Anugerah

INOVASI

NEGERI SELANGOR 2

SJKT CASTLEFIELD PUCHONG

GROUP NAME

PALMITIZER

Innovators :

1.Sai Pranaavhhsree S

2.Mozhiyaalyne Jivan

3.Nethra Gobinath

4.Jaishnavi Mageswa

5.Roshen Chandraseg

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1.0 Introduction:

The increasing volume of organic waste generated by various industries poses a serious environmental challenge. In Malaysia, the palm oil industry alone produces approximately 28 million tons of empty fruit bunches (EFB) annually, while over 57,000 tons of paper waste end up in landfills. Similarly, restaurants and food industries discard large quantities of biodegradable waste such as banana peels, eggshells, coffee grounds, and tea dust. Despite their potential value, these materials are often left unutilized, contributing to pollution and inefficient waste management. Recognizing this issue, our project seeks to repurpose these organic waste materials into a sustainable, user-friendly product that encourages home gardening and environmental awareness.

2.0 Description on Innovation

2.1 Summary of the innovation outcome

The innovation, known as Palmitizer Solution Pellets, transforms various agricultural and household organic wastes into a compact, dry, and lightweight pellet that functions both as a soil substitute and a natural fertilizer. These pellets are clean and easy to handle, making them ideal for indoor and outdoor gardening without the mess typically associated with traditional soil. Upon adding water, the pellets expand within 10 minutes and provide a balanced nutrient profile with an NPK ratio of 3:3:3. They are capable of retaining moisture for up to seven days, reducing the need for frequent watering and supporting healthy plant growth. The innovation not only reduces organic waste but also promotes sustainable living practices. Future developments include creating larger pellet formats and embedding seeds within the pellets to further simplify the planting process.

2.2 Date the innovation was developed

01 May 2024

2.3 Objective of the innovation project

This project aims to provide a sustainable solution for organic waste utilization by converting it into an innovative planting medium that supports home gardening with minimal mess and space requirements in a light weight pellet form.

2.4 Implementation process of the innovation

2.4.1 Raw Material Collection

The raw material used in the projects are Empty fruit Bunch(EFB), used A4 papers, tea dust, coffee dust, egg shell and banana skin. All the materials were collected from the hawker stalls and restaurants.

 Empty Fruit Bunch (EFB) Fiber (Oil palm)	 Used A4 paper
 Egg Shell	 Banana Peel
 Coffee Dust	 Tea Dust

