February 2025 International Society of Sugar Cane Technologists Founded 1924 Bulletin

Welcome to the ISSCT Bulletin for February 2025, 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

ISSCT XXXII Centennial Congress

The preparations for the Centennial Congress and the associated activities are now well underway. Detailed information may be found the Congress website at https://www.issctcennial.com/ and in the Newsletter 3 https://issctcennial.com/newsletters/

It is to be recalled that the Pre-Congress Tour which will be held from 22 to 23 August 2025 will consist of two components: Zone 1 - Central and Southern of Valle del Cauca technical and Zone 2 - Northern of Valle del Cauca y Risaralda. **Participants should arrive in Cali on 21 August 2025. They will stay in the same hotel for the Pre-Congress and Congress.**

The Congress will take place in Cali from 24 to 28 August 2025. On 24 August there will be the Welcoming Cocktail and the Opening of Trade Exhibition. The Opening Ceremony will be held on 25 August and will be followed by plenary and technical sessions over four days with poster sessions. There will be also the social and cultural events as well as programmes for accompanying persons. **Participants attending Congress only should arrive in Cali on 23 August or by mid-day on 24 August 2025.**

The Post-Congress Tour will take place from 29 to 31 August 2025 in the Cartagena area in the Caribbean side of Colombia and will offer further insights into the sugarcane sector followed by tourist activities for those who are interested in exploring Colombia's rich culture and landscapes. Full information comprising cost of air ticket Cali-Cartagena-Cali, hotel accommodation and registration fee will be available in early March. **These will be communicated immediately to ISSCT members who are expected to travel from Cali on 29 August and leave Cartagena either on the 31 August or 1 September 2025.**

Postponement of deadline for Early Bird Registration

With a view to facilitate registration of members, especially those whose papers/posters are under review, the deadline for the Early Bird Registration has

been extended from 15 February 2025 to 31 March 2025 at the unchanged registration fee USD 1200. It is hoped that this measure will greatly facilitate the participation of ISSCT members at Congress.

Technical Aspects of the Centennial Congress

Two hundred and forty-six (246) full texts have been submitted to the Editor and the review process is underway. It is expected to be completed as scheduled. The Technical Programme Committee will comprise apart from oral communications and posters presentations, 40 other presentations emanating from the Centennial Volume with 4 presentations for the periods four periods 1924-1938, 1950-1974, 1975-1999 and 2000-2023 for each of the 10 disciplines of ISSCT. All but one of the texts related to these 40 presentations have been received and reviewed.

The preparation of the second volume related to the history of ISSCT, excluding technical aspects is underway and is expected to be completed in End March.

Thematic Workshops

A mentioned in the December issue of ISSCT Bulletin, the programme of thematic workshops has been completed successfully with 410 participants from 34 countries. The lowest number of participants at a workshop was 27 and the highest number was 112, the latter having been held in a non-sugarcane producing area. The total number of participants exceeded the pre-COVID attendance of 367 for the workshops held during the inter-congress period 2016-2019. Detailed reports on the workshops have been published in issues of ISSCT Bulletin as follows:

- August 2024: Germplasm & Breeding/Molecular Biology Workshop held from 8 to 12 July 2024, Coimbatore, India
- October 2024: Agricultural Engineering and Agronomy Workshop held from 9 to 22 August 2024, at the Zign Hotel in Pattaya, Thailand
- December 2024: Co-product Commission Workshop held from 16 to 20 September 2024, at the Le Recif Hotel in Saint Gilles, Réunion
- The programmes and abstracts of presentations made at these Workshops were also circulated.

In the present issue the presentation of reports is being pursued.

Report of the ISSCT Joint Factory Engineering and Processing Workshop

The ISSCT joint workshop of Factory Engineering and Processing was held from 6 to 10 October 2024, at the Hotel Meliá Berlin, Germany followed by a visit to the Klein Wanzleben beet sugar factory of Nordzucker group.

Themes and Topics

The workshop theme **"Innovations in the Sugar Cane Industry- Enhancing Sustainability, Quality and Efficiency"** covered several important topics for the Engineering and Processing sections:

Engineering section topics

- Material handling and testing
- Contribution of the cane sugar industry for decarbonization with special focus on Carbon Capture Storage and Utilization (CCS and CCU)
- Green cane harvesting
- Trash collection
- Fuels including pre-treatment
- Beet & Cane – Potential joint topic
- Energy management
- Industry 4.0

Processing section topics

- Sugar quality
- Mass and energy balances
- Sustainable processing practices
- Factory data analyses and trends
- NIRS (Near Infrared Spectroscopy) technology applications and updates

Workshop Activities

From 20 countries, 120 delegates registered for the workshop. Due to visa issues, a few of them could not attend the workshop. Nevertheless, the event was the largest factory workshop of ISSCT. The workshop was supported and sponsored by 17 companies which certainly contributed to the success of the workshop. The workshop commenced with

registration and a welcome party on the evening of 6th October. In the workshop opening address, Dr Boris Morgenroth, the Workshop Chair, welcomed the participants. He also expressed the gratitude to the sponsors for their financial support to organize the workshop.

