

RESAGRO SARGAZO

MEMORIAS DE LA CONFERENCIA VALORIZACIÓN DE RESIDUOS AGRÍCOLAS Y SARGAZO

Editores: **Ulises Jáuregui Haza, Yvette Smith Pujols**



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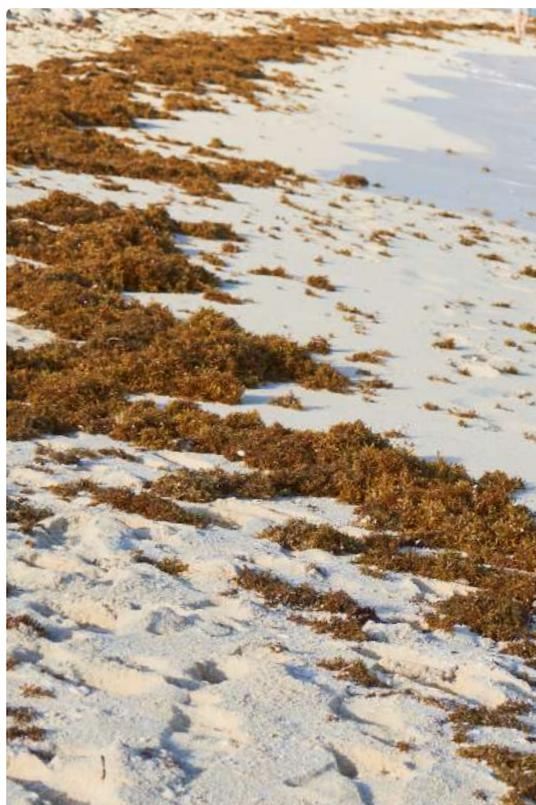


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RESAGRO SARGAZO

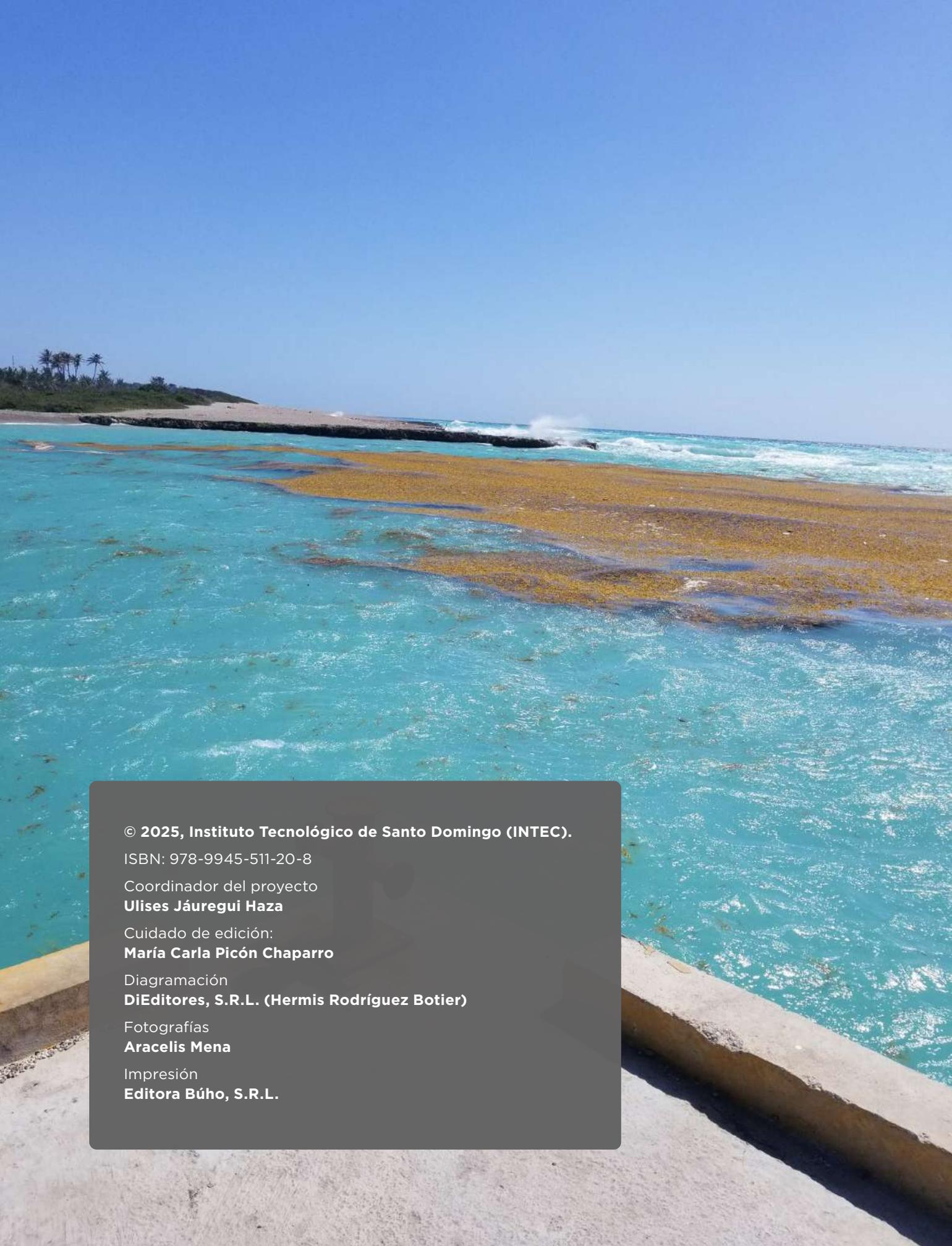
MEMORIAS DE LA CONFERENCIA VALORIZACIÓN DE RESIDUOS AGRÍCOLAS Y SARGAZO

Editores: Ulises Jáuregui Haza, Yvette Smith Pujols

**28 y 29 de octubre del 2024 en el marco del proyecto
COOPERACIÓN FRANCO-DOMINICANA EN MATERIA
DE GESTIÓN DE DESECHOS AGRÍCOLAS Y SARGAZO**

Financiado por el Ministerio de Asuntos Exteriores francés
a través de la Embajada de Francia en República Dominicana
e implementado por INTEC.



A photograph of a tropical beach. The water is a vibrant turquoise color, with white foam from waves breaking against a concrete pier in the foreground. The sky is a clear, bright blue. In the distance, a small island with palm trees is visible on the left. The overall scene is bright and sunny.

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PALABRAS DE LOS EDITORES

El sargazo es un alga marina que llega a las playas del Caribe desde 2011. Su acumulación tiene consecuencias ambientales, económicas y sociales negativas, particularmente en el turismo, la pesca y las comunidades costeras. En contraposición, estas algas pardas son una biomasa de alto valor, cuya valorización constituye una oportunidad para el desarrollo sostenible de los países de nuestra área geográfica. Sin embargo, la temporalidad de las afluencias masivas de sargazo, la variación de los volúmenes mensuales y los riesgos asociados a la bioacumulación de metales pesados en el alga han provocado que, trece años después, todavía no se aproveche esa biomasa y se trate como un residuo sólido.