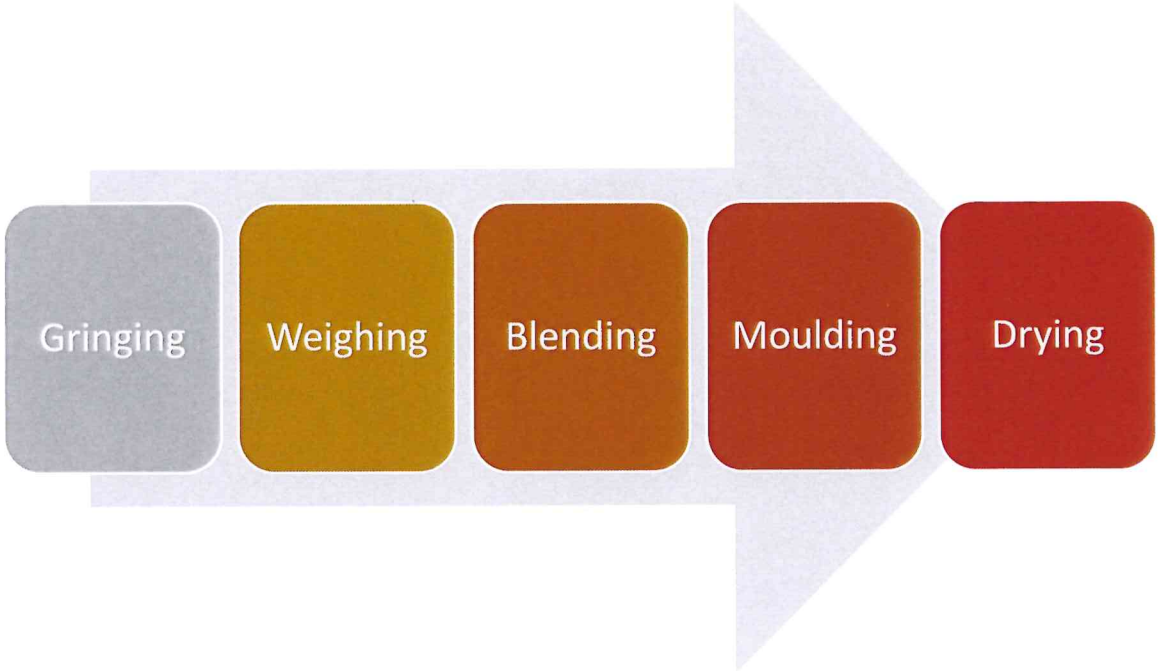
Empty Fruit Bunch fibre (EFB) – collected from Sime Darby Plantation Research Sdn Bhd
Used A4 papers- collected the from school, soaked for 1 hour and grinded into the paste
Banana peel – collected from the banana fritter seller and grinded into the paste
Egg shell – Collected from Restoran Syed and Restoran , washed, dried and grinded into powder
Tea dust – collected from Restoran Syed and Restoran Karim and dried for 2 days.
Coffee waste – collected from Tesco food court and dried for 2 days.

2.4.2 Hydraulic Press Machine

In order to do the pellet, a small scale hydraulic machine was designed with 4MT hydraulic press to squeeze the water our from the pellet and to make it as a compress pellet which in a smaller size.

Hydraulic Machine – Designed and fabricated in a hardware shop

2.5 Process of making of pellet



2.6 Results & Discussion

Organic garden soil, EFB+paper and Palmitizer were sent to a private lab called EnviChem Consults Sdn.Bhd as well as to soil & compose laboratory in Sime Darby. The results stated in Table 1 and the original results attached in Appendix I & II.

Table 1: Nutrient analysis results for the garden soil and 3 different prototypes

Description	**Sample A** Garden Soil	**Sample B** Combination of EFB+ A4 paper	**Sample C** Combination of EFB+ A4 paper + Egg shell + banana peel	**Sample D** Combination of EFB+ A4 paper + Egg shell + banana peel+ Coffee waste + tea dust
pH	5.69	6.58	6.83	7.12
Moisture,%	43.10	69.10	73.50	77.10
Nitrogen,%	0.95	1.36	2.85	3.20
Phosphorus,%	1.21	2.16	3.14	3.75
Potassium (K),%	0.54	1.32	2.53	2.91
Calcium,%	0.42	0.75	0.99	1.23

The final results that tested in Lab is attached in the Appendix 1.

2.7 Targeted Group and Scope

The target group for this product includes women at home who may find it difficult to handle heavy bags of soil or dislike the mess associated with traditional soil. It is also aimed at residents of high-rise buildings and those living in small spaces, encouraging them to grow plants using clean, dry pellets as a soil substitute. This offers greater convenience while also promoting a healthier living environment through home gardening.

3.0 Impact of the innovation on the target group

3.1 Innovative / Creative Elements

- **First Soilless Pellet Made Entirely from Waste -** A novel innovation that repurposes agricultural and household organic waste into a clean, convenient pellet form—offering a new approach to waste management and gardening.
- **Dry and Lightweight Format -** Unlike traditional soil, the pellets are dry, light, and easy to carry, making them ideal for users who prefer clean handling and need minimal storage space.

