and the challenges in replacing it to deliver reformulated food products that provide significant calorie reduction and consumer acceptance.

Professor Cooper identified the key issues with reformulation as being the increased numbers of ingredients, increased warnings on pack, insignificant changes to the energy content of products and a potential impact of food safety. In addition the product developer must ensure a similar taste to the original product and deliver it with little or no increase in price.

Consumers are demanding cleaner labels and wish to see ingredients that they recognise on labels. The use of multiple ingredients to replicate the multi-functional properties of sugars brings reformulation into conflict with consumer demands.

Research shows that consumers see sugar(s) as a proxy for calories and expect a similar reduction in calories if a reduced sugars claim is made on the pack which is not usually the case. The examples provided were primarily from the United Kingdom where reformulation has been well advanced and promoted for many years. The examples provided in his presentation were real food products that have been sold to consumers and highlighted the challenges in delivering reformulated products to provide sustainable products that meet consumers demands.

A single factorial approach ie sugars reformulation may not be the universal panacea for the obesity crisis and could lead to unintended consequences. Reformulation and stepwise reductions in sugars may not deliver a significant

reduction in calories in many products and care must be taken to avoid the 'halo effect' where reduced sugars products are perceived as 'healthier' and overconsumed. A paradigm shift in reformulation is needed and a holistic approach to product development should aim to deliver lower calorie products where all ingredients deliver maximum impact at optimal levels.

Dr Gillian Eggleston, Department Head, Audubon Sugar Institute, LSU USA and Chair of the Factory Processing Section within the Factory Commission, presented the case for natural, nutritious, and functional sweeteners from sugarcane 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 remains the gold standard of sweeteners because of its multitude of functions that are difficult to replace and the most widely used sweetener. Ironically, the present and accelerating consumer-driven trend toward healthier, sustainably manufactured, and more natural foods, beverages, 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 caloric sweeteners, are the least processed and contain a greater range and higher quantity of nutrients, including antioxidants, minerals, and vitamins. Brown and golden sugars from sugarcane are having a 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. Dr Eggleston said that the global sugar industry needs to consider an educational or marketing campaign to educate consumers on these antioxidant-rich, less-processed sugars.

Technical sessions

A key focus for several papers presented at Congress in both the Factory and Management commissions was sustainability of factories and the industry. Papers presented in the Factory Commission included the following:

- *Sustainability in Indian sugar mills by adopting innovative and viable technologies* by RA Chandgude, PG Patil and SR Khengare.
- *The journey towards sustainable business through technological advancement and diversification into the downstream industry: a role model in the Pakistan sugar industry* by Zahid Mahmood Qureshi and Ammar Ghazanfar.
- *A new sugar complex designed to provide maximum raw material to a paper industry* by S Awasthi, A Goyal and D Kumar.
- *Engineering concept for combined refinery operations with cane sugar milling*

by Omkar P Thaval.

Bagasse, energy savings and sustainable factory operations while maximising the potential for spreading the income base through opportunities such as export power and co-products were the subject of eight papers including:

- *Low-temperature bagasse applications for fuel saving and power export* by S Wicht, B Morgenroth and H Singh Bola.
- *Power generation in the Indian sugar industry using segregated urban dry waste as an auxiliary fuel* by Dattaram M Raskar and Vikas V Kshirsagar.
- *Costing steam and vapour bleeds in a cane sugar factory* by KM Foxon.
- *Experiences with low-temperature dryers in the cane sugar industry* by T Kimmenauer and S Szymkiewicz.
- *Evaporation and concentration at low temperatures using plate-type evaporators based on a mechanical vapour-recompression system* by V Verma.

The first session on the second morning was devoted to extraction papers that included:

- *Modelling the extraction performance of a diffuser station* by Omkar P Thaval.
- *Influence of two-roller mills in enhancing the efficiency of conventional milling tandems* by Y Sakhardande, KP Vasanthan and A Bekwadkar.
- *Implementation of a first-mill cane-feeding control strategy based on a cane-harvest system* by J Calpa Pantoja, J David Montes, J Tierradentro and N Gil Zapata.
- *Effect of imbibition water temperature on tandem mill extraction* by LF Muñoz, A Orozco, JD Montes and J Sierra.

Many research and practical papers dealing with the back end of the factory (juice processing through to crystallisation and massecuite exhaustion) created much interest for delegates attending the congress including the following:

- *Use of lamella clarifiers for juice and syrup clarification at a direct-white cane-sugar plant* by Mullapudi Narendranath, and Tito Silva.
- *Ceramic membrane filtration of sugarcane juice for high-quality sugar production: a review* by Wenqing Liu and Kai Li, Changrong Shi and D Rackemann.
- *Evaluation of rotary vacuum filter (RVF) and decanter- based mud-filter technologies* by A Kesarwani, V K Baliyan and RK Moharana.
- D Rackemann and C Marasinghege presented two evaporation papers,

Understanding and minimising the impacts of non-sucrose constituents of sugarcane juice on juice degradation during evaporation and *Optimisation of pH for minimising juice degradation during evaporation.*