Por otra parte, en la mayoría de los países del Caribe, y especialmente en la República Dominicana, la agricultura es una actividad económica importante, y el manejo adecuado de los residuos agrícolas es esencial para reducir el impacto ambiental, promover la sostenibilidad agrícola y evitar la contaminación. Por tanto, una manera probable de potenciar estas dos posibilidades es evaluar el desarrollo de tecnologías que permitan de forma simultánea y flexible valorizar el sargazo y los residuos agrícolas.

En este contexto, en el año 2024, el Ministerio para Europa y de Asuntos Exteriores de Francia aprobó financiar el proyecto “Cooperación franco-dominicana en la gestión de residuos agrícolas y sargazo”, que se ejecuta en la República Dominicana por el Instituto Tecnológico de Santo Domingo (INTEC) a través de la Embajada de Francia. Este proyecto pretende identificar acciones para mejorar la gestión de estos residuos; encontrar soluciones para utilizar el sargazo de forma sostenible; promover la cooperación entre Francia (incluidos los territorios franceses de ultramar en el Caribe, también afectados por las invasiones de sargazo) y la República Dominicana en el ámbito de los residuos agrícolas y la gestión del sargazo; ayudar a fortalecer vínculos, compartiendo experiencias y buenas prácticas entre ambos países y fomentar el intercambio entre los sectores público, privado y académico, con un enfoque holístico para la gestión de residuos agrícolas y sargazo, involucrando a diferentes partes interesadas.

En el marco de este proyecto, el 28 y 29 de octubre del 2024 se celebró en INTEC la conferencia “Valorización de residuos agrícolas y sargazo”, con la participación de 59 personas (de ellos, 21 ponentes) de Francia, Guadalupe, Martinica y República Dominicana. Siete provenientes del sector estatal, 10 del sector privado



productivo y de servicios, y 34 del sector académico. Se presentaron 22 ponencias, 13 relacionadas con la valorización del sargazo y nueve con el aprovechamiento de los residuos agrícolas. Estas memorias recogen los resúmenes de los trabajos presentados como testimonio de las ricas discusiones y debates que compartimos durante los dos días de conferencia y durante el recorrido que nuestros colegas de Francia metropolitana y del Caribe realizaron por tres días más por instituciones académicas, de servicio y producción de Santo Domingo, Santiago de los Caballeros y Punta Cana. Esperamos que esta publicación quede, justo, como memoria histórica del evento y como material de consulta de las potencialidades de trabajo y colaboración entre Francia y República Dominicana en la valorización de residuos agrícolas y sargazo.

Dr. Ulises Jáuregui Haza

Mag. Yvette Smith Pujols



Link 1: <https://youtu.be/jbmer4UThWc>



Link 2: <https://youtu.be/6z87MJSiHcA>



PALABRAS DE EMBAJADORA DE FRANCIA EN REPÚBLICA DOMINICANA, EXCELENTÍSIMA SRA. SONIA BARBRY

Francia está plenamente involucrada en los esfuerzos internacionales para luchar contra el sargazo.

El proyecto ResAgroSargazo, financiado por el Ministerio de Asuntos Exteriores francés a través de nuestra embajada e implementado en 2024/2025 por la universidad dominicana INTEC, es parte de este compromiso. Gracias a ResAgroSargazo la cooperación bilateral franco-dominicana sobre valorización de sargazos y residuos agrícolas se ha potenciado y la publicación de las actas de este seminario que se celebró en Santo Domingo el 28 y 29 de octubre del 2024 es uno de los resultados de este esfuerzo común.

Desde 2011, las Antillas francesas se enfrentan a la llegada cada vez más masiva de sargazo en sus costas. La proliferación de esta alga significa un reto sanitario (emisiones de gas tóxico), económico (turismo, pesca) y una presión medioambiental creciente sobre los ecosistemas costeros y marinos.

Ante la amplitud de este fenómeno, el gobierno francés ha lanzado en 2018 un Plan nacional de prevención y lucha contra los sargazos, actualizado y reforzado en 2022. Este plan se basa en cuatro pilares: conocimiento científico, mejora de las técnicas de recolección, apoyo a los ayuntamientos y valorización de las algas.

En octubre de 2019, una conferencia internacional fue organizada en Guadalupe y se lanzó el programa SARG'COOP, financiado por el programa Interreg Caribe de la Unión Europea, con el objetivo de trabajar con los países de la región y organizaciones regionales sobre detección, seguimiento satelital, colección en mar y experimentos de soluciones de valorización.

La Conferencia de Naciones Unidas sobre el clima (COP28), que tuvo lugar en Dubái en diciembre de 2023, ha permitido también una movilización de los actores regionales e internacionales. Francia expuso allí una iniciativa internacional de lucha contra los sargazos.

En marzo de 2025, se presentó el programa SARG'COOP2 en Guadalupe para reforzar la investigación aplicada sobre predicción y recolección en mar, y para experimentar modelos económicos de valorización. El programa integra



especialmente una parte importante sobre gestión de riesgos sanitarios, con las autoridades de salud pública de los países socios.

La Agencia Francesa de Desarrollo (AFD) lleva también un proyecto de gestión y de coordinación regional de sargazos, con el objetivo de impulsar una dinámica de cooperación regional en el Caribe en la materia y apoyar la estructuración de un marco de gestión y valorización de estas algas. En este sentido, proyectos piloto de economía circular, que incluyen compostaje y producción de energía renovable a partir de sargazo, se ponen en marcha.

Por otra parte, la Agencia nacional de investigación (ANR) ha lanzado múltiples proyectos conjuntos para aumentar las competencias de los laboratorios locales sobre modelización de flujos oceánicos y las biotecnologías marinas.

La Unión Europea ha intensificado también su compromiso sobre la valorización de los sargazos integrando esta problemática en su iniciativa *Global Gateway*. En este marco, la DG INTPA ha organizado con la Organización de los Estados del Caribe Oriental (OECS) y el gobierno de Granada, la II Conferencia UE-Caribe sobre el Sargazo (1 y 2 de octubre de 2024), lo que ha permitido hacer un balance de las posibilidades de tratamiento de los sargazos y ha llamado a la creación de un “hub” regional en Granada sobre esta cuestión.

Otros Estados de la región se posicionan también sobre cuestiones de valorización, México, por ejemplo, fuertemente impactado por los arribos en la costa caribeña de Quintana Roo.

La tercera conferencia de las Naciones Unidas Sobre el Océano (UNOC3) que tiene lugar en Francia, Niza, del 9 al 13 de junio de 2025, representa una etapa importante en la toma de consciencia y movilización internacional sobre el fenómeno de arribos masivos de sargazo y sus graves consecuencias para el Caribe y más allá.

Solo aunando nuestros esfuerzos tanto a nivel diplomático, científico como económico se podrá luchar contra estos arribos masivos. Gracias a la universidad INTEC y a República Dominicana por trabajar conjuntamente con Francia ante este desafío.

Excma. Sra. Sonia Barbry

Embajadora de Francia en República Dominicana

Santo Domingo, 5 de junio de 2025



PALABRAS RECTORA EN FUNCIONES DE INTEC, MAESTRA ALLIET ORTEGA

Con gran satisfacción presentamos a la comunidad académica, científica y al público en general las memorias de la conferencia “Valorización de residuos agrícolas y sargazo”, celebrada los días 28 y 29 de octubre de 2024 en el Instituto Tecnológico de Santo Domingo (INTEC). Este encuentro, fruto de la cooperación franco-dominicana y el compromiso del INTEC con el desarrollo sostenible reunió a especialistas, investigadores, actores del sector productivo y representantes institucionales comprometidos con una visión común: transformar desafíos ambientales en oportunidades sostenibles.