- **100% Organic and Eco-Friendly** - The product is completely natural and sustainable, supporting eco-conscious consumers and aligning with environmental goals.
- **Balanced Nutrient Composition (NPK 3:3:3) -**Delivers essential nutrients to plants, promoting healthy growth without the need for additional fertilizers.
- **Moisture Retention for Up to 7 Days -** The pellets help retain moisture longer than typical soil, reducing the frequency of watering and making plant care easier, especially for busy individuals.
- **Clean and Mess-Free Gardening -** The pellet format prevents soil spillage and clutter, especially useful for indoor or small-space gardening.
- **Affordable and Accessible -**Designed to be low-cost, the product is accessible to a wide range of users, encouraging broader adoption of sustainable gardening practices.
- **Supports Urban and Indoor Gardening -** Enables gardening in high-rise buildings and small living spaces, promoting greenery even in urban settings.
- **Promotes Sustainable Lifestyle and Environmental Awareness** - Converts waste into value-added products, educating users on sustainability while offering practical benefits.

3.2 Effectiveness of the product

3.2.1 **The final product**

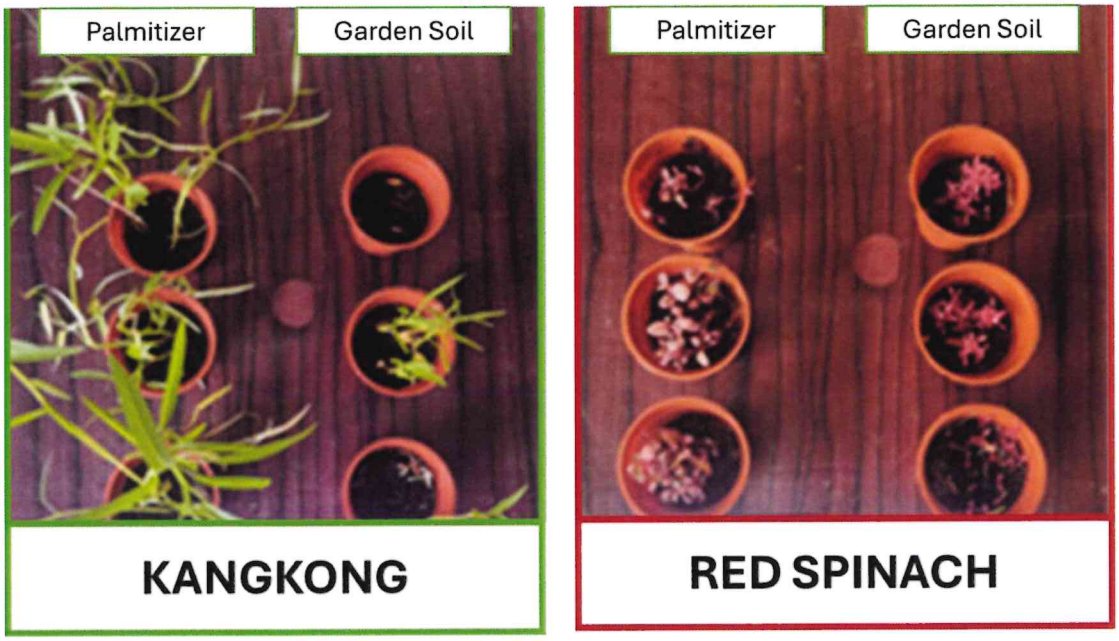
The final product looks like a big pellet with 7cm diameter and with 2cm thickness. The weight of the product is about 50g each pallet. 1kg of dry pellet can be equivalent to 8kg of garden soil.

3.2.1 **Pellet expansion**

One of the unique features of the Palmitizer Soilless Pellet is its ability to expand significantly when water is added. This feature not only adds convenience but also improves the efficiency of use.

3.2.2 **Effectiveness in the plant growth**

The Palmitizer Pellet is not just a growing medium — it also acts as a fertilizer. The presence of essential nutrients like Nitrogen (N), Phosphorus (P), and Potassium (K) in a balanced 3:3:3 ratio. This dual function enhances plant growth in several important ways. Below figure shows the growth difference between a normal garden soil and Palmitizer Soilless Pellet.