In the workshop opening address on 7th October, Dr Boris Morgenroth welcomed again all the participants and explained the challenges to the sugar industry along with need to implement innovative solutions to improve performance. The opening session proceeded with ISSCT presentation by Harjeet Singh Bola, the Chair of Engineering Section and a plenary presentation by Dr. Gillian Eggleston, the ISSCT Factory Commissioner of Engineering and Processing sections on *Circular Sustainability of the Sugar Crop Processing Industry through By-Product Utilization*. Dr. Eggleston gave this plenary presentation on behalf of Dr. Isabel Lima of USDA-ARS in the USA, who was unfortunately unable to attend the workshop. The plenary highlighted the application of biochar (low temperature pyrolysis of sugarcane bagasse and leafy material or sugar beet pulp) as a soil amendment around the world that can improve crop yields.

Starting from 7th October, the next three days included 50 presentations and panel discussions at the venue hotel. On the fourth day, the participants went to visit the Klein Wanzleben beet sugar factory.

Workshop Highlights

- **Industry 4.0**

  To bring awareness among the operators, Illovo sugar in South Africa has implemented dashboards for KPI (Key Performance Indicators), Asset monitoring and lead indicators. Brazilian sugar factories discussed plans for factory digitalization along with AI implementation and already executed modern automation concepts and digitalization projects to a good level. The Sugar Milling Research Institute (SMRI), South Africa has also implemented digitalization projects based on NIRS and optical imaging systems to determine sugar losses and to improve the operation of centrifugal machines. Several technologies are available in the market to support digitalization initiatives, but it is important to make the plant set-up suitable to adapt these technologies. With digital twins, different operational concepts can be planned and evaluated in real operation through online operation management tools.

- **Energy Management**

  With modern technologies and operational concepts, the process steam demand can be reduced to zero and power export up to 131 kWh/t cane is feasible. Such

projects, however, require commercial viability evaluation to decide on the plant performance. With the modern engineering tools, cost of energy, energy consumed at different stations, and loss of energy can be tracked. Overall water reduction in the process helps to reduce process steam demand. Power export from the sugar mills can be a good source of additional revenue. From the Australian perspective, negative power pricing during the day when solar power is available is a challenge for the sugar mills.

- **Green cane harvesting**

  Mechanical and green (unburnt) cane harvesting cause cane losses and deliver higher amounts of trash or extraneous matter (leaves, mud, tops etc) to the factory. Several challenges to the factory operation were reported. The front end, backend and boiler operations suffer due to higher amounts of trash and invert sugars. Post harvest cleaning is a possibility to avoid the detrimental processing effects of trash, but this can cause an additional cost on the cane supply. Trials were done in Australia and Eswatini to reduce cane loss during the harvesting by adjusting the harvesters' operation and by separation of brown leaves before the cane gets into the factory operation, but all these efforts cause additional costs. A question remains if the increased cane yield and improved factory operations compensate for these additional costs. In Colombia, mechanical harvesting has increased from 39 to 75% in last 10 years. Thus, the Colombian sugar industry is developing standards to categorise and evaluate the trash amounts coming to the sugar factories. It must also be added that one of the Procession Section topics was the innovative use of NIRS to measure trash in the cane supply by Stephania Imbachi Ordonez, which is discussed later in this report.

- **Sustainable processing practices**

  New operational concepts and state-of-the-art technologies to improve the performance of cane sugar factories were reported to improve their sustainability. In the reported modern concepts, the cane sugar factories are moving towards sextuple and even septuple evaporation plant operation with falling film evaporators along with the installation of vertical continuous pans, direct contact heaters, plate heaters, and mechanical vapor recompressors (MVRs) to reduce the process steam demand. The equipment designs have been adapted for ease of operation and cleaning. Cutting down the water additions to the process is important and to a good extent is an inexpensive aspect to consider when reducing the process steam demand. Increasing power export with saved bagasse is important to earn additional revenues to improve the sustainability of sugar factories. The saved bagasse can be also used to other industries, e.g., paper

industry. To improve the process performance, utilization of chemicals and juice softening though ion exchange have also been reported. An evaluation of the gain versus cost for these additional efforts is required.

- **Beet and Cane**

  A comparison between beet and cane processing was discussed which considered the feedstock composition properties, agriculture, cultivation area, yield, processing chemistry, sugar production, technological aspects are reported. In addition to the beet and cane, properties and handling of sweet sorghum was also discussed. It is not techno-economically viable at the moment to produce white sugar from sweet sorghum due to its relatively high starch and invert sugar contents, but it has the advantages of being a rich source of antioxidants and minerals which needs to be further exploited. Sweet sorghum shows a good potential to be brought into the business stream of beet and/or sugarcane processing to produce syrup and high value cattle feed. A state-of-the-art combined beet and cane sugar plant in Pakistan has a good blend of technologies from beet and cane sugar industries. A combined cane and beet sugar plant improves the degree of utilization of installed equipment and helps to earn additional revenues. Quite a few technologies and concepts can be transferred from beet to the cane sugar industry.