En esta ocasión, no podemos dejar de rendir un sentido homenaje al Dr. Julio Sánchez Maríñez, quien fuera nuestro rector hasta su fallecimiento en mayo de este año. Su legado permanece profundamente arraigado en la vida institucional del INTEC y en la promoción de una educación superior comprometida con la investigación y la solución de los grandes problemas nacionales.

En uno de sus últimos escritos publicados en su blog institucional, titulado “Problemas complejos, investigación inspirada en uso y el caso del sargazo¹”, el Dr. Sánchez Maríñez reflexionaba con lucidez sobre la necesidad de una investigación universitaria conectada con las problemáticas reales del entorno. Destacaba el sargazo como un ejemplo de problema complejo y como una oportunidad para impulsar investigaciones transdisciplinarias, de impacto tangible en nuestras comunidades.

Esta conferencia y el proyecto ResAgroSargazo que la enmarca, son una expresión concreta de esa visión: una universidad abierta al mundo, colaborativa, útil y pertinente.

Agradecemos a todos los participantes, instituciones aliadas y al equipo organizador por hacer posible este espacio de diálogo y construcción conjunta. Que estas memorias sirvan de inspiración para continuar desarrollando soluciones innovadoras, sostenibles y solidarias para la República Dominicana y toda nuestra región del Caribe.

Maestra Alliet Ortega

Rectora en funciones

Instituto Tecnológico de Santo Domingo (INTEC)

¹ <https://blogdelrector.intec.edu.do/problemas-complejos-investigacion-inspirada-en-uso-y-el-caso-del-sargazo>



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PROGRAMA

28 de octubre de 2024

Lugar: OSES, INTEC. En español, con interpretación al francés.

08:30 Registro y café.

09:00 Acto Inaugural - Palabras de bienvenida:

Rosario Aróstegui, vicerrectora de Investigación y Vinculación INTEC.

Brigitte Veyne, consejera de Cooperación y Acción Cultural de la Embajada de Francia en RD.

Yatnna de León, directora de Agricultura Orgánica del Ministerio de Agricultura.

SESIÓN “VALORIZACIÓN DE SARGAZO” (OSES)

Presidentes de sesión: Alvin Rodríguez, Sarra Gaspard.

09:45 Alberto J. Núñez Sellés (UNPHU, Rep. Dom.). *Modular technology for the production of a standardized raw material from sargassum for industrial applications.*

10:00 Emma Duclaut (ADEME, Guadalupe-Martinica). *Prevention and perspective of valorization of sargassum in the French West Indies.*

10:15 Jérôme Bauta (INP-Toulouse, Francia). *Valorization of sargassum algae: towards bio-based materials for environmental and economic sustainability.*

10:30 Pausa café.

11:05 Yessica Castro (UFHEC, Rep. Dom.). *Effect of unconventional pretreatments on the morphology and biochemical methane potential of Sargassum spp.*

11:20 Sarra Gaspard (Université des Antilles, Rep. Dom.). *Preparation of carbon materials, biochars and activated carbon from Caribbean agricultural biomass and sargassum seaweeds for different applications: water treatment, pesticide sequestration and energy storage.*

11:35 Yeray Álvarez-Galván (NBC, Guyana Francesa). *Valorization of Sargassum biomass for the fabrication of porous carbon electrodes and implementation in 3d-printed capacitive deionization cells.*

11:50 Isabelle Polaert (INSA-Rouen, Francia). *Use of SiC and biochar as microwave absorbers during the pyrolysis of sargassum in a single-mode microwave cavity.*

12:05 Marlen Ramil (UNAPEC, Rep. Dom.). *Obtaining biofilters for water treatment from sargassum combined with other biomass sources.*

- 12:20 Elena Martínez Martínez (SOS Carbon | SOS Biotech, Rep. Dom.). *Harnessing Invasive Seaweed: The BlueTech Revolution Transforming the Caribbean's Future.*
- 12:35 Gustavo Gandini (BANELINO, Rep. Dom.). *Sargassum liquid bio-fertilizer: obtention, characterization and evaluation in organic banana culture.*
- 12:50 Ashley Marie Mejía Disla (INTEC, Rep. Dom.). *Evaluation of the physicochemical, microbiological, and ecotoxicological properties of two sargassum-based liquid biofertilizers for industrial Solanum lycopersicum production.*
- 13:05 Franklyn Zabala (UTESA, Rep. Dom.). *Sargassum-based fertilizers: Obtaining and evaluating organic fertilizer based on Sargassum in agricultural crops.*
- 13:20 Preguntas y comentarios.
- 13:30 Almuerzo.
Lugar: sala Julio Ravelo.

SESIÓN DE PROYECTOS

Lugar: sala Julio Ravelo.

Presidentes de sesión: Ulises Jáuregui, Patricia Taillandier.

- 14:30 Sara Davo Boza (AFD en Rep. Dom.). *Heading Toward Project Funding Opportunities.*
- 15:00 Sesión de trabajo por equipos de proyectos.
- 17:00 Cierre de la primera sesión.

29 de octubre de 2024

Lugar: sala Julio Ravelo.

- 08:30 Registro y café.

SESIÓN “VALORIZACIÓN DE RESIDUOS AGRÍCOLAS”

Lugar: sala Julio Ravelo.

Presidentes de sesión: Alberto Núñez, Hélène Roux-de Balmann.

- 09:00 Conferencia. Hélène Roux-de Balmann (INP-Toulouse, Francia). *Biorefinery approach for the valorization of agricultural residues.*
- 09:30 Conferencia. Henry Joseph (Phytobokaz, Guadalupe). *The Phytobokaz Laboratory and the concept of phytosymbiosis.*
- 10:00 Pausa café.
- 10:30 Patricia Taillandier (INP-Toulouse, Francia). *Production of platform molecules from cellulosic and lignocellulosic materials by fermentation.*
- 10:45 Alberto J. Núñez Sellés (UNPHU, Rep. Dom.). *Potential of biorefineries from agricultural residues in Dominican Republic.*

- 11:00 Virginie Vandenbossche (INP-Toulouse, Francia). *Use of twin-screw extrusion technology for the biorefining of agro-resources.*
- 11:15 Pamela Tejada-Tejada (INTEC, Rep. Dom.). *First experiences in utilizing agricultural residues at INTEC's innovation unit for bioplastics and biomaterials.*
- 11:30 Marlen Ramil (UNAPEC, Rep. Dom.). *Development of bricking technologies for cocoa husk for use as a renewable energy source and animal feed.*
- 12:00 Rafik Balti, Yusmel González Hernández (CentraleSupélec, Université Paris Saclay, France). *Experiences in agricultural waste valorization: combining experimental work and mathematical modeling.*
- 12:15 Yessica Castro (UFHEC, Rep. Dom.). *Creation of a Smart Laboratory Prototype for Agriculture - Smart Rural Living Lab - in rural areas of the Dominican Republic (AgLabRD).*
- 12:30 Eriberto Tejada (UFHEC, Rep. Dom.). *Bioprocesses applied to obtain biofertilizers from organic coffee waste in vegetable production.*
- 12:45 Preguntas y comentarios.
- 13:00 Almuerzo.
Lugar: sala Julio Ravelo.