3.2.3 Significant elements in the innovation

3.2.3.1 The product has key nutrients from Organic Waste and Their Benefits to Plants (NPK)

The formula contains NPK 3:3:3 which means the fertilizer contains equal parts of Nitrogen (N), Phosphorus (P), and Potassium (K) — each at 3%. This balanced formula provides well-rounded nutrition for overall plant health and growth. Below is a breakdown of the nutrients from the material used.

- **Nitrogen (from coffee waste, banana peel, tea dust)**
  - Helps leaf growth and green color (chlorophyll)
  - Important for making proteins and plant tissue
- **Phosphorus (from banana peel, coffee and tea dust)**
  - Supports root and flower development
  - Vital for energy transfer and genetic growth (DNA/RNA)
- **Potassium (from coffee dust, banana peel, tea dust)**
  - Boosts plant health and resistance to disease
  - Regulates water use and photosynthesis
- **Magnesium (from EFB fiber, banana peel)**
  - Main part of chlorophyll for photosynthesis
  - Helps plants use sunlight and nutrients better
- **Carbon (from waste paper, EFB fiber)**
  - Builds plant structure and supports growth
  - Essential for photosynthesis and development
- **Calcium (from eggshells)**
  - Strengthens cell walls and supports cell growth
  - Helps with internal plant communication and structure
- **Other Nutrients (e.g. Sulfur, trace minerals)**
  - Found naturally in organic waste
  - Support overall plant health and productivity

3.2.3.2 Convenience

1 dry pellet is equal to 200g of soil. 1kg of palmitizer pellet is equal to 8kg. So the products are packed in various sizes for the convenience of the customer.

3.2.3.3 Cost

Cost per pellet: **RM0.20**
Selling Price/pellet: **RM0.50**

Selling Price/20 pellets bag: **RM10.00**
Selling price/40 pellets bag: **RM20.00**

3.2.4 Contribution to the organization/National agenda

The innovation of Palmitizer Soilless Pellet is more than just a gardening product — it is a sustainable solution with the power to create environmental, economic, and social impact both locally and globally. It directly supports several United Nations Sustainable Development Goals (SDGs), particularly SDG 11, SDG 12, and SDG 1.

4.0 Discussion with External Parties

4.1 Mr.Balan – Urban Farmers

Mr.Balan informed that the Nitrogen, Potassium and Phosphate which is known as NPK is the primary source for the plant to grow (Balan, n.d.). NPK helps in leaf, flower, fruit and root development (Agrocares, 2022). The tea dust, coffee waste, and banana skin act as the source of NPK and known as natural fertiliser. While EFB, paper and sugar cane are act as soil and gives carbon source for plant while egg-shell act as calcium provider to build the cell walls. He said with smaller pot the growth is limited which could see for red bayam. He said this known as microgreen which also very healthy to eat as green salad.

4.2 Sime Darby Research Sdn Bhd– Mr.Zaki (Appendix 2)

According to him EFB is one of the biggest waste which currently used as composting material and excessive EFB has been used in the plantation as fertiliser. As a whole EFB it may take longer time to decompose and he said with making it into the soil replacer is a fantastic idea. He said EFB also rich with nitrogen.

5.0 Future improvement

To do in difference sizes to cater the pots size available in the market to encourage people to plant their own organic farming.

6.0 Conclusion

The Palmitizer Soilless Pellet is a powerful example of how simple, sustainable innovations can create meaningful impact. By transforming agricultural and organic waste into a lightweight, nutrient-rich planting solution, this product supports greener lifestyles, empowers communities, and protects our environment.

It promotes urban gardening, simplifies home planting, and makes gardening accessible to all — especially women, the elderly, and those living in small spaces. At the same time, it opens up income opportunities for B40 families and underprivileged groups, helping them build a better future.

By aligning with Sustainable Development Goals (SDGs) 1, 11, and 12, the Palmitizer project not only addresses local challenges but also contributes to global efforts for a healthier, more sustainable planet.