- **Material handling and testing**

  Bagasse drying with multiple heat sources including exhaust steam, boiler flue gas, hot water and tail pipe condensate were reported. The utilization of waste heat for bagasse drying and the eventual improvement of the boiler efficiency can significantly contribute to the improved sustainability of sugar factories. Safety concerns of the centrifugal machines and improvement aspects were reported. Another aspect reported was the possibilities in the batch pans operation improvement by changing the pan design.

- **Factory data analyses and trends**

  Good progress on the development of advanced lab sensors compliant to International Commission for Uniform Methods of Sugar Analysis (ICUMSA) methods, online analytical sensors and utilization of factory data for plant performance review were reported. SMRI is currently utilizing factory data to develop a research program to monitor various aspects of the plant operation and cane quality. In Australia, the analytical data from the lab and online measurements is being utilized to determine cane quality and its impact on processing. The utilization of optical microscopy in the crystallization process was

reported to significantly help to improve the pan operation and cut down the water additions to the pans. The latest development in sensors will certainly help to implement more digitalization measures in cane sugar factories and refineries.

- **NIRS/instrument technology applications and updates**

  NIRS systems have now been adopted in some countries for cane payment and in South Africa and other African countries is also being used in the factory to monitor processing and as such is replacing traditional analyses. The latter can be attributed to the work of SMRI. NIRS offers cost savings, labor savings, the reduction of chemical usage, and above all offers real-time data and major time savings. Recent research at the Audubon Sugar Institute (ASI) in the USA has shown that NIR is now capable of measuring the soil contents in the cane supply if incinerated ash is used in the calibrations. Currently sugarcane trash in the cane supply is difficult to measure and the most accurate method is by hand separation and weighing. By using mixtures of leaves/soil/cane, NIRS has now been shown to be able to measure trash in the cane supply by ASI and has great potential. Australia is currently exploring the potential use of NIRS for detecting other impurities such as polysaccharides.

- **Sugar quality**

  Advances in the knowledge of sugar quality and its analyses were presented. These included color transfer into sucrose crystals and the influence of dextran on color inclusion. Accurate methodologies to measure impurities are always needed to improve processing and reliable, tracable at line color and turbidity analyses were discussed. Starch is an impurity in sugarcane that comes in insoluble and soluble forms. In-depth research over the past decade by ASI in the USA has shown that the starch form and the extent of solubilization in the factory does affect molasses exhaustion, and possible enzyme applications to better control starch forms are on the horizon.

- **Visit to the Klein Wanzleben beet sugar plant**

  On the last day of the workshop, a visit to the Klein Wanzleben beet sugar plant was hosted by Nordzucker. This factory originally started operations in 1838, and a new factory was built between 1992 -1994. It is one of the most modern sugar factories in Europe.

Conclusion

The workshop was largest in terms of number of participants for ISSCT. A wide range of topics on the innovations in the sugar industry were presented and discussed at the workshop.

The topics discussed during the workshop generated much interest and useful discissions. New and important aspects of sugarcane delivered to the sugar factories and their effect on quality were discussed and included: cane processing practices, modern equipment & concepts for performance improvement, latest technological developments in the instrumentation & digitalization areas, power export potential, combined beet & cane plants were presented and discussed.

The visit to the Klein Wanzleben beet sugar factory was very informative especially in terms of plant setup, operation and maintenance.

Congratulations to the Joint Engineering and Processing Workshop organising committee in Berlin for a very successful workshop.

Dr Gillian Eggleston, Factory Commissioner and Chair of the Processing Section and Harjeet Singh Bola, Chair of the Engineering Section

Sugar Cane News

Chasing peak sugar: India's sugar cane farmers use AI to predict weather, fight pests and optimize harvests

Microsoft	**Microsoft**	**January 7, 2025**	**https://news.microsoft.com/source/asia/features/chasing-peak-sugar-indias-sugar-cane-farmers-use-ai-to-predict-weather-fight-pests-and-optimize-harvests**

Ready?" Suresh Jagtap asks, then turns and disappears into a field of tall sugar canes.
Inside is a world of dappled green. The 65-year-old farmer bats rustling leaves aside, clearing a swift path to a thin metal structure rising above.

His family has been farming in the area for generations – vegetables, fruit and, more recently, sugar cane. Over the years, climate change has made the weather more unpredictable and extreme, and raised the risk of pests and disease.

Recently, Jagtap turned to AI for help, aided by scientists at the nearby Agricultural Development Trust (ADT) of Baramati and using Microsoft AI technology.

Microsoft CEO Satya Nadella all praise for agri change via tech tie-up with Baramati farmers

THE TIMES OF INDIA	**The Times of India**	**January 9, 2025**	**https://timesofindia.indiatimes.com/city/pune/nadella-praises-agri-change-via-tech-tie-up-with-baramati-farmers/articleshow/117064013.cms**

Microsoft CEO Satya Nadella, speaking at the Microsoft AI Tour in New Delhi on Wednesday, discussed the tech giant's collaboration with the Agricultural Development Trust (ADT) in Baramati, which helps small farmers increase their yield while reducing their use of chemicals and water.