- *Impact of scale composition in evaporator cleaning efficiency* by S Imbachi-Ordonez.
- *An improved understanding of the operation of falling- film evaporators in cane sugar factories* by A Lehnberger and OP Thaval.
- *Degradation modelling of and optimising the timing of replacements for batch vacuum pans* by A Horner, H Truong-Ba, ME Cholette and GA Kent.
- Automatic pan microscope measurement of sugar crystals and its utilization in real-time crystallization control by M Honkanen, H Eloranta, H Singh Bola, B Morgenroth and Naresh Saini.
- *Experience with online optical crystal monitoring from the first two modern batch-pan automation projects* in India by H Singh Bola, B Morgenroth2, N Saini and S Singh.
- *Application of a hydrostatic transmission in cooling crystallisers* by J Lewinski, M Fredriksson and M Enriquez Poy.
- *Limiting the effects of the Maillard reaction during evaporative and cooling crystallisation of C massecuites* by R Broadfoot and D Rackemann.
- *In-house C massecuite reheater: a successful development for Le Gol sugar factory* by J Rivière, M Cadarsi, JR Payet and C Roussel.

Finally, there were papers on issues with pol in cane juice and measurement techniques for cane fibre.

- *How a clarification aid can affect polarimetric analysis of sugarcane juices* by S Imbachi-Ordonez, M del Carmen Perez, A Mandalika and G Eggleston.
- *A new approach to measuring the fibre content of sugarcane* by C Shi, GA Kent and C Henderson.
- *Implementation of a test to predict cane fiber characteristics during the milling process* by JD Montes, JC Aristizabal, MA Gomez and N Gil Zapata.

Awards

The Emile Hugot Award for the best factory Commission paper went to Julien Rivière, Marc Cadarsi, Jean-Raymond Payet and Camille Roussel for their paper titled In-house C massecuite reheater: a successful development for Le Gol sugar factory.

The John Claton Award for the best Factory Commission poster went to Giovanna M. Aita and Young Hwan Moon for the poster titled Effect of cultivation conditions on extracellular polymeric substances production by microbial isolates from Louisiana's crusher juice.

Committees

The make-up of the Engineering and processing sections of the Factory Commission for the period 2023 to 2025 can be found [at *issct.org/about-issct/governance/*]

Instructions to Authors & Intent to Submit Form - XXXII Centennial Congress

Instructions to authors wishing to submit a paper or poster for the XXXII Centennial Congress, set to take place in Cali, Colombia between 21 and 31 August 2024, can find instructions on the ISSCT website. This is accompanied by an 'intent to submit a paper or poster form',

The timeline for submissions is:

- 30 August 2024 – Deadline for submitting titles and outlines for papers and posters
- 31 December 2024 - Deadline for receipt from authors of manuscripts for oral papers, symposium papers and poster papers.

Documents

- Instructions to Authors
- Intent to Submit form

Members' Corner

2023 ASSCT conference

The 44th annual conference of ASSCT was held at the Cairns Convention Centre over four days during April 2023 and, by all accounts, was very successful. There were 350 registered delegates including 21 delegates from overseas enjoyed a mix of technical discussions, networking and social events. The Industry Equipment Exhibition was supported by 49 domestic and international companies occupying

55 sites displaying a full range of equipment and services typically used in the sugar industry.

A total of 70 papers were presented over two days of technical sessions including 37 agricultural, 28 manufacturing and five case studies from equipment suppliers.

On the first day agricultural delegates attended an SRA field day at the Meringa research Station while an Asset Reliability Workshop was held for manufacturing delegates.

On the final day of the conference, manufacturing delegates had a field trip to the local bulk sugar terminal and the nearby Barron Gorge Hydroelectric Power Station.

The next ASSCT conference will be held at the Townsville Entertainment and Convention Centre on 16 to 19 April 2024. A Call for Papers has been issued and is also available on the ASSCT website for anyone who may be interested in attending the conference.

Sugar Cane News

Data-Driven Success: How AI and Machine Learning are Transforming Food and Beverage Operations

Asia Food JOURNAL	**Asia Food Journal**	**August 8, 2023**	**https://asiafoodjournal.com/how-ai-machine-learning-transforming-food-beverage-operations/**

The food and beverage (F&B) industry is undergoing a remarkable transformation with the advent of artificial intelligence (AI) and machine learning (ML). Armin Haller, Director CoE Data & AI for APAC at Crayon, sheds light on the impact of these technologies, stating, "AI is revolutionizing farming practices and reshaping food and beverage manufacturing."

In the context of food production, farmers regain control through the use of satellite imagery and AI models. Training models on high-resolution imagery and utilizing free lower-resolution satellite images makes large-scale analysis possible for individual farmers, conglomerates, and even entire countries.

This information is valuable for companies purchasing specific products like bananas, kiwi fruit, pineapples, or coconuts, as they can assess the yield of the farmers they source from. Additionally, countries such as Canada, Bali, or Indonesia can utilize satellite images to determine the quantity and extent of production for various crops, such as sugar cane.

Allbirds shares recipe for 'first' net-zero carbon shoe

Just Style	**Just Style**	**August 16, 2023**	**https://www.just-style.com/news/allbirds-shares-recipe-for-first-net-zero-carbon-shoe/?cf-view**

Allbirds has revealed the entire toolkit of its M0.0NSHOT shoe which boasts a carbon footprint of net 0.0kg CO2e.