7.0 Appendix

Prepared by:
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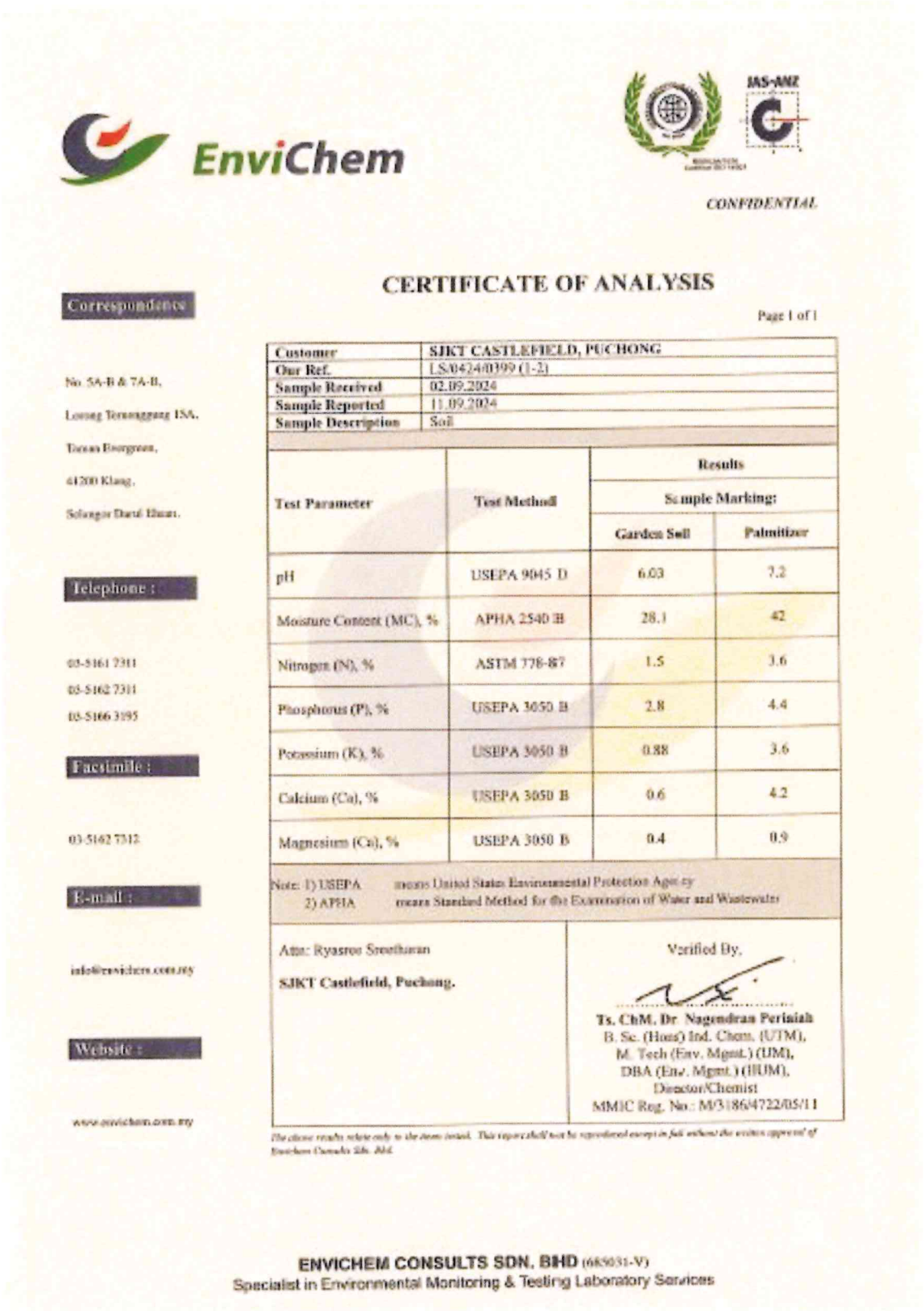
APPENDIX I