Nadella said, "It is one of the most stunning examples of cutting-edge technology. One of the things it does is a fusion—this is using geospatial data, spatial-temporal data from drones, satellites, and soil, all getting connected in real time. It applies AI and translates it back into knowledge for the farmer who ask questions in his language. That is the stitching together; it is phenomenal," he said and tweeted about it too.

Amrut Manikrao Bhosale, 46, a marginal farmer in Satara has three acres. He said for Rs 70,000 per acre input cost in his sugar cane crop, with pests and erratic climate, the yield has been about Rs 50,000 per acre.

Last year, Bhosale invested ₹10,000 in training from ADT in collaboration with Microsoft. Using sensors, a weather station, and a specialised app, he received actionable insights—such as when and how much to irrigate, nutrient application tips, and pest alerts.

Genetic tweak to three key crops massively boosts their growth

NewScientist	**New Scientist**	**December 19, 2024**	**https://www.newscientist.com/article/2460964-genetic-tweak-to-three-key-crops-massively-boosts-their-growth/** *[Paywall]*
	The growth of maize, sugarcane and sorghum has been greatly boosted by modifying the plants to take advantage of higher carbon dioxide levels now found in the air. *This was done by simply increasing the activity of two genes, says Coralie Salesse-Smith at the University of Illinois. The finding should lead to the creation of new varieties whose yields go up as CO_2 levels continue to rise.*		

UK researchers use sugar cane from Spain's Granada province to produce eco-friendly bricks

SUR in English 40	**Sur in English**	**January 15, 2025**	**https://www.surinenglish.com/andalucia/costa-tropical/london-uses-coastal-sugar-cane-create-an-20250115081816-nt.html**
	Granada province's Costa Tropical is gaining ground in the field of innovation in sustainability thanks to a pioneering project that uses sugar cane from Granada to manufacture sustainable building materials. The project, led by architect and professor Armor Gutiérrez Rivas of the University of East London, highlights the value of a crop that was once one of the area's most important sectors, especially in towns such as Salobreña, Motril and Almuñécar. *The project grew out of research Gutiérrez Rivas was doing in class with his architecture students. In 2022, they began to explore the possibility of using agricultural waste, such as sugar cane, to create buildig materials.*		

The Role of Precision Agriculture in Sugarcane Production

USDA Agricultural Research Service U.S. DEPARTMENT OF AGRICULTURE	**USDA**	**January 10, 2025**	**https://www.ars.usda.gov/oc/utm/the-role-of-precision-agriculture-in-sugarcane-production/**
	Sugarcane production in Louisiana is a $3 billion agricultural business. However, because sugarcane is a tropical crop, and is planted and harvested differently than many crops, it presents many challenges to farmers in the southeast. *Dr. Richard Johnson is a research agronomist with ARS's Sugarcane Research Unit in Houma, LA. ARS and its partners have provided valuable research and insight to Louisiana sugarcane farmers.*		

Pantaleon Partners with Bright Yeti to Deploy Its Technology in Sugarcane Production

iGrow News	**iGrow News**	**January 23, 2025**	**https://igrownews.com/pantaleon-partners-with-bright-yeti-to-deploy-its-technology-in-sugarcane-production/**
	Pantaleon, a leading sugarcane producer in Central America, and Bright Yeti, a technology-focused agriculture company, have announced plans to introduce advanced crop technology into Pantaleon's farming operations. A Letter of Intent was signed between the two organizations to formalize this collaboration, with implementation expected to begin in 2025. *The agreement focuses on improving the germination rates, growth, and harvest yields of sugarcane crops through Bright Yeti's technology, which provides non-chemical solutions for boosting crop performance.*		

Sugarcane trash can produce energy – what South Africa's small farmers need to make this happen [South Africa]

Stuff	**Stuff**	**January 9, 2025**	**https://stuff.co.za/2025/01/09/sugarcane-trash-produce-energy-south-africa/**
	Bioenergy – the renewable energy derived from plant and animal waste products – is largely ignored in South Africa. Solar energy, wind power, and green hydrogen attract the most investment in renewable energy. *Sugarcane trash (the discarded leaves and tops of the plant) is a good example of plant waste that could be turned into energy. But it's overlooked.* *South Africa is a major sugarcane producer, producing about 2.2 million tonnes of refined sugar per season. This generates an estimated average direct income of over R20 billion (more than US$1 billion) per year.*		

Making Thai farms 'smart' [Thailand]

CHINA DAILY	**China Daily**	**December 19, 2024**	**https://www.chinadailyhk.com/hk/article/600492**
	As Southeast Asia's most important agricultural country and the world's top producer of natural rubber and rice exporter, Thailand is now seeking to transform its agricultural sector with support from China's smart farm technology. *In Danmakamtia, a village in Kanchanaburi province, 50-year-old Somboon Songwainiaw is one of the 30 pioneers in the village who have benefited from using technology, specifically the HD408 autopilot steering system designed and produced by Huida Tech, a Chinese company specializing in smart farm solutions.* *Somboon, who owns a total of 22.4 hectares of farmland mainly for sugarcane, tomato and cassava, has two of his tractors equipped with Huida's smart steering system for six months.*		

GE tech investment to give cash crops a boost [Thailand]