Following the announcement of this carbon-negative footwear product earlier this year, Allbirds' co-founder Tim Brown took centre stage at the Global Fashion Summit in Copenhagen recently to unveil the shoe and called on industry competitors to create their own versions.

- *A midsole featuring a specially crafted version of Allbirds's SuperLight Foam, a carbon-negative bio-based midsole foam made with sugarcane and formed via supercritical foaming.*
- *Sugarcane-based polyethylene packaging — a carbon-negative material — reduces the weight and space required for transportation.*

Plant-Based Plastics Gain Favor as Companies Pursue Sustainability Goals

THE WALL STREET JOURNAL.	**Wall Street Journal**	**August 17, 2023**	**https://www.wsj.com/articles/plant-based-plastics-gain-favor-as-companies-pursue-sustainability-goals-b0ea7dd8#:~:text=Bioplastics'%20benefits&text=Plants%20absorb%20the%20atmosphere's%20carbon,they%20degrade%20in%20the%20environment.**

The future is more plastic. Plant-based plastic, that is.

Plant-based plastics, or bioplastics, have accounted for just 1% of the world's plastic production for well over a decade, according to a review of more than 100 companies by research organization nova-Institute. Bioplastics haven't taken off largely because they are typically 50% to 80% more expensive than traditional fossil-fuel-based plastics, but their production is now growing 14% a year, putting them on track to reach up to 3% of the plastics market in the next five years.

Latest version of Bonsucro Production Standard published

BON SUCRO	**Bonsucro**	**July 31, 2023**	**https://bonsucro.com/latest-bonsucro-production-standard-has-been-published/**

Bonsucro has published version 5.2 of the Bonsucro Production Standard, which will come into effect on 2 December 2023. It builds upon version 5.1 of the Production Standard, improving and clarifying some indicators.

In January 2022, version 5.1 of the Bonsucro Production Standard was launched. This version of the standard was developed through a multi-stakeholder consultation process, which aimed to align the standard to emerging best practices for sustainability and to regulatory changes impacting the sugarcane sector.

Companies test pilot science-based target-setting tool for sugarcane

	Bonsucro	**July 24, 2023**	**https://bonsucro.com/companies-test-pilot-science-based-target-setting-tool-for-sugarcane/**
	In October 2022 we launched our initiative, 'Setting science-based targets in sugarcane', which aims to develop a greenhouse gas (GHG) mitigation pathway and a target-setting tool. Ultimately, the sector will be equipped to set targets to reduce GHG emissions, in line with science. *In the last few months, we worked closely with sustainability consultant Quantis to develop the first draft of our target-setting tool and its accompanying guide. The tool will allow companies to input data on their GHG emissions from a range of sources, and will generate an overview of what their GHG mitigation targets for sugarcane production (agricultural phase) should look like.*		

WHO advises not to use non-sugar sweeteners for weight control in newly released guideline

	WHO	**May 15, 2023**	**https://www.who.int/news/item/15-05-2023-who-advises-not-to-use-non-sugar-sweeteners-for-weight-control-in-newly-released-guideline**
	The World Health Organization (WHO) has released a new guideline on non-sugar sweeteners (NSS), which recommends against the use of NSS to control body weight or reduce the risk of noncommunicable diseases (NCDs). *The recommendation is based on the findings of a systematic review of the available evidence which suggests that use of NSS does not confer any long-term benefit in reducing body fat in adults or children. Results of the review also suggest that there may be potential undesirable effects from long-term use of NSS, such as an increased risk of type 2 diabetes, cardiovascular diseases, and mortality in adults.* *"Replacing free sugars with NSS does not help with weight control in the long term. People need to consider other ways to reduce free sugars intake, such as consuming food with naturally occurring sugars, like fruit, or unsweetened food and beverages," says Francesco Branca, WHO Director for Nutrition and Food Safety. "NSS are not essential dietary factors and have no nutritional value. People should reduce the sweetness of the diet altogether, starting early in life, to improve their health."*		

Sustainability in packaging 2023: Inside the minds of global consumers

	McKinsey	**August 15, 2023**	**https://www.mckinsey.com/industries/paper-forest-products-and-packaging/our-insights/sustainability-in-packaging-2023-inside-the-minds-of-global-consumers**
	Sustainability continues to be an increasingly important issue for the packaging value chain. At the same time, consumer awareness is also growing. As societies emerge from the COVID-19 pandemic, consumer sentiment is evolving away from a hyperfocus on hygiene. To understand this better, we launched a survey across 11 countries to explore consumers' attitudes toward sustainable packaging. This builds on our 2020 work focusing on consumer sentiment globally,1 as well as our 2023 work related to consumer sentiment in the United States. *Compostable and plant-based packaging (for example, sugar cane and cornstarch) tends to rank*		

	higher in several countries, with the exception of Japan. In Japan, consumers view plastics made from recycled content or fully recyclable plastics as being equally sustainable as compostable packaging.

