



Universiti Malaysia Perlis

INVENTORS

AIMI NOORLIYANA BT HASHIM
FAIZUL BIN CHE PA
AP CHE MOHD RUZAIKI BIN GHAZALI

CONTACT DETAILS

CENTER OF EXCELLENCE GEOPOLYMER AND GREEN
TECHNOLOGY (CEGEOGTECH),
SCHOOL OF MATERIALS ENGINEERING,
UNIVERSITI MALAYSIA PERLIS,
TAMAN MUHIBBAH,
02600 JEJAWI, PERLIS,
MALAYSIA.
e-mail : aimiliyana@unimap.edu.my

ECO ACTIVATED CHARCOAL FIBER SHEET

PRODUCT DESCRIPTION

Eco-Activated Charcoal fiber sheets (Eco-ACFS) manufactured from blending sugarcane bagasse cellulose fiber with coconut shell activated carbon powder. This product has one of the largest activated surface areas combined with a high percentage of micro pores, making it ideal for removal of odorous compounds, toxic metals and gases from volatile organic compounds (VOCs). For this reason, Eco-ACFS is used in a wide range of air purification systems from fume hoods, gas masks, refrigerators and air purifiers for indoor. Where indoor air quality is being compromised by odours, Eco-ACFS is the safest and most effective way of dealing with the problem.

PROBLEM STATEMENT

Tobacco smoke components are representative of a wide range of pollutants found in indoor air. By now, it is well established that cigarette smoking is dangerous to human health. Heavy metals are present in tobacco smoke contribute significantly to cancer risk indices. A new idea on the removal of toxic metals of indoor air pollutants has been carried out by synthesizing coconut shells activated carbon embedded in fiber cellulose sheet from sugarcane bagasse.

PRODUCT ADVANTAGES

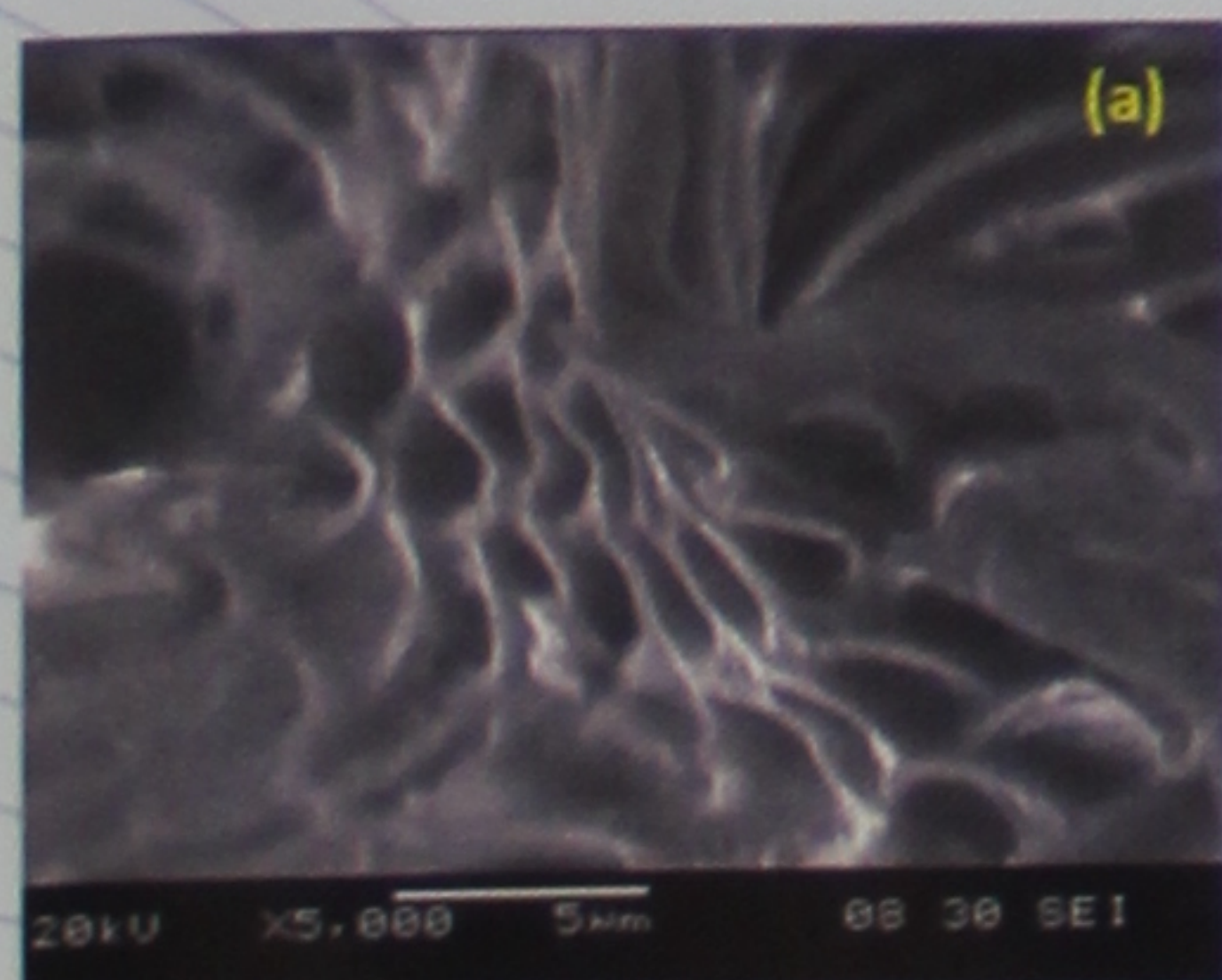


Table1: Quantitative EDX analysis of Activated carbon fiber sheet (ACFS) (a) before and (b) after adsorbing the sidestream cigarette smoke.