SESIÓN DE PROYECTOS

Lugar: sala Julio Ravelo.

Presidentes de sesión: Yessica Castro, Yusmel González Hernández.

- 13:45 Sesión de trabajo por equipos proyectos.
- 15:00 Cierre del evento - Palabras de despedida:
Carlos Sanlley, director de Investigaciones de INTEC.
Alvin Rodríguez, coordinador Red Inter-Universitaria de Investigaciones en Sargazo República Dominicana.
Sarra Gaspard, Université des Antilles, en representación de la delegación francesa.



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Modular technology for the production of a standardized raw material from sargassum for industrial applications

Sargassum (SG) has been considered a residue, but it may be converted into a raw material by proper procedures. Attempts to use SG as raw material have been done mainly at local scale. Alternatives for fresh SG processing have been developed in the Caribbean for producing biogas, construction blocks or re-usable materials for hotels, but the amount of SG that has been processed by these alternatives were limited. Dried SG powder, with defined quality specifications for commercialization has not been developed previously. There is a need for the demonstration of the proof-of-concept, at lab and field scales, which means that SG may be transformed into a Standardized Raw Material (SRM) for its use as starting material for industrial uses, under Good Manufacturing Practices, through the development of a scalable technology for the production of a SRM for the Caribbean region that will contribute to enable SG processing plants through technology transfer. Once the collecting operation has been solved, the problem will be to avoid the environmental impact provoked by the SG decomposition, not only in terms of gas emissions contributing to global warming but risks associated with health issues and soil alterations. A Business Plan is proposed, leading to the construction and operation

of at least four (4) SG Processing Plants (SPP) in Dominican Republic and other Caribbean countries affected by SG, once the proof of concept has been reached. Attracting capital from the investors (public and private) according to the Net Present Value (NPV) and the Internal Rate of Return (IRR) will be the main goal of the Project. Moreover, plant design will allow processing of agrifood biowastes in times when there is no SG (November-April), which adds an additional value to the SPP.

Keywords:

sargassum processing plant • standardized operational procedures • sargassum raw material • modular technology • sargassum biorefinery • technology transfer.



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Prevention and perspectives of valorization of sargassum in the french West Indies

In recent years, Sargassum seaweed has become a major issue for numerous countries in the Caribbean Sea. Its massive beaching has significant repercussions on public health, economics, and the environment. Despite its unpredictable nature, this phenomenon appears to be intensifying over time. The French Agency for Ecological Transition (ADEME) is heavily involved in addressing this problem by contributing to knowledge acquisition about these algae through numerous studies on their composition and collection methods, by developing crisis management strategies (storage facilities with leachate treatment) and producing protocols for exposed workers. However, the main challenge we face today is integrating Sargassum into a circular economy to avoid leaving it as mere expensive waste to manage. For this reason, ADEME supports various Sargassum valorization projects. These initiatives include: the methanization of Sargassum for biogas production and utilization of the digestate as fertilizer, the creation of composting sites capable of receiving Sargassum, the production of biochar and activated carbon through pyrolysis using solar microwaves, the eco-material manufacturing for construction, and in-depth studies into potential ways of extracting molecules of interest. These diverse initiatives aim to transform the Sargassum problem

into socio-economic opportunities for local communities without excluding the urge to protect the environment by building appropriate storage facilities.

Keywords:

prevention • methanization • pyrolysis • construction • circular economy



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Valorization of Sargassum algae: towards bio-based materials for environmental and economic sustainability

Since 2010, the rapid growth of Sargassum spp. Algae has become a major environmental concern in the Caribbean region. These algae have far-reaching environmental, economic, and health impacts. The vast quantities of stranded seaweed, coupled with their high salt and heavy metal content (e.g., arsenic, cadmium, lead), significantly hinder their valorization. This situation underscores the urgent need to develop innovative solutions for adding value to Sargassum biomass. One promising avenue is the transformation of these algae into bio-based materials. In this study, twin-screw extrusion was employed as the initial processing step for Sargassum algae. This versatile and modular technique enables the combination of multiple biomass fractionation operations into a single, continuous process. Specifically, it was used to reduce the salt content and remove most heavy metals while simultaneously producing a homogeneous, granular material suitable for material production. The study examined the effects of temperature and solvent type (e.g., water, acids) on the extrusion process. Two different technologies were then applied to shape the resulting material. First, thermocompression coupled with rapid cooling was used to fabricate 100% Sargassum-based

binderless particleboards. A detailed parametric study was conducted to assess the influence of factors such as pressure, compression time, temperature, and particle size on the final product properties. Second, injection molding was explored by combining Sargassum with PHB (Polyhydroxybutyrate), a bio-based thermoplastic. This approach enables continuous processing of large quantities of material and allows the production of complex shapes in high volumes. The mechanical properties of all the bio-based materials were evaluated through bending tests, and their water resistance was assessed using immersion tests and contact angle measurements. The findings indicate that bio-based materials derived from Sargassum present a promising and innovative solution for addressing both the environmental challenges and the material recovery potential associated with Sargassum seaweed blooms.

Keywords:

bio-based material • twin-screw extrusion • biomass fractionation • sargassum • continuous process



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Giovanni Desiderio¹ • Yessica A. Castro²**

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Effect of unconventional pretreatments on the morphology and biochemical methane potential of *Sargassum* spp

Sargassum spp. Blooms disrupt Caribbean coastal ecology, economy, and community health. Methane production is a promising solution for valorizing this macroalgae and cutting macroalgae management costs. However, pretreatment is essential to address low efficiency due to the presence of lignocellulose and calcite in the biomass morphology. In this work we evaluate the effects of non-chemically driven pretreatments (i.e. microwave, sonication, and water wash at 40°C) on the morphology and biochemical methane potential (BMP) of the *Sargassum* spp biomass. The morphological properties of the biomass were determined using X-ray diffractometry (XRD), Fourier-transform infrared spectroscopy (FT-IR), Scanning Electron Microscopy (SEM). The BMP was evaluated using an automated potential test system (AMPTS® II). After pretreatment, there was a notable decrease in the presence of calcium carbonate (CaCO₃), which is primarily associated with bryozoa exoskeletons deposited on *Sargassum* spp. The yield of the untreated biomass was equal to 72.25 NmL/g VS. The microwave pretreatment induced a 26.06% reduction in yield, primarily due to the formation of recalcitrant components. Sonication pretreatment led to a 5.28% increase in yield, attributed to the cellular-level

alterations prompted by cavitation phenomena. In contrast, the water wash pretreatment demonstrated a significant yield enhancement of 20.76% compared to untreated biomass. The low temperature hydrothermal pretreatment represents a safe and energy-efficient method with potential to enhance the efficiency of biomethane production from *Sargassum* biomass through anaerobic digestion.

Keywords:

Bryozoa • anaerobic digestion • seaweed • microwave • sonication • water wash • pretreatment



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Preparation of carbon materials, biochars and activated carbon from Caribbean agricultural biomass and sargassum seaweeds for different applications: water treatment, pesticide sequestration and energy storage

This study explores the preparation of carbon materials, including biochars and activated carbons, using both traditional and unconventional precursors. While bituminous coal, coke, and coconut shells have historically been employed, this work focuses on agricultural and agro-pharmaceutical residues such as bagasse, olive stones, rice husk, coir pith, and sargassum. Additionally, biomass from guava seeds, winged pea pods, boucoussou pea pods, Campeche wood, and galbas—by-products from pharmaceutical activities—were investigated as sustainable feedstocks.