Bangkok Post	**Bangkok Post**	**January 4, 2025**	**https://www.bangkokpost.com/thailand/general/2932751/ge-tech-investment-to-give-cash-crops-a-boost**
	The Agriculture Department is planning to invest in genome editing (GE) technology for economic crops, including rice, palm and sugar cane, as an effort to make Thailand a regional GE seed hub, according to Director-General Rapeepat Chantarasriwong. *Mr Rapeepat said that to answer to the rising global demand for GE crops, the department has worked with partners, including experts from the academic and private sectors in GE technology, which has already been adopted in many countries such as China, Japan, the Philippines, and the United States.*		

Mitr Phol's Campaign Promotes Green Sugarcane Harvesting [Thailand]

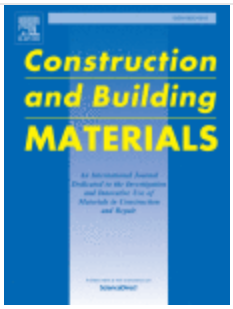
Bangkok Post	**Bangkok Post**	**December 18, 2024**	**https://www.bangkokpost.com/thailand/pr/2922296/mitr-phols-campaign-promotes-green-sugarcane-harvesting**
	Mitr Phol Group, a global leader in sustainable food production, has launched the "Let's Green the Sugarcane" campaign to promote eco-friendly sugarcane harvesting for the 2024/2025 milling season. The initiative encourages cane growers to adopt fresh sugarcane harvesting methods, providing economic benefits while advancing environmental sustainability . *The campaign aims to enhance the livelihoods of cane growers through increased income opportunities while reducing the environmental impact of agricultural practices. A central feature is Mitr Phol's initiative to purchase sugarcane leaves, offering 900 baht per ton for over 700,000 tons this season. These leaves can either be sold for biomass fuel or used as organic mulch to enrich soil naturally, helping to reduce agricultural burning and improve air quality.*		

Carbon credit project set for Thanh Hoa's sugarcane [Vietnam]

Vietnam Investment Review	**Vietnam Investment Review**	**December 31, 2024**	**https://vir.com.vn/carbon-credit-project-set-for-thanh-hoas-sugarcane-120521.html**
	The initiative to generate carbon credits from sugarcane fields in Lam Son, Thanh Hoa province is poised to play a pivotal role in reducing carbon emissions within Vietnam's agricultural sector. If successful, this model could serve as a blueprint for expanding carbon credit projects across the country.		

Latest Research

Development of sustainable and durable ternary blended concrete using sugarcane bagasse ash and glass powder



An effective solution to cement plant carbon emissions and raw materials requirement is to use agro-industrial waste as supplementary cementitious materials. Even though existing research has documented the use of sugarcane bagasse ash and glass powder as a pozzolan in concrete, there is a lack of studies exploring their combined use in the production of ternary cement. In this study, the performance of sugarcane bagasse ash and glass powder based ternary blended cementitious system is evaluated. Compressive strength, Resistance to chloride penetration, quality assessment, resistance to elevated temperatures, microstructural analysis were assessed for sugarcane bagasse ash and glass powder based ternary cement. Results from the study shows that the ternary blended concrete specimens with 10 % bagasse ash and 5 % glass powder had the highest compressive strength. Bagasse ash-glass powder based ternary concrete had lower chloride permeability than control concrete and binary blended concrete. Although the reduction in the compressive strength is witnessed at elevated temperature for all specimens, the reduction is minimal for ternary specimens. Visual inspection and scanning electron micrograph revealed significant variations in colour and the development of cracks at high temperatures, accompanied by a reduction in density and an increase in mass loss. X-ray diffractogram and thermal analysis clearly showed a reduction in portlandite in ternary blended samples when bagasse ash and glass powder were added.

To be published March 7, 2025

> Link

Sugarcane Leaf Disease Classification Using Tensorflow Lite API

Journal of Trends and Challenges in Artificial Intelligence — ASPUR PUBLISHING

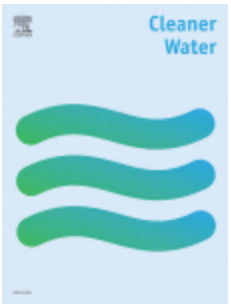
The sugarcane industry is a vital source of various products like biofuels, energy, and sugar-based ethanol, with sugarcane being a significant biomass source for biofuels globally. The Philippines is among the top producers of sugarcane, but it faces challenges, including the devastating red rot disease that affects about 10% of sugarcane-growing areas in the country. The country's productivity also lags other Southeast Asian nations due to issues like poor irrigation, soil fertility, and climate change impacts. To address these problems, researchers developed a sugarcane disease detection and classification system using artificial intelligence to help farmers improve crop yield. The primary focus was on detecting diseases like red rot, brown leaf spot, pineapple disease, and leaf scorch using a mobile application compatible with Android OS. The study aimed to provide farmers with a mobile app that could detect and classify sugarcane

diseases to enable timely prevention and intervention measures, contributing to increased productivity in the Philippine sugarcane industry. The researchers evaluated the performance of a model for diagnosing sugarcane leaf diseases based on precision, recall, F1-score, and accuracy. The study focused on red rot, brown leaf spot, pineapple disease, and leaf scorch detection, excluding other plant diseases and severity assessments. The evaluation of the model's performance revealed promising results. Precision values ranged from 81.6% to 91.4%, indicating high accuracy in identifying instances within each disease category. Recall values ranged from 87.5% to 92%, demonstrating the model's ability to correctly identify actual disease instances. F1 scores, combining precision and recall, were good, ranging from 0.866 to 0.937, indicating reliable classification. The accuracy of diagnosis varied between diseases, with the highest accuracy achieved for red rot and the lowest for leaf scorch. Brown leaf spot classification trials consistently achieved accuracy scores ranging from 95.7% to 99.9%.

