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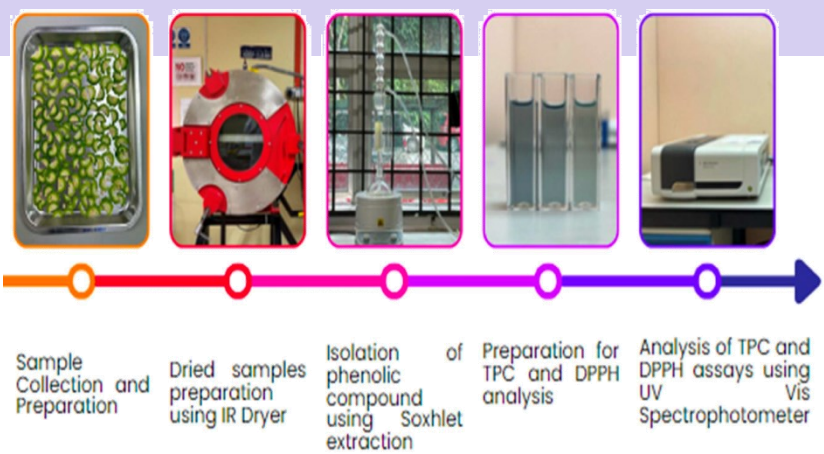
Infrared Drying Preserving Antioxidant from Bitter Melon

Chronic illnesses, including cardiovascular diseases, diabetes, and certain types of cancer, are significantly impacting the health and mortality rates of Malaysians. Our research focuses on the preservation of natural antioxidants through infrared drying techniques and explores the medicinal benefits of phenolic compounds in bitter melon. The utilisation of infrared drying is becoming a crucial method for preserving Momordica charantia, often known as bitter melon, especially for preserving its antioxidant capacity at a level similar to its fresh condition. This novel drying technique utilises infrared radiation to produce heat, effectively removing moisture from the food product. In contrast to conventional drying techniques that often require extended periods at elevated temperatures, infrared drying provides a faster and more energy-efficient option, essential for maintaining the delicate nutritional components.

Antioxidants are vital for health as they fight free radicals in the body, potentially reducing the risk of chronic diseases. The rapid drying process minimises the degradation of these antioxidants, ensuring that the dried product is almost as beneficial as the fresh fruit. Phenolic compounds, renowned for their antioxidant properties, are associated with various health benefits, including anti-inflammatory and anti-cancer effects. It is essential to comprehend the solid-to-solvent ratio to create extracts with the highest bioactivity. This can maximise the health benefits of antioxidant-rich products.

Additionally, understanding the correlation between solvent-to-solid ratio, phenolic content, and antioxidant capacity can help optimize extraction processes, ensuring the highest possible yield and potency from natural sources. This knowledge can guide researchers, manufacturers, and product developers in making informed decisions about extraction protocols and formulations, thereby driving scientific research and fostering the development of innovative and effective products.

Our study reveals that the solid-to-solvent ratio significantly impacts the yield of total phenolic compounds (TPC) in bitter melon extracts. A high solid-to-solvent ratio yields higher TPC extracts, indicating that increasing the ratio improves the extraction efficiency of phenolic compounds. The antioxidant activity of fresh and dried extracts also follows a similar trend, with extracts obtained using a higher ratio exhibiting stronger free radical scavenging abilities. The antioxidant activity was around 90% for fresh and infrared dried extracts. This suggests a positive correlation between phenolic concentration and antioxidant capacity from fresh & infrared-dried bitter melon. The findings have implications for developing extraction methodologies to obtain effective yields of total phenolic compounds and better antioxidant capacity from bitter melon. Optimising infrared drying and extraction technologies to enhance bitter melon extracts' phenolic content and antioxidant capacity can lead to functional foods, dietary supplements, and pharmaceuticals with improved health-promoting properties.



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