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LIMITLESS MIND:

EMPOWERING INNOVATION THROUGH VISUALIZATION

UNIVERSITI TEKNOLOGI MARA

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PROGRAM
PROCEEDINGS
ABSTRACTS BOOK

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CHACO-BAN (THE REVOLUTIONARY OF ECO-CHARCOAL)

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ABSTRACT

Applications of charcoal have become an interest in daily life such as fuel for combustion. However, the commercial charcoal is normally produced by cutting the mangroves trees which are not sustainable and reduced a natural barrier against erosion, storm and floods. Hence, a new eco-friendly homemade charcoal was produced to replace the commercial charcoal. The new ChaCO-Ban material was produced by two-steps conventional pyrolysis methods involving daily waste materials such as orange peels, banana peels and paddy husk. The scanning electron microscope (SEM) images showed that the number of air cavities in the ChaCO-Ban sample is higher compared to the commercial charcoal. Sample with higher air cavity numbers is believed to produce more ignitions due to the higher oxygen levels around the sample. The energy dispersive X-Ray spectroscopy (EDS) results indicated higher ignition elements in the ChaCO-Ban sample compared with the commercial sample. The pH 9.4 of ChaCO-Ban sample is alkali and can neutralize the pH value of soil.

Keywords: eco-friendly, pyrolysis methods, air cavities, ignitions, safe environments

1. INTRODUCTION AND OBJECTIVES

ChaCO-Ban is a new product of charcoal that use orange peels, banana peels and paddy husk as main substances. 'Cha' here stands for charcoal, 'C' stands for citrus, 'O' is for Oryza Sativa and 'Ban' stands for banana and the shape that looks like a bun. Our objectives are to reduce the deforestation in producing charcoal and replacing the commercial charcoal with more eco-friendly charcoal.

2. METHOD

The materials ,apparatus and equipments that are used for this project are orange peels, banana peels, paddy husk, starch, sand, blender, weight scale, mould, Bunsen burner, can, pH meter, Scanning Electron Microscope (SEM) and Energy Dispersive X-Ray Spectroscopy (EDS). The first step is to dry and grind all the materials. Secondly, mixed the material with starch with different ratio. Then, shape the substances and let it dry. Lastly, put the dried substances under slow pyrolysis.

2.1 Ratio of substances

Figure 1. Sample are placed in the can for the slow pyrolysis process

2.2 Apparatus setup for slow pyrolysis

Table 1. Ratio of mass samples

Substances / ChaCO-Ban	Orange peels (g)	Banana peels (g)	Paddy husk (g)	Sand (g)
1	**15**	**15**	**15**	**5**
2	**15**	**10**	**20**	**5**
3	**15**	**20**	**10**	**5**
4	**20**	**10**	**15**	**5**

3. FINDINGS AND ARGUEMENT

We had tested our ChaCO-Ban using the Energy Dispersive X-Ray Spectroscopy (EDS), Scanning Electron Microscope (SEM) and pH testing. Furthermore, image processing, ImageJ was used to investigate the formed cavity in all the fabricated samples and commercial charcoal as a control sample.

Table 2. Results

Charcoal / Characteristic	Sample 1	Sample 2	Sample 3	Sample 4	Commercial charcoal
Number of elements	7	5	6	6	4
Potassium content (more reactive element)	Yes	Yes	Yes	Yes	No
Number of air cavities	1397	1868	1557	1767	560
Total surface area exposure	More	More	More	More	Less
pH value	8.5	9.0	8.2	9.4	7.0

4. CONCLUSION AND SUGGESTION

Based on the findings, we can conclude that our ChaCO-Ban is better than the commercial charcoal because the ChaCO-Ban have more number of elements, potassium content, more air cavities, more total surface area exposure and pH value is alkali. With all those specialty, we suggest our product gives a huge impact on the environmental sustainability such as reducing the mangrove tree as the main material for the

manufacture of commercial charcoal, reduce the landfills, pollution and global warming in reaching a more powerful country in future and maintaining the greenness of the environment.

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