EnviChem

IAS-ANZ

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CERTIFICATE OF ANALYSIS

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Customer	**SJKT CASTLEFIELD, PUCHONG**
Our Ref.	LS/0424/0399 (1-2)
Sample Received	02.09.2024
Sample Reported	11.09.2024
Sample Description	Soil

Test Parameter	Test Method	Results	
		Sample Marking:	
		Garden Soil	Palmitizer
pH	USEPA 9045 D	6.03	7.2
Moisture Content (MC), %	APHA 2540 B	28.1	42
Nitrogen (N), %	ASTM 778-87	1.5	3.6
Phosphorus (P), %	USEPA 3050 B	2.8	4.4
Potassium (K), %	USEPA 3050 B	0.88	3.6
Calcium (Ca), %	USEPA 3050 B	0.6	4.2
Magnesium (Ca), %	USEPA 3050 B	0.4	0.9

Note: 1) USEPA means United States Environmental Protection Agency
2) APHA means Standard Method for the Examination of Water and Wastewater

Attn: Ryasree Sreetharan
SJKT Castlefield, Puchong.

Verified By,

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M. Tech (Env. Mgmt.) (UM),
DBA (Env. Mgmt.) (IIUM),
Director/Chemist
MMIC Reg. No.: M/3186/4722/05/11

APPENDIX II

(Visit to Sime Darby Plantation and Soil Lab)

WYIE WORLD YOUNG INVENTORS EXHIBITION

INCORPORATING

MYIE MALAYSIAN YOUNG INVENTORS EXHIBITION

AYIE ASIAN YOUNG INVENTORS EXHIBITION

Certificate of Award

This is to certify that

SAI PRANAAVHHSREE SREETHARAN; MOZHIYAALYNE JIVAN; ROSHEN CHANDRASEKAR; JAISHNAVI MAGEESVARAN; NETHRA GOBINATH

SEKOLAH JENIS KEBANGSAAN (TAMIL) CASTLEFIELD

MALAYSIA

has been awarded the

WYIE 2024 BEST INVENTION AWARD
– PRIMARY CATEGORY

for the invention

PALMITIZER SOILLESS PELLET

at the

8TH WORLD YOUNG INVENTORS EXHIBITION 2024

KUALA LUMPUR, MALAYSIA
16 – 17 MAY 2024

MALAYSIAN INVENTION AND DESIGN SOCIETY MINDS

Augustine Ong

Academician Emeritus Professor
Tan Sri Datuk Dr Augustine Ong Soon Hock
President
Malaysian Invention and Design Society

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SEKOLAH JENIS KEBANGSAAN (TAMIL) CASTLEFIELD

MALAYSIA

have been awarded the

WYIE 2024 GOLD MEDAL

for the invention

PALMITIZER SOILLESS PELLET

at the

8TH WORLD YOUNG INVENTORS EXHIBITION 2024

KUALA LUMPUR, MALAYSIA

16 – 17 MAY 2024

MALAYSIAN INVENTION AND DESIGN SOCIETY MINDS

Augustine Ong

Academician Emeritus Professor
Tan Sri Datuk Dr Augustine Ong Soon Hock
President
Malaysian Invention and Design Society