Sugarcane researchers find a cure for ripener hangover

FarmProgress	**Farm Progress**	**August 17, 2023**	**https://www.farmprogress.com/harvest/sugarcane-researchers-find-a-cure-for-ripener-hangover**
	Sugarcane producers who walk the fine line between drawing down a heavy load of sugar and supporting strong biomass production recently encountered a yield challenge from their standard ripener treatment. The symptoms are delayed emergence, fewer shoots, and lighter stalks. The overall impact of the malady is a smaller ratoon crop. *Some sugarcane growers and researchers call it ripener hangover. By any name, it melts sugarcane profit by robbing yield from ratoon crops.* *Orgeron and the LSU research and extension team now have a recipe for curing ripener hangover. And they are continuing to research additional alternative ripener treatments.*		

Intellectual Property Strategies for Developing Biofuels

FINNEGAN	**Finnegan/Chemical Industry Journal**	**July 24, 2023**	**https://www.finnegan.com/en/insights/articles/intellectual-property-strategies-for-developing-biofuels.html#:~:text=When%20protecting%20a%20biofuel%20innovation,global%20nature%20of%20biofuel%20production.**
	Biofuels are fuels produced from renewable sources. First generation biofuels are produced from food stocks, including cereal crops (e.g., wheat, maize), oil crops (e.g., rape or palm oil) and sugar crops (e.g., sugar beet, sugar cane), whereas second generation biofuels – sometimes termed "next generation" or "advanced" biofuels – are produced from sources that are not food stocks. Sources for second generation biofuels include cellulosic waste material (e.g., straw, palm oil mill effluent, bagasse from sugar production), and waste oils and fats. Algae also represent a potential source of lipids for second generation biofuel production. *Biofuel innovation is occurring in academia, in start-up enterprises, and in multinational corporations. All of these innovators should consider how they can use Intellectual Property to protect and monetise their innovation.*		

A Natural Gene Regulation System May Change the Future of Farming

Technology Networks Genomics Research	**Technology Networks Genomic Research**	**August 15, 2023**	**https://www.technologynetworks.com/genomics/articles/a-natural-gene-regulation-system-may-change-the-future-of-farming-377699**
	Consider how modern-day agriculture compares to the kind practiced 100, 500 or 10,000 years ago. Farmers produce food on a larger scale than ever before, and standard practices use a heavy hand by relying on chemicals, such as fertilizers, pesticides and genetically modified organisms		

(GMOs), to ensure maximum productivity. However, these practices work against nature rather than with it, and as such, they are an unsustainable way to improve crop yields.

Climate change introduces further challenges to maintaining our food system—new and mounting stressors such as heat, drought, weeds and pests all stunt crop growth. Chemical solutions have a limited ability to address these challenges and are even less effective as resistance builds up. To prepare to feed a growing global population in the face of climate change, farmers must tap into plant biology to fine-tune how crops respond to each unique situation as it arises. A biological phenomenon using micropeptides for crop protection could be leveraged to do just that.

Sugarcane growers to benefit from specialised support [Australia]

Queensland Goverment	**August 4, 2023**	**https://www.des.qld.gov.au/our-department/news-media/mediareleases/sugarcane-growers-to-benefit-from-specialised-support**

Sugarcane growers committed to reducing nutrient run-off into the Great Barrier Reef will soon have access to specialised support thanks to a $3.6 million investment by the Queensland Government.

Scott Robinson Acting Executive Director of the Office of the Great Barrier Reef, Department of Environment and Science, said industry experts are invited to apply for a share in funding under the Sugarcane Practice Change Program for projects that will help sugarcane growers manage the use of nitrogen and phosphorus on their farms.

"Successful applicants will provide agronomic advice and support to help cane growers to undertake actions, such as implementing nutrient management plans and addressing yield constraints, to reduce nutrient loads in water flowing to the Great Barrier Reef," Mr Robinson said.

Fuelling Australia's future sustainable aviation industry [Australia]

CSIRO	**August 10, 2023**	**https://www.csiro.au/en/news/all/articles/2023/august/sustainable-aviation-industry-australia**

Aviation is one of the most challenging industries to decarbonise, contributing 2.5 per cent of the world's total carbon. As countries race to meet their net zero emissions targets, global interest and investment in sustainable aviation fuels (SAF) is increasing.

We've developed the Sustainable Aviation Fuel Roadmap in partnership with Boeing Australia.

This roadmap involved consultation with more than 40 national and international organisations across the SAF value chain. It identifies key opportunities for building an Australian SAF industry and recommends the key actions required to help it overcome economic, regulatory and technological barriers.

The Sustainable Aviation Fuel Roadmap shows Australia is very well placed to develop a diversified portfolio of feedstocks for a domestic SAF industry.

Our climate, farming practices, and established supply chains present significant opportunities for developing a range of feedstocks composed of organic matter. These are known as biogenic feedstocks and include sugar cane, sawmill residues, municipal solid waste, oilseeds and used cooking oil.

Sugar Company Encourages Cane Farmers To Adopt Modern Technology [Kenya]

	Kenya News Agency	**August 7, 2023**	**https://www.kenyanews.go.ke/sugar-company-encourages-cane-farmers-to-adopt-modern-technology/**

Blockchain technology has every element necessary to become a genuine problem-solver. In contrast, many existing technologies are either inadequate or prohibitively expensive, Sumit Sarabhai writes.

