

UNIVERSITI TEKNOLOGI MARA

**FUNGAL INFESTATION IN
OFFICE BUILDINGS OF
UITM PUNCAK ALAM**

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ABSTRACT

Fungi is a significant indoor air quality parameter. Hence, the purpose of this study is to assess airborne fungi in the classrooms, academic offices, and laboratories of FSK buildings in UiTM Puncak Alam and its relation with sick building syndrome (SBS). A walkthrough survey was conducted at the three study areas and environmental sampling of temperature, relative humidity, air velocity, and airborne fungal concentration was conducted. Airborne fungi were sampled using passive settle plate method using Potato Dextrose Agar (PDA). Fungal genera were quantified and identified after 5 to 7 days of incubation. A survey adapted from the Industrial Code of Practice 2010 (ICOP 2010) was participated by 350 occupants of the study areas. It was used to investigate the perceived SBS symptoms experienced by them. Based on visual inspection, several of the study areas had visible damp stained ceiling tiles, an indication of high humidity. Out of all the sampled locations, only one classroom and one laboratory was found to exceed 1000 CFU/m³ acceptable limit of fungal concentration recommended in ICOP 2010. Through the identification of fungal genera, *Aspergillus* sp. was found at all the three study areas. Other fungal genera found include *Cladosporium* sp., *Alternaria* sp., and *Penicillium* sp. In this study, airborne fungi concentration was found not to be a significant risk factor of SBS. Yet, the prevalence of SBS symptoms were more than moderate. Therefore, regular housekeeping and maintenance is still necessary to ensure optimum environmental condition to prevent fungal infestation for the sake of workers' health and wellbeing.

Keywords: *Fungal concentrations, relative humidity, temperature, air movement, Sick Building Syndrome (SBS)*

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Exposure to fungal infestation in buildings is a serious concern due to its adverse health effects. These health effects include allergic symptoms, asthma, and other respiratory problems (WHO, 2005). Furthermore, these exposure effect the wellbeing and productivity of the building occupants. It is estimated that people spend 90% of their time indoors (Cincinelli & Martellini, 2017), which may include office building as their workplace. Sources of fungal infestation can be from outdoor or indoor reservoirs (Crawford, Rosenbaum, Anagnost, Hunt, & Abraham, 2015). Other factors of fungal infestation includes water damaged building, excessive humidity, construction works, piping leakage, and indoor furnishings.

A study from Portugal on fungal concentrations in three different indoor environments (day care centre, primary school, and elderly homes) found that temperature and relative humidity did not influence fungal concentrations as it was possibly due to small variation levels of both parameters indoor (Madureira, Paciência, Rufo, Pereira, et al., 2015). Meanwhile, a study associated with a water damaged building, discovered that low air change rate (ACR) and high relative humidity (RH) had a significant influence on the fungal species composition (S. M. Knudsen, Gunnarsen, & Madsen, 2017).

This study will look at the aspect of relative humidity, temperature, and air velocity on the influence of fungal concentration in office buildings of UiTM Puncak Alam. Since Puncak Alam is a hilly area, receiving rain and sunlight all year round, it is expected that humidity, temperature, and air movement are the main factors that contribute to fungal infestation. The Industry Code of Practice (ICOP, 2010) is referred in this study to ensure employee and occupants are safe from poor indoor air