Published: February 2025

> **Link**

Treatment methods for sugar rich wastewater: A review

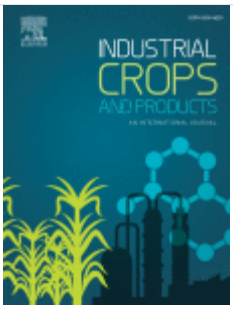


Sugarcane has been recognized as a cash crop in both developed and developing countries for the past century. The sugar manufacturing process requires large volumes of water and consequently generates high-strength wastewater, which, if not treated properly, poses significant environmental risks. This review paper focuses on various treatment techniques for sugar industry effluents including physicochemical, aerobic, anaerobic, and membrane-based approaches. While aerobic and membrane-based methods yield promising results, they are not cost-effective due to high energy demands and challenges related to sludge disposal. Anaerobic methods are more energy-efficient, enabling energy recovery as methane and hydrogen gas while producing less sludge. Sugar industry effluents, which have high organic concentrations, offer great potential for energy recovery through anaerobic treatment. However, the application of anaerobic methods on a commercial scale is limited by long startup periods and seasonal variations in effluent characteristics. The combination of high-rate anaerobic and aerobic methods has proven effective for treating high-strength wastewater.

To be published: June 5, 2025

> **Link**

High-precision identification transgenic sugarcane using active terahertz low-frequency excitation



This study proposes a novel, environmentally friendly, accurate, rapid, and cost-effective technique for the classification and identification of transgenic sugarcane, combining terahertz (THz) time-domain spectroscopy with an Isomap-Deep Convolutional Neural Network (Isomap-DCNN). Different types of transgenic sugarcane derived from the same receptor material exhibit similar THz absorbance spectra, posing significant challenges for accurate categorization. The Tukey window function was first applied to the THz absorbance spectra of five transgenic sugarcane varieties, and the processed data were subsequently used for feature extraction with t-distributed Stochastic Neighbor Embedding (t-SNE), LargeVis (LV), and Isomap. To enhance the robustness and generalization capability of the model, the Kennard-Stone (KS) algorithm was employed to partition the training and testing sets. The processed key "fingerprint" features were then input into a Decision Tree (DT) classifier and a Deep Convolutional Neural Network (DCNN) classifier, respectively. Notably, the Isomap-DCNN model achieved 100 % accuracy in identifying the five transgenic sugarcane varieties. The Isomap-DCNN model, constructed based on THz spectroscopy, is expected to provide a fast, high-precision, environmentally friendly, and cost-effective technique for the classification and identification of transgenic sugarcane. This approach will aid in the development and implementation of regulatory standards, enhance the safety and efficacy of transgenic sugarcane, and promote public transparency regarding information about transgenic sugarcane.

Published: April 2025

> **Link**

Evaluation of Chopped Sugarcane Storage in Different Periods of the Season and Their Influence on the Sugar and Ethanol Process



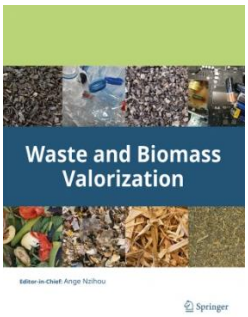
Sugarcane storage has been studied because of the impact of industrial processes. However, the impact of the use of chopped green cane has not been fully characterized. In particular, there was a lack of information on the influence of the harvest season period on cut stalk storage in the "stock on wheels" model. The present work evaluated the effects of chopped sugarcane storage during the beginning, middle, and final harvest seasons on the quality of intermediate sugar and ethanol processing and products during two seasons. The experimental design was a randomized block with split plots (4 × 3) and four replicates. The primary treatments were sugarcane stored for 0, 6, 12, 18, and 24 h and 0, 12, 24, 36, and 48 h for the 2015/2016 and 2016/2017 seasons. The second treatment included the following seasonal periods: the beginning, middle, and end of sugarcane harvest. The intermediate sugar process was evaluated using extracted juice, a clarification process, clarified juice, and syrup. On the other hand, the quality of the wort, fermentation process, and wine were evaluated for ethanol production. The results revealed that the weight loss of the chopped sugarcane gradually increased. Weight loss is more intense depending on the period of the season

when the weather conditions are drying. In terms of the quality of the process and products, a reduction in starch levels was detected with storage of the extracted juice and syrup, probably due to the metabolism of the chopped sugarcane. The maximum storage time of 24 h for sugar- and ethanol-containing products seems possible without reducing the quality of the process or products. However, the continuous weight loss with increasing storage time should reduce the quantity of products obtained.