Agriculture is one of the areas where blockchain technology could revolutionise by solving the existing problem of agri-product fraud, its traceability, price manipulation, and lack of customer trust in the product. Blockchain technology will bring drastic changes to the agriculture industry. Blockchain, coupled with the Internet of Things (IoT), is remodelling the food production industry. It is set to make farming a sustainable practice with a change in approach to optimise farming resources like water, labour and fertilisers. Farmers and other stakeholders will be able to improve the irrigation system on a timely basis with information like the quality of seed, and how crops are growing among other practices.

Future Farming: Agriculture's Role in a More Sustainable India

	S&P Global	**August 3, 2023**	**https://www.spglobal.com/en/research-insights/featured/special-editorial/look-forward/future-farming-agriculture-s-role-in-a-more-sustainable-india**

India's agriculture sector plays a critical role in the country's bioethanol sector, as well as supporting moves toward food security, energy security and decarbonization goals.

The country has come a long way with bioethanol policies, and it is likely to achieve a 10% ethanol blending target in 2023–24. There will be pressure on agriculture to meet future targets, so innovation will be important.

Participating in biofuel will provide farmers with an opportunity to improve economic efficiency. It will also create competition between food and fuel producers for valuable crops.

UPL SAS inks MoU with NSL for sustainable sugarcane production [India}

	United News of India	**August 18, 2023**	**http://www.uniindia.com/upl-sas-inks-mou-with-nsl-for-sustainable-sugarcane-production/south/news/3033274.html**

UPL Sustainable Agriculture solutions Limited (UPL SAS), a global provider of sustainable agriculture products and solutions, here on Friday signed a memorandum of understand (MoU) with NSL Sugars Limited (NSL), one of the leading sugar producers in the country, for sustainable sugarcane production.

Maharashtra minister Dhananjay Munde asks agri universities to experiment drones tech in farm-related activities [India]

	The Indian Express	**August 11, 2023**	**https://indianexpress.com/article/cities/mumbai/maharashtra-minister-dhananjay-munde-agri-universities-experiment-**

			drones-tech-farm-8887698/
	Maharashtra Agriculture Minister Dhananjay Munde has asked the agriculture universities to experiment with the application of drones in farm-related activities, especially in the current kharif season to see if the technology is effective in spraying fertilizers in fields. *The minister, during a meeting of the agriculture department on Thursday, also raised concern over the decline in the number of farm labourers.*		

Braskem, SCG Chemicals form JV to advance Thai bio-based ethylene project [Thailand]

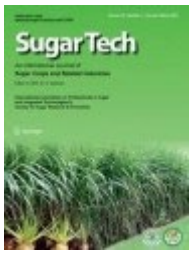
	Sustainable Plastics	**August 18, 2023**	https://www.sustainableplastics.com/news/braskem-scg-chemicals-form-jv-advance-thai-bio-based-ethylene-project
	Thailand-based petrochemical company SCG Chemicals and Brazil chemicals group Braskem have announced the signing of a joint venture agreement to create Braskem Siam Company Limited. The aim of the new company will be to produce sugar-cane based bio-ethylene from bio-ethanol dehydration, which will then be used to produce I'm green bio-based polyethylene (PE). To that end, a new bio-ethylene plant will be built with an annual capacity of 200kt, which will be the first of its kind outside of Brazil.		

Plans afoot to locally develop sugarcane seed varieties [Zimbabwe]

	NewsDay	**August 7, 2023**	https://www.newsday.co.zw/agriculture/article/200014990/plans-afoot-to-locally-develop-sugarcane-seed-varieties
	Senior sugarcane plant breeder Zimbabwe Sugar Association Experiment Station (ZSAES) says the organisation will start developing seed varieties locally to cut the import bill. *"There is need for ZSAES to be able to develop varieties locally because currently we are importing crossed seed from outside Zimbabwe," Mpofu told NewsDay Farming on the sidelines of the Lowveld Agricultural Show in Chiredzi on Friday last week.*		

Latest Research

Cellulase Adsorption on Pretreated Sugarcane Bagasse During Enzymatic Hydrolysis



The enzymatic hydrolysis of lignocellulosic biomass has become attractive for obtaining ethanol. Therefore, optimizing its conditions and revealing the main influencing factors are essential for an effective design. In this sense, this study evaluated the influence of cellulose conversion on the Langmuir isotherm parameters in cellulase adsorption on sugarcane bagasse pretreated by hydrothermal and organosolv methods. The adsorption isotherm assays were performed with commercial cellulase from Trichoderma reesei in Erlenmeyer flasks stirred at 150 rpm and 50 °C. Isotherms were determined for enzymatic hydrolysis substrate samples of hydrothermal bagasse (HB) and organosolv bagasse (OB) at 0, 1, 6, and 18 h, respectively. The Langmuir model represented well the experimental data for the cellulose–cellulase system. The study of cellulase adsorption on HB and OB demonstrated that the maximum adsorption capacity (Emax) decreased during the reaction. From 0 to 18 h of hydrolysis, the value of Emax decreased from 37 ± 3 to 23 ± 2 mg cellulase/g HB and from 29 ± 1 to 25 ± 2 mg cellulase/g OB. Therefore, the adsorption of cellulase on a substrate varied during hydrolysis and its representation was expressed by an empirical equation related to the cellulose conversion and the Langmuir parameters.