Elemental (mass %)	C	O	Sb	As	Others
ACFS (a)	76.8	23.2	-	-	-
ACFS (b)	65.3	2.4	20.7	1.6	9.8



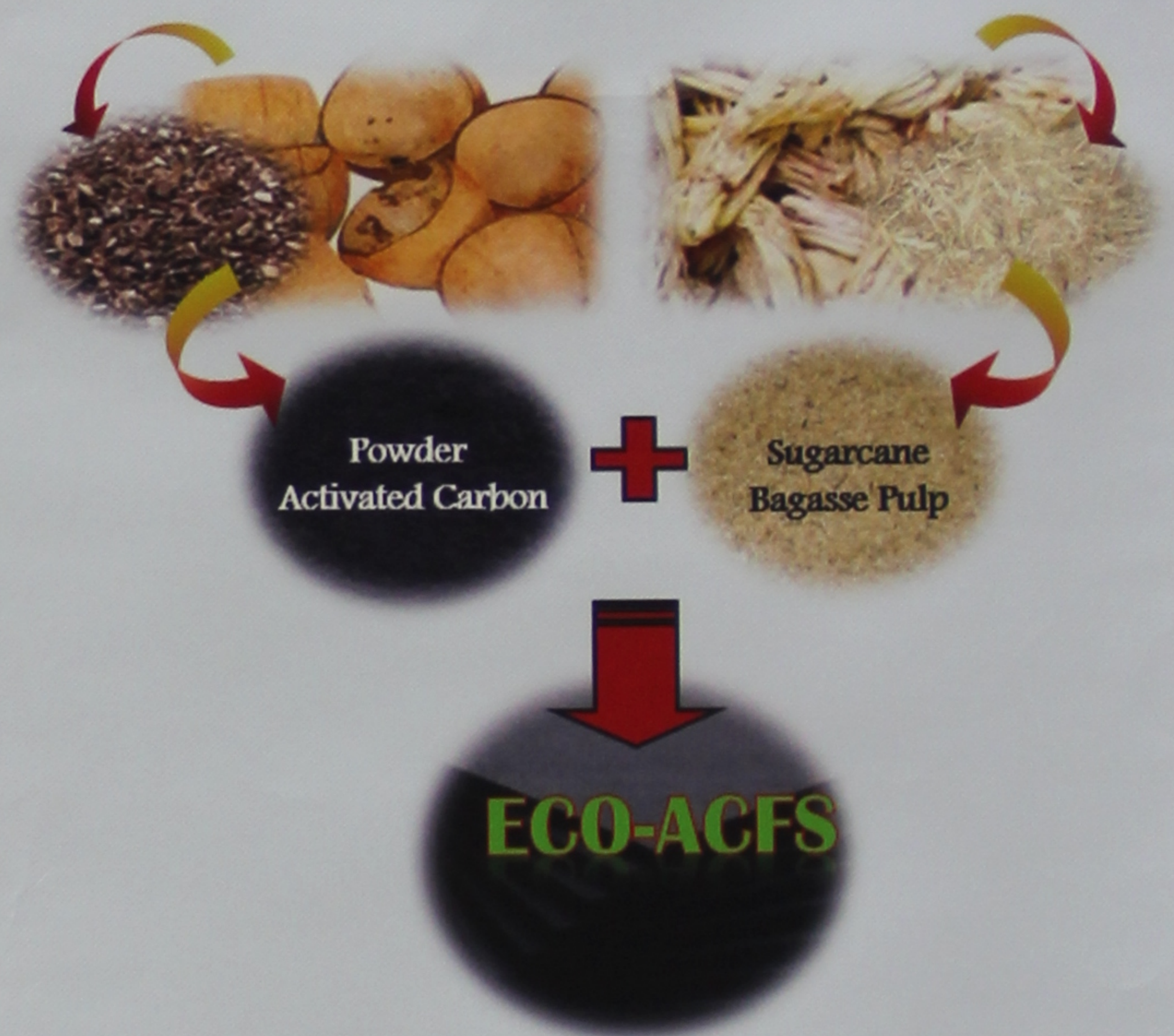
Table2: Adsorption capacity of different Activated carbon.

Activated Carbon (AC)	Pore Characteristics		
	SBET (m ² /g)	Vtotal (mL/g)	Vmi (mL/g)
Powder AC	1310	0.76	0.35
Granular AC	775	0.54	0.29
ACFS (a)	978	0.79	0.37
ACFS (b)	445	0.25	0.14

SBET: BET surface area, Vtotal : total pore volume, Vmi : micropore volume

Figure 1: SEM images of Activated carbon fiber sheet (a) before and (b) after adsorbing the sidestream cigarette smoke.

METHODOLOGY



NOVELTIES

- Using agricultural waste in making activated carbon adsorption sheets
- This product is industrially viable, cost-effective, and environmentally compatible technology for the removal of indoor air pollutants
- Converting waste to wealth

COMMERCIAL POTENTIAL

This agricultural waste product is economic and eco-friendly due to its unique chemical composition, availability in abundance, renewable, low cost and more efficient for heavy metal adsorption.



PUBLICATIONS

S. Saad, F. Che Pa, M. A. Abdullah, R. Mohd Zaki and M. Darus ; Effect of Pyrolysis Temperature on the Synthesis of Carbon Fiber from Natural Organic Waste. Key Engineering Materials Vols. 594-595 (2014) PP 128-132