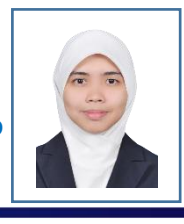
BANANA PEELS SORBENT: AN ALTERNATIVE ACTIVATED CARBON MATERIAL FOR FOOD DYE REDUCTION IN AQUEOUS

INVENTOR: DR. NOOR YAHIDA YAHYA
FACULTY: FACULTY OF CIVIL ENGINEERING TECHNOLOGY (FTKA)
UNIVERSITY: UNIVERSITI MALAYSIA PAHANG
EMAIL: yahida@ump.edu.my
CO-INVENTORS: ANIQ AMIRAH KAMARRUZAMAN, NURUL HAFEEZA MOHAMED



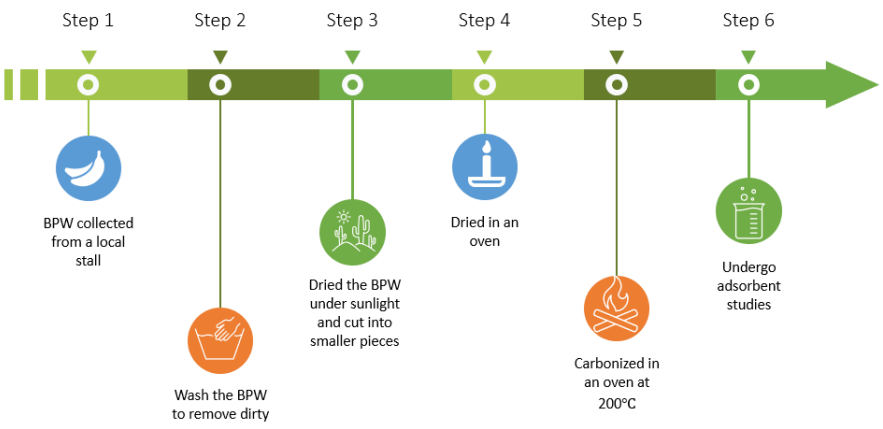
BACKGROUND

Today, the most commonly adopted adsorbent is Activated Carbon. It has large surface area, excellent porosity, low density with high adsorption efficiency towards contaminants in aqueous solution. Besides that, this carbonaceous material has high physicochemical stability, mechanical strength and degree of surface reactivity, with large surface area responsible for the efficiency of adsorption reaction mechanism.

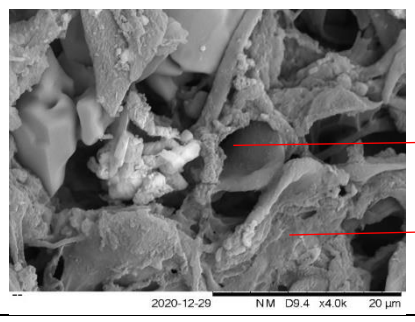
Generally, it is derived from coal, a non-renewable carbon source with a relatively high price. Therefore, with an economic point of view, researchers have made extensive efforts to find a low-cost alternative material for Activated Carbon preparation from a range of lignocellulosic materials, biopolymer, coal, char, and fruit peels. Therefore, we have come out with a solution of **Banana Peels** as the potential material for Activated Carbon preparation.



PREPARATION METHOD



PRODUCT ANALYSIS



Large, open pores, uneven surface

Irregular rough surface structure

- ✓ The existence of the pores sizes.
- ✓ The removal of contaminants highly related with the pores size of the adsorbent.
- ✓ Pore size can make contaminants particles entrance into the internal parts of the adsorbent easier and helpful in the sorption process.

Adsorption Performance-Reduction of food dye in aqueous

Red Colour

Yellow Colour

NOVELTY

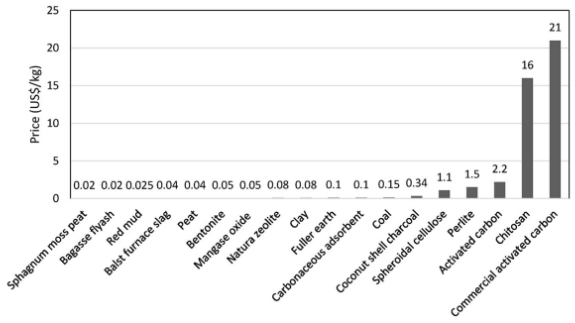
WASTE TO WEALTH

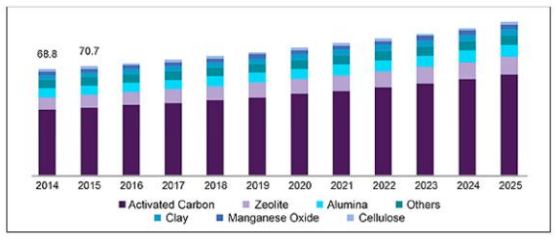
BENEFITS / USEFULNESS / APPLICABILITY

- ✓ Reuse of abundant banana peels waste as effective agro-wastes adsorbent on wastewater treatment.
- ✓ Help the industry especially those dealing with dye effluent to treat wastewater more efficiently.

COST ANALYSIS

- ✓ Estimate as low cost compare to common and well-known commercial activated carbon due to the wide availability of raw materials process requirement, condition during treatment and ability for recycling.





Source: Rudi *et al*. (2020). https://doi.org/10.1016/j.heliyon.2020.e05049.

ENVIRONMENTAL IMPACT

Enviromentally Friendly

Let's waste less

STATUS OF INNOVATION

- ✓ Lab Report/Documentation

RELATED PUBLICATION

- ✓ Zamri, M.Z.A., Yahya, N.Y., Ramli, R.S., Ngadi, N. and Widia, M. (2019). Characterization of Banana peels waste adsorbent for preliminary study of methylene blue removal from aqueous solution. IOP Conference Series: Materials Science and Engineering. 697, 012033.

MARKETABILITY & COMMERCIALISATION

- ✓ Technology transfer potential

Potential Market/Collaborator

FFM

Nestlé Good Food, Good Life

KURITA