Published: February 3, 2025

> **Link**

Valorization of Agricultural and Industrial Wastes to Produce *Trichoderma virens*, an Effective Plant Disease Biocontrol Agent



The sustainable management of agricultural crop residues and agro-industrial by-products is a critical issue in sub-Saharan Africa, particularly in Côte d'Ivoire. This study aimed to evaluate the nutrient potential of various agricultural residues and agro-industrial by-products, such as Yam peel, Cashew apple cake, Maize bran, Coffee parchment, Rice bran, Ripe banana pulp, Cocoa pod pericarp, Banana peel, Rice husk, Sugarcane molasses, Cashew apple juice, Fermented cassava tuber paste water, and Ripe mango pulp, as alternative growth media for three strains of Trichoderma virens (R7, E23, and T7). These substrates were sourced from fields and markets in Yamoussoukro, Central Côte d'Ivoire. The organic matter content of the substrates ranged from 52.77 to 95.79%, except for cashew apple juice and fermented cassava paste water, with respectively 2.69 and 4.53%. The mineral content of the media showed higher levels of Ca and Zn compared to Mg, K, Mn, Fe, Na, P, and Cu. Hierarchical clustering identified three distinct substrate groups based on physicochemical properties. Substrates derived from ripe mango pulp, banana peel, maize bran, and cashew meal supported optimal growth and sporulation of the R7 strain, with growth rates between 11.7 and 14.1 mm/day and spore concentrations averaging 2×10^6 spores/mL after six days. Strains E23 and T7 also grew well on these media but produced lower sporulation rates ($\leq 10^6$ spores/mL) compared to R7. No significant differences ($p > 0.05$) were observed between these substrates and Potato Dextrose Agar (PDA) in terms of growth and sporulation, suggesting their potential for developing T. virens-based biopesticides.

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> **Link**

The stabilization of expansive soil using sugarcane straw ash (Bagasse ash) and lime

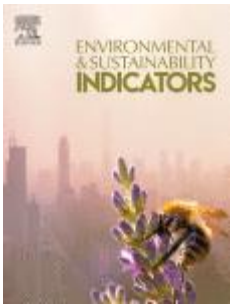
Expansive soils pose significant challenges to civil engineering projects due to their high moisture-induced volume changes, resulting in detrimental effects on foundations, structures, and infrastructure. This study investigates the effectiveness of utilizing bagasse ash and lime (calcium hydroxide) as stabilizers for expansive soil. Bagasse ash

(BA) is an abundant industrial waste from the sugar production industry and is an active pozzolan. The geotechnical characteristics of the expansive soil (control sample) were identified as clayey sand, containing an appreciable amount of organic and inorganic silts and clays. The ratios for investigation consisted of various lime and bagasse ash (2%, 4.5%, and 7%) at a ratio of 1:3, respectively. The maximum dry density and optimum moisture content of the control sample were calculated as 12.91 kN/m³ and 30%, respectively, and were consistent with values observed in similar studies. Increasing stabilizer contents resulted in a decrease in density across all ratios. Free swell and Atterberg's results displayed that the 7%L-21%BA was the most effective ratio at reducing the swelling potential of the control soil. The CBR value of the control sample was 5.22% and indicated that in its current state, it would not be suitable for road subgrade applications, as they require at least 10%. With the addition of 7%L and 7%L-21%BA admixture, the CBR values increased to 19.17% and 17.12%, respectively. Furthermore, the addition of 7%L and 7%L-21%BA to the soil greatly reduced cohesion by 78.6% and 65.8%, respectively. However, it increased the internal friction angle by 32.9% and 46.9%, thus increasing its shear strength and bearing capacity.

Published: 2025

> **Link**

Evaluation of sustainable energy use in sugarcane production: A holistic model from planting to harvest and life cycle assessment



The study evaluates energy consumption in sugarcane production at the Salman Farsi Sugarcane Agro-Industrial Company in Khuzestan province, Iran, comparing plant cane and ratoon cycles. Plant cane show higher energy input (124,912.32 MJ ha^{-1}) and output (107,530.44 MJ ha^{-1}) than ratoon farms (80,317.81 MJ ha^{-1} input and 87,586.68 MJ ha^{-1} output). However, ratoon cycles are more energy efficient. To lessen energy use in plant cane, the research recommends strategies like minimizing machinery use, adopting reduced and no-tillage practices, and employing efficient irrigation and spraying methods. The environmental assessment reveals that plant cane have greater negative impacts on human health, ecosystems, and resources. Specifically, human health impacts are 3.69 DALY for planted systems versus 1.54 for ratoon systems, indicating greater health risks from initial plantings. Ecosystem impacts also show more local species loss in planted systems (6.25E-04 species.yr compared to 4.11E-04 for ratoon). Moreover, resource costs are higher for planted systems at 320.12 USD2013 of sugarcane, compared to 210.46 USD2013 for ratoon production. The analysis compares Artificial Neural Network and Adaptive Neuro-Fuzzy Inference Systems models for predicting energy outputs and environmental effects. Artificial Neural Network models excel in predicting impacts for planted sugarcane, whereas Adaptive Neuro-Fuzzy Inference Systems models are more accurate for ratoon production and are computationally more efficient. The findings emphasize the need for improved sustainability and efficiency in sugarcane production through better energy management and reduced environmental impacts.