Published: August 16, 2023

> Link

Effects of Mixed Cropping on Sugarcane Growth and the Community of Arbuscular Mycorrhizal Fungi



To explore the effects of mixed cropping of different sugarcane varieties on the growth of sugarcane and the community structure of arbuscular mycorrhizal fungi (AMF), field experiments were conducted using ROC22 and GT29 sugarcane varieties as test materials, with monoculture and mixed cropping treatments. The results showed that mixed cropping of sugarcane varieties did not increase the cane yield but improved the brix in GT29. Regardless of monoculture or mixed cropping, the dominant genera of AMF in the rhizosphere soil of ROC22 and GT29 were Glomus and Acaulospora, but mixed cropping decreased the relative abundance of Glomus and increased the relative abundance of Acaulospora. The mixed cropping treatment had no significant effect on the diversity of AMF and their colonization in the rhizosphere of sugarcane. Soil available phosphorus content was the main environmental factor affecting the colonization and community composition of AMF in the rhizosphere of sugarcane. Mixed cropping of different sugarcane varieties can improve sugarcane growth and enhance the community structure of AMF in the rhizosphere.

Published: August 14, 2023

> Link

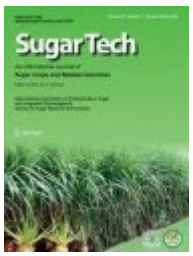
Transgenic Sugarcane Expressing Bacillus Thuringiensis Cry1ac Protein Offers New Possibilities for Controlling the Giant Borer, Telchin Licus (Drury), a Pest Difficult to Control

The giant borer, Telchin licus (Drury), is an important insect pest of sugarcane in Central and South America. This pest is difficult to control with chemical or biological control approaches due to the larvae behavior of hiding in the deepest parts of the plants. Manual scavenging and skewer killing have been the main approaches for monitoring and control of T. licus in Brazil, the world's largest sugarcane producer. Recently, Brazil launched the first commercial use of transgenic sugarcane expressing Bacillus thuringiensis (Bt) proteins to control the sugarcane borer, Diatraea saccharalis (F.), a primary insect pest of sugarcane in the Americas. In this study, five independent field/greenhouse tests were conducted to evaluate the larval survival of and plant injury by T. licus on five non-Bt and five Bt sugarcane varieties containing a single cry1Ac gene. The multiple field/greenhouse tests showed that Cry1Ac sugarcane was highly effective to control T. licus; and the high control efficiency was consistent across varieties, from immature to mature plant stages, as well as for F0 generation plants and F1 ratoons. In addition, diet-incorporated bioassays were performed to determine the susceptibility of three field-collected T. licus populations in Brazil to diet treated with purified Cry1Ac protein or with a 25-fold dilution of Cry1Ac sugarcane stalk tissue. The diet bioassays exhibited that the field T. licus populations were also susceptible to the purified Cry1Ac protein, as well as to diet treated with the 25-fold dilution of stalk tissue. The results of this study provide compelling evidence that the single-protein Cry1Ac sugarcane varieties offer new possibilities for managing the T. licus, a pest that is difficult to control with other current available technologies.

Published: August 9, 2023

> **Link**

Studies on the Uprooting Mechanisms of Sugarcane Under-the-Ground Basecutting



Basecutting is a key procedure in sugarcane harvesting. It is necessary to improve the cutting quality of sugarcane for the development of mechanical harvesting. In the study, force analysis was conducted and demonstrated the stubble damage and uprooting mechanism, and it is found that the cutting force was not only related to the cutting length, but also related to the structural parameters (the cutting angle, the blade bevel angle, etc.) of the basecutter by mechanical equations. Then, field single-factor test was conducted to study the influence of the cutting depth (CD), the cutting angle (CA), and the blade bevel angle (BA) on the basecutting quality. The interaction of various factors and the optimal parameter was obtained by the response surface test. Through the response surface analysis and multi-objective parameter optimization, the influence of each factor on the evaluation index and optimal parameters combination was obtained. The order of three factors affecting the damage index (DI) and uprooting index (UI) was as follows: CA > CD > BA, and CD > CA > BA. It could get the optimal cutting quality when the CD of 10 cm, the CA of 10°, and the blade BA of 20°, respectively. After the field verification test, the stubble DI and UI index were -0.623 and -0.767, respectively, under the optimal parameter combination, which were in agreement with the predicted values of the model. The results could provide a reference for the structure improvement and performance optimization of sugarcane harvester.

