Use of candles and its impact on Indoor Air Quality

The quality of the air we breathe in indoor spaces is crucial for our health and well-being, yet it is often overlooked. You may not realize it, but the air inside our homes, offices, and other indoor spaces, can often be more polluted than outdoor air, as enclosed spaces can trap and concentrate various pollutants. Common sources of indoor air pollution include dust, mould, volatile organic compounds (VOCs) from cleaning products and building materials. However, one lesser-known contributor to poor indoor air quality is the burning of candles.

Candles, often used for ambiance, relaxation, or scent, can release a range of harmful pollutants into the air as they burn. These include fine particulate matter (PM), which are microscopic particles that can penetrate deep into the lungs and even enter the bloodstream. Studies have shown that burning candles, particularly those made from paraffin wax, can significantly increase the concentration of PM2.5—particles small enough to evade our body's natural defences—in indoor environments.

In the context of the K-HEALTHinAIR pills (K-pills), which focus on identifying and mitigating various issues that affect indoor air quality (IAQ), this particular K-pill will explore the impact of candle burning on indoor air. We will lightly examine how candles contribute to particulate matter pollution and discuss potential measures to improve IAQ in spaces where candles are frequently used. Understanding and addressing these sources of pollution is key to creating healthier indoor environments.

We compared the use of three different types of candles: two conventional and one low emission candle (according the manufacturer). Candle burning is a common practice in many households, whether for decorative, aromatic, or ceremonial purposes. However, this activity can go unnoticed as a significant source of fine particulate matter (PM) in indoor air. Fine particles can have adverse effects on respiratory and cardiovascular health, especially with prolonged exposure.

To assess the impact of candle burning on IAQ, PM concentrations were measure using IAQ monitors (MICA by INBIOT) in a controlled environment. This simple study focused on three types of candles:

1. Conventional wide candle.
2. Conventional thin candle.
3. Low emission candle.

Measurements were taken throughout the burning duration of each candle, and the maximum PM levels reached were recorded. By comparing these different candle types, the study aimed to assess how each one contributes to indoor air pollution and to determine if certain candle designs or compositions emit fewer harmful particles.

The PM measurement results showed significant differences between conventional candles and the low emission candle, as illustrated in Figure 1.

- Conventional wide candle: Reached a maximum peak of 493 µg/m³.

- Conventional thin candle: Reached a maximum peak of 349 µg/m³.
- Low emission candle: Reached a maximum peak of 70 µg/m³.

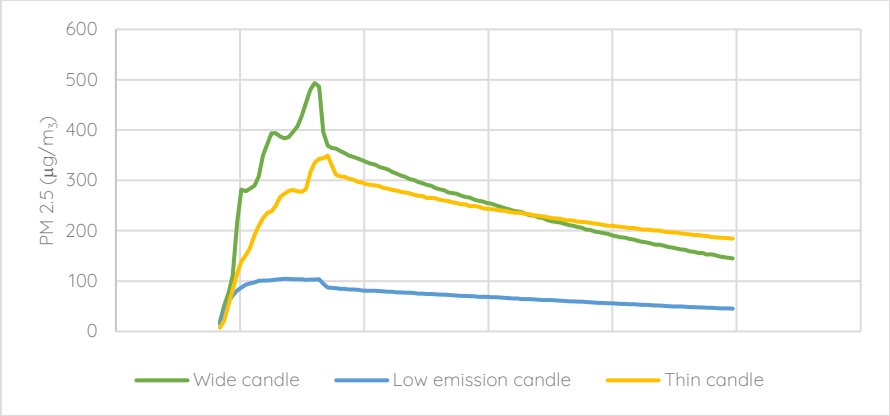

Figure 1. PM results between three different candles.

These results clearly demonstrate that conventional candles generate significantly higher levels of PM compared to low emission candles.

Exposure to high levels of fine particles can cause various long-term health problems, such as:

- Respiratory problems: Asthma, chronic cough, and respiratory infections can be exacerbated with continued exposure to fine particles.
- Cardiovascular complications: Fine particles can increase the risk of heart-related conditions, such as arrhythmias and heart attacks.
- General health effects: Inhalation of fine particles can cause inflammation and oxidative stress in the body, affecting overall health.

In conclusion, the burning of conventional candles is a significant source of indoor air pollution due to the high levels of fine particles they release. However, using low emission candles provides a potential alternative to reduce PM exposure (if you are a candle lover) and minimize the associated health risks. It is important for consumers to be aware of the potential health impacts when choosing candles for home use.