To be published: June 2025, article available online now

> **Link**

Determining Mosaic Resilience in Sugarcane Plants using Hyperspectral Images

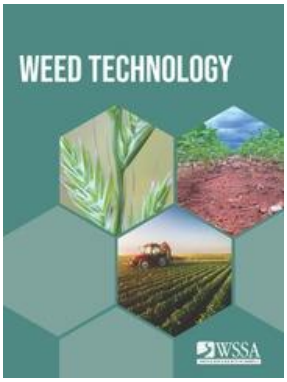


Sugarcane mosaic disease poses a serious threat to the Australian sugarcane industry, leading to yield losses of up to 30% in susceptible varieties. Existing manual inspection methods for detecting mosaic resilience are inefficient and impractical for large-scale application. This study introduces a novel approach using hyperspectral imaging and machine learning to detect mosaic resilience by leveraging global feature representation from local spectral patches. Hyperspectral data were collected from eight sugarcane varieties under controlled and field conditions. Local spectral patches were analyzed to capture spatial and spectral variations, which were then aggregated into global feature representations using a ResNet18 deep learning architecture. While classical methods like Support Vector Machines struggled to utilize spatial-spectral relationships effectively, the deep learning model achieved high classification accuracy, demonstrating its capacity to identify mosaic resilience from fine-grained hyperspectral data. This approach enhances early detection capabilities, enabling more efficient management of susceptible strains and contributing to sustainable sugarcane production.

Published: January 28, 2025

> **Link**

Evaluation of spring herbicide programs during a three-year sugarcane (*Saccharum* spp. hybrids) cropping cycle



A limited number of herbicides and sites of action are registered for use in sugarcane in Louisiana. Repeated use of the same sites of action can lead to the evolution of herbicide resistance in weeds. Therefore, it is critical to evaluate additional sites of action to provide growers with options for rotating herbicides to reduce the risk of resistance. Topramezone, indaziflam, and a formulation including mesotrione, bicyclopyrone, atrazine, and S-metolachlor, along with more common herbicide applications (pendimethalin, and metribuzin, clomazone, and diuron), were evaluated in the spring for injury to sugarcane, weed control, sugarcane yield, and sugar yield. Of these treatments, clomazone applied with diuron was the only herbicide combination to consistently injure the crop, with injury estimates ranging from 11 to 36%, which frequently resulted in reduced sugar yield with losses between 2.3% to 24.1% of the non-treated control. In most treatments, an increase in itchgrass counts was observed between harvests, indicating that additional control strategies will be needed in fields infested with this weed. However, topramezone alone and with triclopyr was well tolerated by sugarcane, with injuries ranging from 0 to 11% two weeks after treatment. Indaziflam and combined application of mesotrione, bicyclopyrone, atrazine, and S-

metolachlor injury was at or under 10% two weeks after treatment. The tolerance of sugarcane for these herbicides suggests that they can be incorporated into weed management strategies in sugarcane. These herbicides would increase the sites of action available to be applied in sugarcane and help mitigate the risk of herbicide-resistant weeds.

Published: November 2024

> Link

Events

The 11th International Conference on Sugar and Integrated Industries (ICSII-2025)

Assiut University

15-18 February 2025

Jolie Ville Resort & SPA kings Island Luxor, Luxor, Egypt

> Link



Geneva Sugar Conference 2025

S&P Global

23 April – 24 April 2025

Geneva, Switzerland

> Link

	Annual Conference of the Australian Society of Sugar Cane Technologists (ASSCT) *ASSCT* **28 April – 2 May 2025** **Brisbane, Queensland, Australia** > **Link**
	97th SASTA Congress 2025 *SASTA* **12 August – 14 August 2025** **ICC, Durban, South Africa** > **Link**
	Fenasucro & Agrocana *RX Events* **12 August – 15 August 2025** **Centro de Eventos Zanini** **Marginal João Olézio Marques, 3.563** **Chácara Recreio Planalto - Sertãozinho/SP, Brazil** > **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**
International Society of Sugar Cane Technologists Founded 1924	**ISSCT Management Commission Workshop** *International Society of Sugar Cane Technologists* *Call for abstracts* **26-27 August 2025** **Cali, Colombia** > **Link**
11th Edition SugarEx THAILAND 2025	**SugarEx Thailand 2025** *Fireworks Media (Thailand)* **11-12 September 2025** **Khonkaen International Convention & Exhibition Center, Khonkaen, Thailand** > **Link**

7th Edition Sugarex INDONESIA 2025 An International Exhibition of Sugar Companies, Sugar Technology, and Its Supporting Industries	**SugarEx Indonesia 2025** *Fireworks Exhibitions* **19-20 November 2025** **Surabaya, Jawa Timur, Indonesia** > **Link**
	**34th International Sugar Organization Seminar** *ISO* **2-3 December 2025** **Westminster, London, UK** > **Link**