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YOUNG
INVENTORS
EXHIBITION
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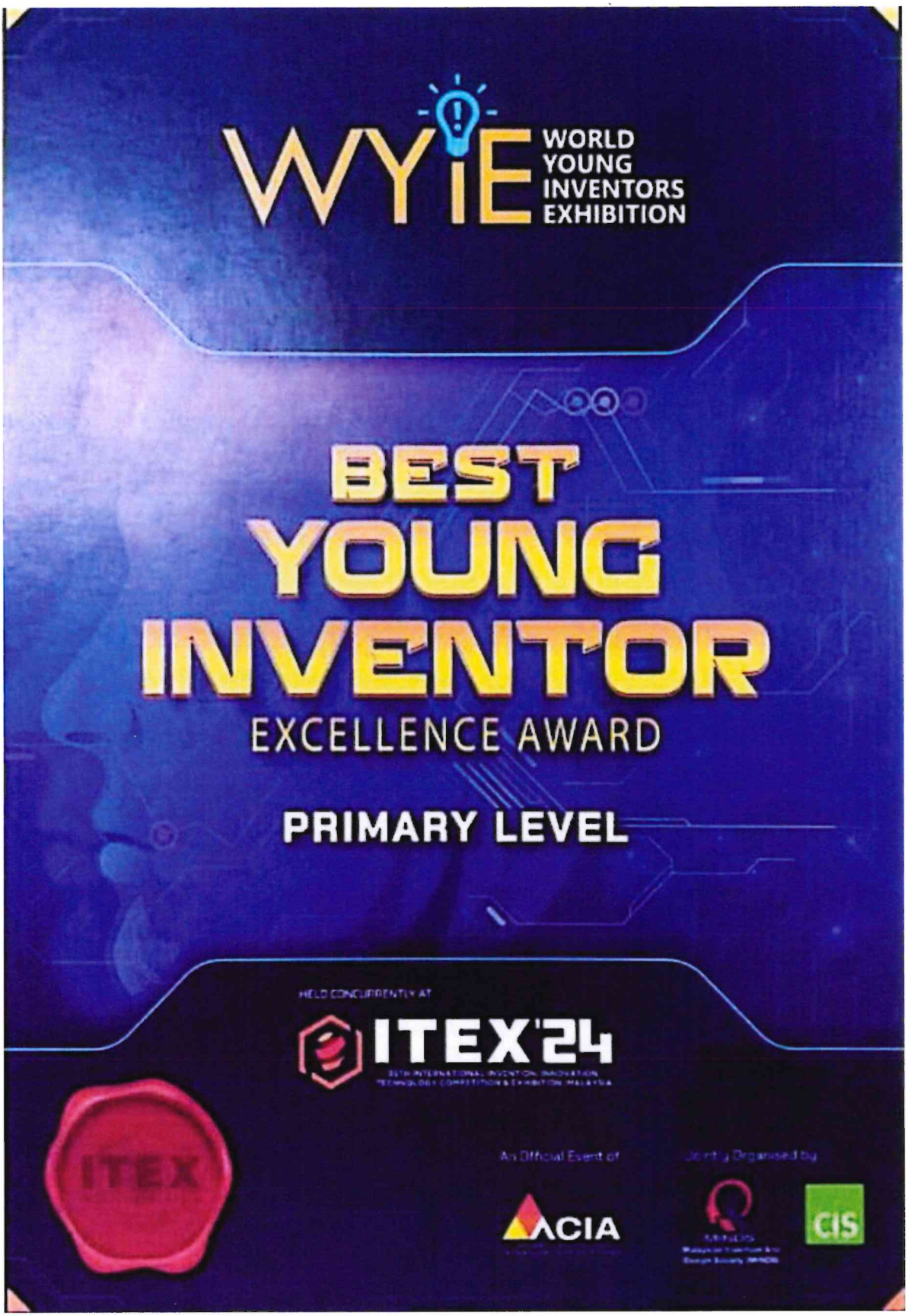
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Certificate of Award

NWERA ASSOCIATION

SIF

SPECIAL AWARD

This certificate is presented for the project

PALMITIZER ECO PELLET

from

SJKT CASTLEFIELD, PUCHONG, MALAYSIA

has been awarded the

NWERA Association

This diploma is awarded in recognition of the remarkable dedication, innovation, and creativity demonstrated, as well as the exemplary passion and teamwork that contributed to an outstanding presentation during the ceremony.

November 2024

Prof. Eng. MARIANA-OANA FARCAŞ

NWERA

PRESIDENT OF