

## Reusable Face-piece using Benzene Adsorbent from Banana Peel and Sugarcane Pulp Charcoal

Ananda Nafisah Sahran<sup>1,a</sup>, Rilda Yasifa Idznih<sup>2</sup>, Muhammad Resky Rachmanto<sup>3</sup>, Zulfitriah Andi Azis<sup>4</sup>, Munira Munira<sup>5,\*a</sup>

<sup>a</sup>Department of Chemical Engineering, Faculty of Industrial Technology, Universitas Muslim Indonesia

\*munira@umi.ac.id

**Abstract.** Fuel at the Petrol Station (SPBU) produces a pretty pungent odor that can be inhaled and enter the human body. There is a danger for a person who inhales the smell continuously, such as an SPBU filling staff. The smell of the fuel contains the organic compound of benzene. The Agency for Toxic Substance and Disease Register (ATSDR) states that benzene severely impacts human health. Exposure to benzene in humans through inhalation is carcinogenic. Exposure to benzene in the workplace has been associated with an increased incidence of acute or chronic myeloblastic or erythroblasts myeloid leukemia and lymphoid leukemia in workers. According to WHO, one of the sources of benzene in ambient air is the evaporation of benzene at fueling stations. The concentration of benzene gas can be reduced by passing the gas through activated carbon adsorbent. Therefore, a face-piece equipped with an activated carbon filter which is worn by fuel filling staff at SPBU may reduce the inhalation of benzene gas. Activated carbon could be produced by a pyrolysis process of banana peels and sugarcane followed by an activation process of the charcoal. The face-piece is designed using a 3D printing tool so that it is ergonomic. The face piece is also reusable. There fore the face-piece offers benefits such as it can filter the benzene content in the air directly and can be used easily because of its simple, ergonomic, and efficient shape.

**Keyword:** reusable facepiece, benzene, activated carbon, banana peel, sugarcane pulp