These abundant and cost-effective materials, rich in lignin, cellulose, hemicellulose, lipids, fibers, and proteins, were converted into biochars and activated carbons through pyrolysis. The resulting carbon materials demonstrated diverse physico-chemical properties suited for applications in water treatment, pesticide sequestration in soils, and energy storage. Activated carbon derived from sugarcane bagasse, vetiver roots, galbas, and sargassum effectively treated contaminated water containing chlorinated pesticides, dyes, pharmaceuticals, and metals.

Additionally, carbon electrodes fabricated from sargassum and agro-pharmaceutical biomass exhibited promising electrochemical properties for supercapacitors, which offer rapid energy storage and discharge with minimal performance degradation.

These findings underscore the potential of biomass-derived carbon materials as versatile and sustainable solutions for environmental remediation and energy storage, contributing to the advancement of green technologies.

Keywords:

biomass • sargassum • pyrolysis • activated carbon • biochar • water treatment • energy storage • pesticide sequestration



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Valorization of sargassum biomass for the fabrication of porous carbon electrodes and implementation in 3d-printed capacitive deionization cells

As freshwater scarcity becomes a pressing global issue, desalination technologies are gaining increasing attention. Among these, capacitive deionization (CDI) is an emerging method with significant advantages over traditional processes. Simultaneously, the invasive proliferation of Sargassum seaweed along the Caribbean coastline has led to environmental and economic challenges. This research focuses on valorizing Sargassum as a raw material for producing porous carbon electrodes for water desalination using CDI. Two types of carbon materials, Sargassum-derived biochar (SBC) and activated carbon (SAC), were synthesized and characterized. SAC, produced with an impregnation mass ratio of 3:1 ($\text{H}_3\text{PO}_4/\text{Sargassum}$), demonstrated high specific surface areas of $1695 \text{ m}^2\cdot\text{g}^{-1}$ at $600 \text{ }^\circ\text{C}$ and $1761 \text{ m}^2\cdot\text{g}^{-1}$ at $700 \text{ }^\circ\text{C}$. SBC achieved a maximum specific surface area of $960 \text{ m}^2\cdot\text{g}^{-1}$ at $800 \text{ }^\circ\text{C}$. Electrodes were fabricated using polyvinylidene fluoride (PVDF) and sodium alginate as binders. Electrochemical evaluations, including cyclic voltammetry (CV) and galvanostatic charge/discharge (GCD) analyses, demonstrated that the SAC600 3/1 electrode delivered a capacitance of $48 \text{ F}\cdot\text{g}^{-1}$, while SBC800 reached $43 \text{ F}\cdot\text{g}^{-1}$. Although alginate-based electrodes exhibited lower

mechanical stability, their potential as green binders was validated.

Building on this research, a novel scalable 3D-printed CDI cell was developed using the Sargassum-derived electrodes. This work highlights the advantages of 3D printing in the water desalination field due to its precision, cost-effectiveness, and versatility. The performance of electrodes with both PVDF and alginate binders was evaluated in terms of their electrochemical and desalination properties. The SAC600 3/1 electrode prepared with PVDF showed a salt adsorption capacity of $2.06 \text{ mg}\cdot\text{g}^{-1}$, while the SBC800 with alginate reached $1.30 \text{ mg}\cdot\text{g}^{-1}$. These results underscore the potential of Sargassum-derived porous carbon materials and 3D printing technology for improving CDI applications, paving the way for more sustainable desalination processes.

Keywords:

sargassum • capacitive deionization • water desalination • porous carbon electrodes • 3D printing • green binders



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Use of sic and biochar as microwave absorbers during the pyrolysis of sargassum in a single-mode microwave cavity

Sargassum is a macro-algae belonging to the third generation of biofuel production, which has proliferated significantly in recent years on the coasts of the Dominican Republic and other Caribbean countries (Liranzo et al., 2021). This macroalgae has shown promising potential for the production of fuel by pyrolytic means (Lee et al., 2020). The use of sargassum by microwave pyrolysis is therefore an interesting and promising option. Microwave pyrolysis is capable of improving the physical or chemical properties of the pyrolysis products obtained, thanks to an unconventional heating mechanism that increases the temperature from the inside to the outside of the biomass. However, the properties of the pyrolytic products will naturally be highly dependent on the composition of the biomass and the operating conditions used. Depending on the starting biomass, heating sometimes requires microwave absorbers, as plants are more or less receptive to electromagnetic energy.

Batch pyrolysis of sargassum was carried out in a single-mode microwave cavity using silicon carbide (SiC) and, for the first time, sargassum biochar as microwave absorbers. The microwave absorbers facilitate the initiation and intensification of the pyrolysis process. To our knowledge, the use of sargassum biochar in microwave pyrolysis

of sargassum has never been studied. This process has resulted in the production of biochar, bio-oils and gases, which have been fully characterized. The composition of the pyrolytic oils shows the presence of at least 30 different compounds, which have been grouped into families. A few molecules of interest are present, and the main families are amines, carboxylic acids and ketones. The gas produced is rich in methane, CO and H₂. The coal has a specific surface area of around 200 to 330 m² /g without any particular activation, which only needs to be improved. The use of sargassum biochar as a microwave absorber is effective, and advantageous compared with SiC because it is produced in situ and therefore requires no additional separation.

Keywords:

sargassum • pyrolysis • microwaves • bio-oils • biochar • biogas



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Obtaining biofilters for water treatment from sargassum combined with other biomass sources

The massive deposition of sargassum on the coasts and beaches of the Dominican Republic has become a serious challenge, negatively impacting tourism, a key sector of the country's economy, as well as the health of coastal ecosystems. This phenomenon not only affects the aesthetics of the beaches, which are a major tourist attraction, but also has repercussions on marine biodiversity and fishing activities. Although multiple potential applications for sargassum have been identified, only a few have been implemented in practice, largely due to the difficulties and high costs associated with collecting this seaweed, both at sea, where it would be optimal, and on the coasts and beaches.

This project proposes to develop biofilters using sargassum and other biomass sources as a sustainable alternative for managing and treating the sargassum that reaches the Dominican Republic's shores. By using biofilters to treat wastewater generated by small and medium-sized enterprises, a significant reduction in the pollutant load from these industries could be achieved, in addition to promoting the reuse of water for various applications. This would not only help improve water quality in the environment but also represent an important step

toward sustainability and environmental conservation.

As part of the project, laboratory-scale tests will be conducted to evaluate three biofilter prototypes that will combine sargassum with other biomass sources. Special attention will be given to the biomass collection and preparation processes, including the necessary grinding and compaction to maximize filtration effectiveness. These stages are crucial, as they will determine the filtering capacity of the prototypes in treating wastewater from small-scale agro-industrial businesses. Through this approach, the goal is not only to mitigate the impact of sargassum but also to promote more responsible environmental management practices in the country's business sector.