Published: August 5, 2023

> **Link**

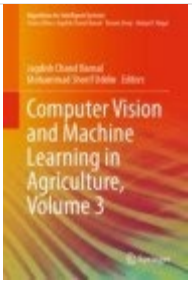
Sugarcane Diseases Identification and Detection via Machine Learning

Sugarcane diseases are major concern for the global sugarcane market, as they can significantly impact crop yield and quality. This can result in economic losses for farmers

and reduced supplies for the sugar industry. In this research, we propose a solution for detecting three classes of sugarcane diseases using the YOLO algorithm. The YOLO version 8 model got a maximum accuracy of 96.67% after being trained and evaluated on a dataset of sugarcane disease images. This high accuracy demonstrates the potential of our proposed method for the early diagnosis and treatment of affected plants. By using the YOLO algorithm, a deep learning technique, our proposed solution can improve the efficiency and effectiveness of disease management in sugarcane. Additionally, the proposed solution can be integrated with robotics technology to enable real-time monitoring and treatment of sugarcane fields. The use of robotics technology can enable the automated monitoring of large sugarcane fields, providing real-time data on the health of the crop, which can help farmers and agronomists make informed decisions on disease management. In conclusion, our proposed solution can help mitigate the impact of sugarcane diseases on the global sugarcane market by providing early diagnosis, efficient treatment, and real-time monitoring of crop health.

Published: August 1, 2023

> **Link**



Sugarcane Harvester: A Bibliometric Review

Sugarcane has become an essential production crop for energy and biofuels. Productive performance, combined with sustainability, was mainly provided by the latest development in mechanization. Over the years, sugarcane harvesting mechanization has been highlighted in scientific research to solve complex factors aiming at technology input in this management stage. The bibliometric analysis verifies more relevant research, citations number, relevant journals, and scientific production trends. This study aims to characterize mechanized sugarcane harvesting evolution and verify future scientific research trends. We adopted RStudio processing and bibliometric maps with VosViewer software to Scopus and Web of Science databases, which identified 325 articles relating to mechanized harvesting of sugarcane. Based on citation number, Brazil, China, USA, and Australia are the leading countries with maximum development and research products related to mechanized sugarcane harvesting. Harvesters, mechanized harvesting optimization, computer simulation, and precision agriculture were the main subjects addressed in experimental research. The investigations exploring precision agriculture and technologies are being applied in mechanized sugarcane harvesting to future research. Therefore, this review provided valuable information for the farmers and researchers on future research trends to optimize mechanized harvesting of sugarcane.

Published: July 31, 2023

> **Link**



Critical State of the Art of Sugarcane Industry Wastewater Treatment Technologies and Perspectives for Sustainability

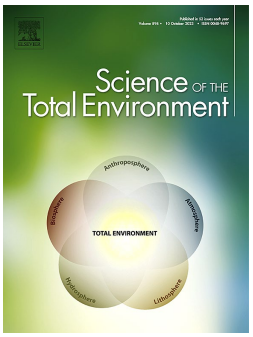
The worldwide pressure on water resources is aggravated by rapid industrialization, with the food industry, particularly sugar factories, being the foremost contributor. Sugarcane, a primary source of sugar production, requires vast amounts of water, over half of which is discharged as wastewater, often mixed with several byproducts. The discharge of untreated wastewater can have detrimental effects on the environment, making the treatment and reuse of effluents crucial. However, conventional treatment systems may not be adequate for sugarcane industry effluent treatment due to the high organic load and variable chemical and mineral pollution. It

is essential to explore pollution-remediating technologies that can achieve a nexus (water, energy, and food) approach and contribute to sustainable development. Based on the extensive literature, membrane technologies such as the membrane bioreactor have shown promising results in treating sugarcane industry wastewater, producing treated water of higher quality, and the possibility of biogas recovery. The byproducts generated from this treatment can also be recovered and used in agriculture for food security. To date, membrane technologies have demonstrated successful results in treating industrial wastewater. This critical review aims to evaluate the performance of traditional and conventional processes in order to propose sustainable perspectives. It also serves to emphasize the need for further research on operating conditions related to membrane bioreactors for valuing sugarcane effluent, to establish it as a sustainable treatment system.

Published: July 31, 2023

> **Link**

Agriculture and biodiversity damage: A prospective evaluation of the impact of Brazilian agriculture on its ecoregions through life cycle assessment methodology



The natural ecosystems' replacement by farmland and the consequent biodiversity damage (BD) for agriculture are one of the principal concerns worldwide. The development of the life cycle assessment (LCA) methodology involves enormous efforts to include BD parameters and develop a prospective LCA approach for future evaluations of production and technologies use. Thus, this work aims to determine the current impacts and estimate the future impacts in terms of damage to biodiversity caused by land occupation by agricultural commodities produced in Brazil, such as coffee, corn, oranges, and sugar cane, for the six ecoregions present in the country—Amazon, Atlantic Forest, Caatinga, Cerrado, Pampas, and Pantanal—in the 20-year period from 2015 to 2035. For this and to search for hotpots, we applied the indicators proposed by Chaudhary and Books (2018), for inventories whose functional unit is production per m2 of 1 kg of crop. Although the Cerrado is one of the ecoregions in which deforestation has advanced the most, it has the area/production ratio that has evolved the most. In contrast, Pampas and Caatinga, which are not seen as agricultural frontiers, increased their impacts. The most optimistic scenarios for the future have been those in regions considered agricultural frontiers; however, these are the regions where agriculture is more technologically developed, for example, coffee production in the Atlantic Forest and in the Cerrado. The results indicate that the technological development of agriculture can contribute to mitigating the impacts of damage to biodiversity in the future, and that the implementation of legislative and inspection measures is fundamental to supporting the correct use of the soil and preventing illegal soil change. Otherwise, in the future, we will see the increasing disappearance of species. Thus, we need researchers, farmers, and policy makers to move from development to conservation.

