

APYCS 2024:AN INTERNATIONAL EXPERIENCE

S. Cannizzaro Technical High School in Catania is Italy's representative

A delegation of six Chemistry students, specifically Giulio Bonaccorso, Sonia Censabella, Francesco De Luca, Noemi Di Martino, Karola Giudice, and Cosimo Gabriel Pulvirenti, from S. Cannizzaro Technical High School in Catania, accompanied by the headmistress, Mrs. Giuseppina Montella and four teachers from the school, namely Mr. Domenico Crudo, Mr. Carmelo Messina, Mr. Gaetano Chiarenza, and Mrs. Donatella De Marco, were selected to participate in APCYS 2024 and to represent Italy at the intercontinental event. The activity involved these students in a preparation phase that engaged them throughout the school year, from the initial conceptualization to the realization and drafting stages. The students were divided into three groups and received assistance from two subject specialist teachers, a tutor teacher responsible for the management of the course and various classroom activities, and a language teacher who guided the project drafting in English and the oral presentation of the students' work.

The three projects were completed with dedication and care, involving the students in a range of classroom and laboratory activities up to a few days before the event and also engaging them throughout the summer months.

Additionally, the students participated in an intensive English language course at their educational institution, with the objective of enhancing their familiarity and proficiency in using specific terminology.

The emphasis was placed on environmental sustainability, which is vital for preserving natural capital and its responsible utilization.

The project, entitled "*Production of Pellets from Man-Made Waste: Used Vegetable Oil and Cereal Granules*," was inspired by the high flammability of waste dust. The 2015 Paris Agreement established the imperative goal of achieving zero net emissions by 2050 in order to combat global warming. The proposal put forth was the creation of a two-phase biofuel, comprising a liquid phase (biodiesel produced in the school's chemistry laboratories) and a solid phase (cereal waste), designated as 'CerOil'. This term was derived from the fusion of 'Cereal' and 'Oil'. The experimental findings indicated that the calorific value of CerOil was approximately 20% higher than that of conventional pellets and approximately half that of heating oil.

The project, entitled "*Extraction from Prickly Pear Waste as an Additive in Bio-Mortar*", was conceived as a result of an investigation into the prickly pear supply chain, to develop a tool capable of offering bio-products with a high degree of perceived naturalness. The research project examines the extraction and utilization of by-products derived from the processing of prickly pear and its fruits, with a particular emphasis on mucilage and its potential as an additive in mortars. The incorporation of mucilage facilitates moisture retention for an extended period, resulting in a slower setting process and a more uniform carbonation. The utilization of plant-based materials contributes to enhanced environmental sustainability, as they exert a reduced impact on the natural environment and human health.

The '*Production of Biogas from Citrus Waste*' project, in contrast, is based on the concept of generating biogas through the conversion of 'pomace', a by-product of the citrus industry comprising peels, pulp debris, seeds, and fruit waste, using the established anaerobic digestion process. The generation of biogas from biomass represents an effective strategy for mitigating the greenhouse effect and reducing costs. The positive attributes of the process and the cost-effectiveness of utilizing this renewable energy source were subsequently evaluated.

The three projects submitted by the school were examined and chosen by a jury of international members.

APCYS 2024, the 13th Asia Pacific Conference of Young Scientists organised by the Malaysia Young Scientists Organisation (MYSO) and the Centre for Young Scientists (Indonesia), was held from 15 to 19 September 2024.

The aim of the Conference was to promote and encourage young students to be curious about science and take up scientific research. Secondary school students from different countries presented and supported individual or maximum two-student projects in the categories of Physics, Mathematics, Computer Science, Life Science and Environmental Science.

From the initial preparation of the poster exhibition to the culminating project opening ceremony, from the project presentation poster to the oral presentation of ideas and the cultural exchange, each moment was characterised by intense engagement and activity. These experiences were further enhanced by excursions and cultural outings, which provided opportunities to gain deeper insights and appreciate the local cultural heritage. The four-day event also offered participants the opportunity to explore different cultures, to learn from the practices and initiatives proposed, and to engage in organised activities, highlighting the role of young people in promoting sustainability for a greener planet.

Malacca, formerly known as Melaka, is Malaysia's most historically significant city. It was the capital of the Malacca state and is now a UNESCO World Heritage Site. It is an ideal destination for those wishing to gain a deeper understanding of Malaysia's cultural heritage. The city's unique location along the Malacca River has resulted in the construction of numerous monuments and historical buildings. The streets are characterised by a warm and welcoming atmosphere, a quality that is reflected throughout Malaysia.

The students, accompanied by their team leaders, had the opportunity to share a unique experience, to exchange ideas and emotions, to understand and overcome their own limitations, and to broaden their understanding of diverse, distant and unfamiliar cultures.

S. Cannizzaro Technical High School was gratified to be bestowed the Special Award in Sustainability for the project "*Production of Biogas from Citrus Waste*," the Special Award in Innovation for the project "*Production of Pellets from Man-Made Waste: Used Vegetable Oil and Cereal Granules*," and the bronze medal for the project "*Extraction from Prickly Pear Waste as an Additive in Bio-Mortar*."

The event ended successfully, and everyone took home a wealth of experience and new ideas, and why not... the hope of participating in the next APCYS 2025!