Keywords:

biofilter • sargassum • biomass • wastewater treatment • environmental management



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Harnessing invasive seaweed: the Bluetech revolution transforming the Caribbean's future

The recurring invasion of sargassum seaweed in the Caribbean presents a major environmental, economic, and public health challenge. However, it also offers a unique opportunity for innovation. SOS Carbon and its spin-off, SOS Biotech are transforming this crisis into a solution for climate action and sustainable development.

SOS Carbon developed the patented Littoral Collection Module (LCM), a near-shore harvesting system that collects up to 10 tons of sargassum per hour, preventing landfall and reducing methane emissions, coastal erosion, and ecological damage. This system is currently working in four countries (Antigua, Dominican Republic, Mexico and Puerto Rico), generating employment for local fishermen and supplying raw seaweed material for biotechnology.

In 2024, SOS Biotech emerged to expand this impact by converting the collected seaweed into scalable, high-value bioproducts. Its agricultural product line is already commercially available in the Dominican Republic and undergoing market trials in the United States, Spain, and Colombia. The company currently commercializes three products: Marine Symbiotic, an organic-certified biostimulant that boosts crop yield and resilience while reducing synthetic fertilizer use; Marine Blossom, a natural preservative that prolongs the freshness of cut flowers and home plants; and Marine Soil, a substrate designed for hydroponics.

Building on this foundation, SOS Biotech is preparing to launch four new biotechnological innovations: Alginaqua, a bio-based polymer derived from alginate and fucoidan for use in biomaterials; Atabey's Nectar, a cosmeceutical line with antioxidant and depigmenting; Chlorovita, a bioactive pigment targeting the nutraceutical and textile sectors; and Escumaqua, a biosurfactant for use in detergents and cosmetics.

These initiatives are part of a broader vision to establish a circular bioeconomy around invasive seaweed, where waste is redefined as raw material and coastal communities are empowered through innovation. Their work has gained recognition from global institutions including MIT Solve, The Rockefeller Foundation, the UN World Tourism Organization, ITC, and The Economist, reinforcing the potential of the Caribbean to emerge as a global BlueHub. The transformation of sargassum from environmental threat to economic is already happening and offers a replicable model for other coastal regions facing similar challenges.

Keywords:

sargassum • seaweed • BlueTech • blue economy • biostimulants • sustainable agriculture • marine biotechnology • ocean conservation • formal employment



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Sargassum liquid bio-fertilizer: production, characterization and evaluation in organic banana culture

The massive influxes of sargassum to the Caribbean have impacted the environment, the economy and society of our region. However, the use of this algal biomass can be an opportunity for our countries. Among the sectors that can benefit from sargassum products is agriculture. The objective of this work is to obtain and characterize a sargassum liquid bio-fertilizer (Biol) and evaluate it in organic banana cultivation in the Dominican Republic. The biol was obtained by fermentation in the presence of yeasts and lactic bacteria for a period of 30 days. Regarding its composition of macronutrients, it contains 0.18% nitrogen, 0.16% phosphorus, 0.31% potassium, 0.79% calcium and 1.04% magnesium, all values fall within the reported ranges by other authors for this type of product. The protein content is 1.1%, carbohydrates 2.3% and lipids less than 1%. The presence of bacteria, actinomycetes and beneficial fungi for soils was verified. Knowing that sargassum accumulates heavy metals, the presence of these in the biol was evaluated. Traces of arsenic, copper, iron, manganese and zinc were found, all in values below the limits allowed for agricultural soil use. The presence of fifteen other metals was analyzed by inductively coupled plasma with optical emission spectrometry but

were not detected within the limits established for this technique. The liquid fertilizer was evaluated for two months in organic banana cultivation on three family farms of the Banelino Association, Dominican Republic. Crops treated with a conventional biol produced by Banelino with our sargassum biol were compared, demonstrating that there were no significant differences in terms of leaf development and the vegetative state of black Sigatoka, which remained well below the warning signs of the disease caused by this pest. However, the diameter growth of the banana plant was significantly higher between 12 and 47 % when using the sargassum biol over the conventional Banelino's biol. In this way, it can be concluded that obtaining a liquid sargassum biofertilizer is a viable alternative for the use of brown algae.

Keywords:
sargassum • liquid fertilizer • organic banana



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Evaluation of the physicochemical, microbiological, and ecotoxicological properties of two sargassum-based liquid biofertilizers for industrial *Solanum lycopersicum* production

Intensive agricultural practices to meet the demand for food have increased the use of fertilizers and pesticides, negatively impacting the environment and human health. Sustainable agriculture proposes the use of biofertilizers as an alternative. In the Dominican Republic, the sargassum that arrives on its coasts represents an opportunity to develop biofertilizers, leveraging its physicochemical properties and contributing to managing this waste. This research aims to develop two sargassum-based liquid biofertilizers for application in industrial tomato crops. To this end, sargassum was collected in Punta Cana and processed as raw material at the bioproducts plant of the BANELINO association to produce two biofertilizers at a scale of 1000 liters. The sargassum and the obtained biofertilizers were characterized in physicochemical, microbiological, and ecotoxicological terms through tests with *Lactuca sativa*. Analysis of the sargassum revealed the presence of heavy metals, with arsenic concentrations exceeding reference limits. In the biofertilizers, arsenic was detected only in one formulation and within the permissible range; the rest of the metals were at acceptable levels for soils. The formulations with sargassum showed higher

contents of Ca, Mg, K, and Na compared to the conventional biofertilizer, although lower than the traditional chemical fertilizer used for tomatoes. Fungi and bacteria were quantified in the biofertilizers, with no detection of actinomycetes. Ecotoxicological tests indicated that the product should be diluted to avoid adverse effects on plants. Therefore, sargassum-based liquid biofertilizers present properties that make them potentially useful in industrial tomato production. However, it is essential to consider their dilution to minimize possible ecotoxicological effects. The valorization of sargassum as a biofertilizer is a viable strategy that can contribute to sustainable agriculture and the management of massive sargassum influxes in the Dominican Republic.

Keywords:
biofertilizers • sargassum • industrial tomato • sustainable agriculture • heavy metals



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Sargassum-based fertilizers: Obtaining and evaluating organic fertilizer based on Sargassum in agricultural crops

Sargassum is a seaweed that has become an environmental problem in the Caribbean region. However, it has also been studied for its potential as organic fertilizers. Taking advantage of this biomass as organic fertilizers can be beneficial for both the environment and the agricultural industry. This project proposes the creation of organic fertilizers based on Sargassum, specifically for the collection, treatment, and transformation of sargassum into fertilizers. For this purpose, Industry 4.0 technologies will be used, such as robotics, sensors, the Internet and data management systems. These technologies will allow the automation of production processes, control of product quality and monitoring of the status of machinery in real time. In addition, an economic and environmental feasibility analysis of the project will be carried out. The mineral content in algae is high, about 36% of dry weight, within the macrominerals are sodium, calcium, potassium, chlorine, sulfur and phosphorus and more minerals which are essential for the natural crops of our country. The benefits of sargassum for the production of fertilizers are the following: rich in nutrients such as nitrogen, phosphorus and potassium, which are essential for the growth of plants. These nutrients can be extracted from sargassum and used in the production of organic

fertilizers, which will benefit agriculture and the impact they have on the environment. During the test phase, a notable change in the greenness and growth of these could be observed.