Article online now, journal to be published: November 15, 2023

> **Link**

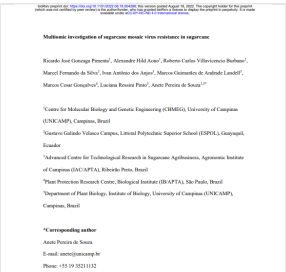
Multiomic investigation of sugarcane mosaic virus resistance in sugarcane

Sugarcane mosaic virus (SCMV) is the main etiological agent of sugarcane mosaic disease, which affects sugarcane, maize and other economically important grass species. Despite the extensive characterization of quantitative trait loci controlling

resistance to SCMV in maize, the genetic basis of this trait is largely unexplored in sugarcane. Here, a genome-wide association study was performed and machine learning coupled to feature selection was used for the genomic prediction of resistance to SCMV in a diverse panel of sugarcane accessions. This ultimately led to the identification of nine single nucleotide polymorphisms (SNPs) explaining up to 29.9% of the phenotypic variance and a 73-SNP set that predicted resistance with high accuracy, precision, recall, and F1 scores. Both marker sets were validated in additional sugarcane genotypes, in which the SNPs explained up to 23.6% of the phenotypic variation and predicted resistance with a maximum accuracy of 69.1%. Synteny analyses showed that the gene responsible for the major SCMV resistance in maize is probably absent in sugarcane, explaining why such a major resistance source is thus far unknown in this crop. Lastly, using sugarcane RNA sequencing data, markers associated with the resistance to SCMV in sugarcane were annotated and a gene coexpression network was constructed to identify the predicted biological processes involved in SCMV resistance. This allowed the identification of candidate resistance genes and confirmed the involvement of stress responses, photosynthesis and regulation of transcription and translation in the resistance to this virus. These results provide a viable marker-assisted breeding approach for sugarcane and identify target genes for future molecular studies on resistance to SCMV.

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> **Link**



Multiomic investigation of sugarcane mosaic virus resistance in sugarcane

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Events



SugarMach Indonesia
GEM Indonesia
23-25 August 2023

JIExpo Kemayoran
Jalan Benyamin Suaeb No. 1
Pademangan,, Jakarta Indonesia

> **Link**



81st Annual Convention & International Sugar Expo
The Sugar Technologists' Association of India (STAI)
6-8 September 2023

Travancore International Convention Centre, Thiruvananthapuram, Kerala, India

> **Link**



Sugarex Thailand 2023

Fireworks Exhibitions and Conferences

14-15 September 2023

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

> **Link**



The India Sugar and Bio-Energy Conference 2023

Government of India, ISMA & ISO

21-22 September 2023

J W Marriott Hotel, New Delhi Aerocity Near Indira Gandhi International Airport, New Delhi, 10037

> **Link**



XII Congreso ATALAC 2023 COSTA RICA

Asociación de Técnicos Azucareros de Latinoamérica y El Caribe ATALAC

Congress: 18-20 September 2023

Centro de Convenciones de Costa Rica, Heredia.

Post-Congress: 21-22 September 2023

Hotel Condovac La Costa, Guanacaste.

> **Link**



International Conference on 'Sugar Industry – Modernization & Diversification for Sustainability'

UP Sugar Mills Assocation, National Sugar Institute Kanput

11-12 October 2023

National Sugar Institute, Kanpur, India

> **Link**

Sugar & Ethanol Asia	**Sugar & Ethanol Asia 2023** *InformaConnect* **3-5 October 2023** **Radisson Blu Plaza, Bangkok, Thailand** > **Link**
ISO 32nd ISO International Seminar 21st - 22nd November 2023 SAVE THE DATE www.isosugar.org	**32nd ISO International Seminar** *ISO* **21-22 November 2023** **London** > **Link**
AFA Our Crops, Our Wealth	**The Sugar Industry Innovation Symposium** *AFA – Sugar Directorate Office* **5-7 December 2023** **Grand Royal Swiss Hotel Kisumu** **Riat, Kisumu-Kakamega Highway , Vihiga Road** **Kisumu-40100 Kenya** > **Link**
CARBO SOLUTIONS INTERNATIONAL HIGH TECH SUGAR SOLUTIONS	**Carbo Solutions 25th International Sugar Conference** *Carbo Solutions* **24-26 January 2024** **Casablanca Marriott Hotel, 100, Avenue des FAR** **Casablanca, Morocco** > **Link**

	ASSCT Annual Conference *Australian Society of Sugar Cane Technologists* **16-19 April 2024** **Townsville Entertainment and Convention Centre, Townsville, Queensland, Australia** > **Link**
	ISSCT XXXII Centennial Congress *International Society of Sugar Cane Technologists / Asociación Colombiana de Tecnicos de la Caña de Azúcar (TECNICAÑA).* **21-31 August 2025** **Centro de Eventos Valle del Pacifico, Cali – Colombia** > **Link**