

UNIVERSITI TEKNOLOGI MARA

**ISOLATION, IDENTIFICATION AND
CHARACTERIZATION OF
MICROORGANISMS INVOLVED IN
RUBBER ODOUR PRODUCTION**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

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AUTHOR'S DECLARATION

I declare that this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and the result is of my own research except as indicated or knowledge in the references. This thesis has not been submitted to any other academic institutions or non-academic institutions for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The presence of obnoxious odour is due to microbial reactions that could lead to harmful effects to the environment. This study was aimed to investigate the correlation between microorganisms and rubber odour production. There were 23 isolates possibly producing the odour isolated from various sampling points of rubber plantation at Felda Kg. Awah, Temerloh Pahang and were identified using VITEK[®]2 System analysis. From the observation, *Kocuria kristinae* was found to be the common species in this study since it was isolated at all sampling sites. Furthermore, 15 isolates were selected for analysis of rubber odour production using solid-phase microextraction (SPME) and Gas Chromatography Mass Spectrometry (GC-MS). The analysis showed that, the volatile components detected comprised of hydrocarbon and low molecular weight compounds such as volatile fatty acids, amino and sulphur-containing compound, esters and alcohol. There were 18 odorous compounds detected in this study mainly comprised of 5H-Naphto[2,3-c] carbazole,5-methyl-; 7H-Dibenzo[b,g] carbazole,7-methyl and camphene. However, in order to suppress the growth of microorganism that lead to the production of odorous compounds, three different antimicrobial agents (Sodium hypochlorite, Chloroxylenol and Formaldehyde) as well as HISKA[®] were used. The treated rubber was subjected to SPME/GCMS analysis to check for the absence of volatile components. The analysis showed that 0.5% (w/v) and 1.0% (w/v) formaldehyde followed by 1.0% (w/v) and 3.0% (w/v) sodium hypochlorite were able to inhibit the microbial growth and at the same time eliminate the unpleasant odour. The cure characteristics and physical properties of the vulcanized rubber base on ACS 1 mix formulation were evaluated. The treated rubber showed a better quality, hence enhanced the physical properties such as tensile strength, hardness and resilience when compared to SMR L.

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