Keywords:

sargassum • organic fertilizer • automation • economic and environmental feasibility







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Biorefinery approach for the valorization of agricultural residues

The importance of the circular economy has become evident. In the transition to such a circular economy, chemicals and materials produced from biomass will play a key role. A lot of biomass resources can be used, from agriculture, forestry, fishery, or aquaculture, as well as from industrial side-streams, food waste, or organic municipal waste. A successful bio-based economy requires the development of biorefineries, defined as “a sustainable processing of biomass into a spectrum of marketable products (feed, food, materials, chemicals) and energy (fuels, heat, power).” Indeed, replacing fossil resources with renewable ones is not enough; economic and environmental impacts must also be considered.

The technological pathway from biomass to products is usually divided into three blocks. Firstly, the pretreatment consists of cracking and fractionating the biomass to obtain platform products, which are the key intermediates between raw materials (biomass) and final products. The second block is the functionalization of the platform products, carried out by chemical or biochemical transformations. Finally, downstream processes are required to recover the target added-value products with a given purity and concentration.

Even if most of the processes that can be used are considered mature and already

largely implemented in the industry, the development of biorefineries faces challenges due to the complexity of the compositions of the fluids to be treated, together with more demanding constraints to satisfy.

After introducing biorefineries in general, the research activities in LGC will be presented. An example of the biorefinery of an agricultural waste, wheat bran, will be discussed.

Keywords:

circular economy • biorefinery • biomass • sustainability • platform products



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The Phytobokaz Laboratory and the concept of phytosymbiosis

The Phytobokaz Laboratory does more than produce natural health products; it is part of a pioneering industrial model called “phytosymbiosis.” This concept emphasizes agriculture in harmony with nature, incorporating agroecology and agroforestry. Its agricultural practices promote soil health and biodiversity by transforming waste into resources. For instance, indigo residues are repurposed as biostimulants, while fragmented ramial wood nourishes soil fungi to support microbial life. Galba and indigo crops are cultivated with an integrated approach, utilizing bees for pollination and bats for fruit harvesting. These sustainable methods exploit natural resources while preserving ecological balance. The principle merges modern science with ancestral knowledge to deliver innovative, environmentally friendly health solutions. It aims to highlight Caribbean medicinal plants, dye plants, and oil plants, preserving traditions while adapting

to contemporary scientific standards. This approach fosters a sustainable development model for the natural health products industry, ensuring mastery of both industrial and agricultural techniques.

Keywords:

phytosymbiosis • sustainability • organic agriculture



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Production of platform molecules from cellulosic and lignocellulosic materials by fermentation

In the framework of biorefineries the development of bioprocesses to alternatively produce commodity chemical platforms based on renewable feedstocks is gaining more and more interest.

Among these platform molecules of interest succinic acid and butanediol are both potentially very relevant since they can be converted to a range of industrial chemicals with very large markets such as biodegradable deicing compounds, solvents, pharmaceutical products, bio-plastics or fuel additives. Their production from renewable feedstocks started to gain attention due to the increasing oil prices, dwindling oil supplies, and most importantly, it may meet the requirements of bioeconomy.

Many microbial strains are able to convert sugars extracted from biomass and specifically agricultural wastes in molecules of interest. The challenge of producing them biologically at commercial scale implies to design optimized bioprocess in order to justify the economic feasibility.

In this work we developed fermentation processes using different strains of the bacteria *Klebsiella oxytoca* which is a fast growing strain with low nutrient requirements able to accumulate these 2 products at high concentrations according to the fermentation conditions.

To optimize the process, we used 2 strategies: production of butanediol from cassava starch by combining enzymatic hydrolysis and fed-batch aerobic fermentation and production of succinic acid from cellulose using a modified strain transformed with an endocellulase

In both cases the optimization of the fermentation step resulted in an increase of productivity. Moreover, enzymatic hydrolysis and biotransformation could be done in one single step intensifying the process.

Keywords:

bioprocesses • succinic acid • butanediol • renewable feedstocks • fermentation



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Potential of biorefineries from agricultural residues in Dominican Republic

There is a need to apply the biorefinery concept to the agricultural and forestry production systems, where a large amount of residues and/or by-products are generated. In tropical and subtropical countries, these residues are decomposed at a higher rate than in temperate countries due to higher temperatures and humidity. Our group has explored which possibilities might exist in the Dominican Republic to develop a value chain to convert residues and/or by-products in value-added products instead of deposition or incineration, considering coconut, pineapple, avocado, soursop, coffee, cocoa and mango.

There is a potential for the settlement of a multi-source biorefinery in the Dominican Republic, with more than 2 million tons of

tropical crop residues as raw materials for the production of value-added products. Also, there is the possibility to consider a two-season biorefinery, which might include tropical fruits residues (November to April), and *Sargassum* (season May - October), although more research is needed to implement such a plant.

Keywords:

biorefinery • agricultural residues • biodiesel • polyphenols • bioadsorbents • food products • cosmetics



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Use of twin-screw extrusion technology for the biorefining of agro-resources

Biomass, whether of plant or animal origin, represents a significant source of alternative molecules to fossil resources for the chemical, materials, and energy sectors. Its diversity in terms of origin, structure and composition (carbohydrates, lipids, cell wall components, secondary metabolites, etc.) requires the development of new biorefineries to be processed and valorized. These biorefineries must be dimensioned according to the collection areas and must include technologies that are adapted to the variability of the raw materials, their physical structure and the richness of their constituents. Among these technologies, twin-screw extrusion stands out as a particularly promising solution for biomass valorization. It offers numerous possibilities for implementing biomass fractionation through the combination of mechanical, thermal, chemical, and enzymatic actions, which can be performed in a single compact and continuous piece of equipment, or integrated into more complex systems. The configuration of the barrel, screw profile, and operating conditions—such as temperature, reagent and solvent concentrations, flow rates, and screw speed—allow the intensification of successive fractionation operations. This presentation aims to provide a brief overview of the technology's functionality, highlight various application fields, and present several examples

of twin-screw fractionation, including: the production of plant fibers, the pretreatment of lignocellulosic materials, liquid-solid extraction of valuable fractions, and the plasticization of biopolymers for the production of agro-materials.

Keywords:

biomass • biorefinery • Twin-screw extrusion • fractionation • valorization



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First experiences in utilizing agricultural residues at INTEC's innovation unit for bioplastics and biomaterials

This study presents the outcomes of the project Creation of a Development Unit for Bioplastics and Biomaterials at the Instituto Tecnológico de Santo Domingo (INTEC), in collaboration with the Circular Caribbean: Preventing Plastic Waste in the Caribbean Sea initiative and funded by the German Development Cooperation (GIZ). The unit is dedicated to transforming agroindustrial residues and sargassum into sustainable bioplastics and biomaterials, marking a pioneering step for INTEC and the Dominican Republic. Over six months, interdisciplinary teams from Biochemistry, Biotechnology, and Industrial Engineering, alongside industry collaborators, conducted four pilot studies utilizing coconut fiber, cassava starch, rice husk, and sargassum.

Key findings include the enhancement of tensile strength in bioplastics produced from coconut fibers treated with sodium hydroxide and starch, the development of rice husk-based boards with improved physical properties through direct and indirect heating techniques, and the optimization of sargassum-based agglomerated boards via binder selection and pressing conditions. Additionally, alginate extraction methods were assessed, with FTIR spectra confirming its viability, and sodium alginate-derived films exhibited mechanical

properties comparable to commercial polymers.

These results highlight INTEC's capacity to spearhead biomaterials research, establishing a foundation for future innovations in the Dominican Republic and the Caribbean. The project reinforces INTEC's commitment to advancing technological solutions for environmental sustainability

Keywords:

sargassum • agricultural residues • bioplastics • biomaterials • alginate • coconut fiber • rice husk • cassava starch



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Development of bricking technologies for cocoa husk for use as a renewable energy source and animal feed

The production of 77,000 tons of cocoa beans in the Dominican Republic generates 770,000 tons of wet husk waste, which constitutes an important underexploited development source. This would allow for diversification of the cocoa industry, bringing about economic, social, and environmental benefits for the country. The projected growth in cocoa production in the Dominican Republic, from the 77,000 tons produced in 2020 to 150,000 tons over the next 10 years, will lead to an increase in harvest waste, particularly wet husk, to approximately 1,500,000 tons (each ton of dry seed represents around 10 tons of husk). This environmental issue cannot be resolved solely through current applications such as compost and animal feed, as current demand cannot accommodate quantities of that scale. If these residues are not utilized in a diversified manner, they will incur additional costs for proper disposal to prevent them from becoming a health and environmental hazard. There is extensive experience in the pelletization of various materials and harvest residues, such as pine, hardwoods, wheat straw, rice straw, sugarcane bagasse, and soybean harvest waste, among others. However, there are no reports of pelletizing cocoa harvest waste, making it crucial for the Dominican

Republic to have efficient technologies that enable the pelletization of harvest residues for preservation and transformation into a product that could be directly used as fuel in biomass boilers for heat and energy generation, or converted into high-value products such as animal feed. This work develops a pilot-scale technology that is economically viable for obtaining pellets and briquettes from cocoa husk, for use as fuel and the development of high-value-added products. The morphological and physicochemical characteristics of cocoa husk are determined for pelletization and briquetting, to evaluate it as a renewable fuel for biomass boilers and as a raw material for developing high-value-added products, primarily animal feed.

Keywords:

pelletization • cocoa • biomass • high-value products • renewable fuel



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Experiences in bioresources valorization: combining experimental work and mathematical modeling

This presentation will outline our experiences in the valorization of renewable resources and agricultural co-products focusing on a combined approach that integrates experimental bioprocesses and mathematical modeling. First, we will present a study on the extraction of protein and bioactive compounds from red macroalgae using various innovative pretreatment strategies. Among all the tested techniques, ultrasonication for 1 h at 20 kHz, 200 W and 90% of amplitude could be a promising method to improve cell disruption not only for proteins but also to recover a wider range of high-value compounds such as phenolic compounds, flavonoids, and carbohydrates. In addition, the bioactivity analysis revealed high antioxidant activity, including free radical scavenging activity, reducing power, and iron-chelating capacity. Overall, the study highlighted the potential of ultrasonication treatment in efficiently disrupting the cell walls of macroalgae and extracting important molecules of interest, especially proteins, thus offering promising opportunities for further research and application in various fields. Then, these macroalgal proteins were enzymatically digested to produce several protein hydrolysates enriched in bioactive peptides. Peptidomic analysis identified a significant number of peptides predicted to be potent inhibitors

of angiotensin-converting enzyme ($IC_{50} < 100 \mu\text{M}$) and dipeptidyl peptidase-IV ($IC_{50} < 2 \text{ mM}$). Also, we will present the main results of our project concerning the biotransformation of agro-industrial by-products by solid-state fermentation and the optimization of bioprocess conditions in order to obtain fermented foods enriched with biomolecules of interest. Finally, we will discuss how mathematical models have been applied to improve process understanding and optimization. In the valorization of organic waste through biological methods, modeling serves as a crucial tool for enhancing process understanding and optimization. This presentation will highlight several bioprocess modeling approaches developed by our team, including *Saccharomyces cerevisiae* for ethanol and biomass production, *Escherichia coli* for protein synthesis, and CHO cells for monoclonal antibody production. These models provide valuable insights for improving efficiency and scalability in biotechnological applications.

Keywords:
macroalgae • agro-byproducts • enzymatic hydrolysis • fermentation • modeling



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Bioprocesses applied to obtain biofertilizers from organic coffee waste in vegetable production

Conventional agriculture, heavily reliant on inorganic fertilizers and pesticides, poses significant environmental and public health risks. In contrast, organic farming promotes sustainability through natural processes. Coffee, with an annual global production exceeding 7 million tons, presents an opportunity for the sustainable use of its by-products in agricultural production. This study aims to optimize the production of biofertilizers from organic coffee residues as an alternative for vegetable cultivation. The experimental trial will take place at the experimental campus of the Federico Henríquez y Carvajal University (UFHEC) in Escañón Province. Coffee pulp and mucilage, collected from the coffee processing stage, will be subjected to fermentation in a biodigester, producing biofertilizers for use in vegetable production. A randomized complete block design with a factorial arrangement will be applied, evaluating coffee pulp biofertilizer and mucilage biofertilizer, each with four treatments and three replications, and an application frequency of every five days. Data will be analyzed through analysis of variance (ANOVA) and statistical tests. The findings of this research will generate innovative solutions for waste management in agriculture, reducing production costs and

promoting sustainability and profitability in coffee-growing regions. This study will contribute to advancing sustainable agricultural practices by integrating organic waste valorization into crop production.

Keywords:

biofertilizers • coffee residues • organic farming • sustainable agriculture • waste management

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FOTOGRAMA DEL EVENTO Y DE LAS VISITAS



En los talleres de AlgeaNova, Punta Cana. Malla de las redes de contención de sargazo.



Nueva embarcación de AlgeaNova para la colecta de sargazo, CapCana.



En los campos de coco del Consorcio de Cítricos Dominicanos, Grupo RICA.



Variedad de coco enano de alta productividad. Consorcio de Cítricos Dominicanos, Grupo RICA.



Brigitte Veyne, consejera de colaboración y Acción Cultural de la Embajada de Francia en la República Dominicana.



Equipo franco-dominicano de la Conferencia Valorización de Residuos Agrícolas y Sargazo.



Mesa de honor de la Conferencia. De izquierda a derecha: Yatna de León, directora de Agricultura Orgánica del Ministerio de Agricultura; Ulises Jáuregui Haza, profesor de INTEC y coordinador del Proyecto ResAgroSargazo; Rosario Aróstegui, vicerrectora de Investigación y Vinculación del INTEC; Luis Mejía, asesor en el Viceministerio de Producción Agrícola y Mercadeo de Agricultura; Brigitte Veyne, consejera de Colaboración y Acción Cultural de la Embajada de Francia en la República Dominicana y Sara Davo Boza, especialista de la Agencia Francesa para el Desarrollo en República Dominicana.



Visita al Centro de Sustentabilidad de la Fundación Grupo Punta Cana.



Unidad para los estudios de metanización de sargazo en la plataforma experimental de la Fundación Grupo Punta Cana.



Compostaje por aireación forzada en la plataforma experimental de la Fundación Grupo Punta Cana.



En la Universidad ISA, Santiago de los Caballeros.



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En el Laboratorio de Eficiencia Energética de la Pontificia Universidad Católica Madre y Maestra, Santiago de los Caballeros.



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