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MORINGA OLEIFERA: NATURE'S HEALTH SUPERSTAR

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INTRODUCTION

The global surge in cancer rates is an increasingly concerning issue due to its ability to affect various organs and its potential for serious outcomes. The reasons behind the differing rates worldwide involve a complex mix of factors like genetics, lifestyle choices, and environmental influences. The consumption of processed foods and unhealthy habits, which are connected to a higher cancer risk, is particularly worrying. Figure 1 shows the most common cancers for men and women in Malaysia.

As a response to the challenges posed by conventional cancer treatments and their side effects, there is a growing interest in exploring alternative approaches. Herbal treatments are gaining attention in this context, with *Moringa oleifera* standing out as a promising candidate. This tropical plant contains a range of beneficial compounds in its leaves, flowers, seeds, and other parts. These compounds, including vitamins, amino acids, flavonoids, and phenolic compounds, have shown potential for preventing and combating cancer.

Beyond this potential, *Moringa oleifera*'s richness in antioxidants and essential nutrients makes it valuable for addressing nutritional deficiencies, especially in regions with malnutrition. This multi-faceted potential positions *Moringa oleifera* as a holistic option for cancer management and related health issues.

Moringa oleifera

Originally from India, the *Moringa oleifera* tree, often known as the horseradish tree or drumstick tree, belongs to the Moringaceae family and may be found growing in both tropical and subtropical regions. In Malaysia, *Moringa oleifera* is locally known as "murungai" or "kelor". The *Moringa oleifera* tree may reach heights of 7 to 15 metres and a trunk diameter of 20 to 40 cm. *Moringa oleifera* is a multifunctional plant with medicinal and nutritional potential. They can grow in places with limited access to water, which allows *Moringa oleifera* to survive in both extremely dry and somewhat frosty environments. Figure 2 shows the *Moringa oleifera* leaves.

Moringa oleifera leaves have been the subject of the most research and have been found to contain a high number of bioactive compounds, including vitamins, carotenoids, polyphenols, phenolic acids, flavonoids, alkaloids, glucosinolates, isothiocyanates, tannins, and saponins. Flavonoids can get rid of free radicals and reduce oxidative stress, which means flavonoids could be used to treat a variety of serious diseases. Oxidative stress is caused when there are insufficient quantities of anti-oxidants or when the enzymes that create anti-oxidants are inhibited, which can harm or even kill cells. In previous studies, *Moringa oleifera* has been shown to have anti-oxidant, anti-inflammatory, and anti-cancer properties.

In faraway lands like India and Africa, *Moringa oleifera* has been used for ages as a natural remedy for many health issues. It's like a superhero plant with powers like fighting off harmful substances in our bodies, reducing inflammation, and maybe even stopping cancer from growing.

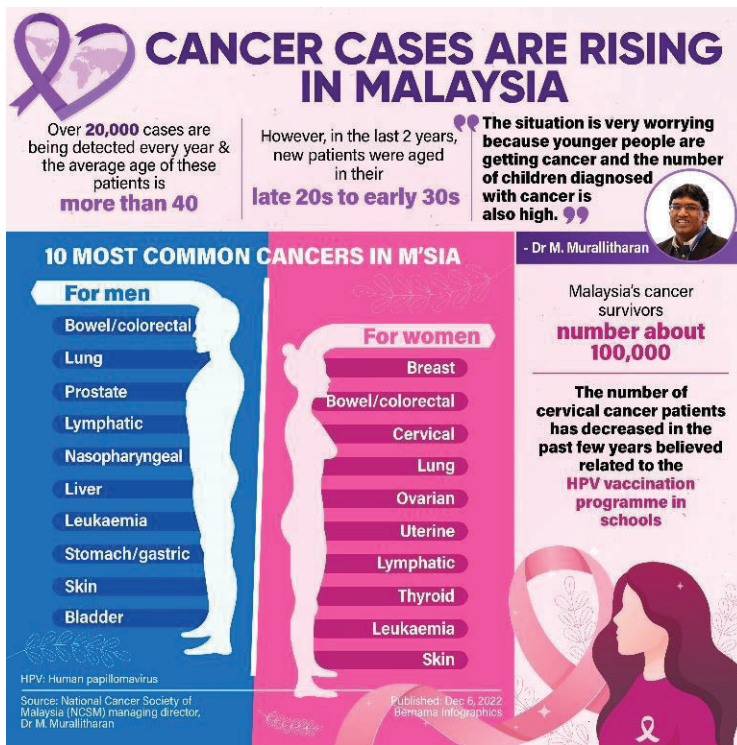


Figure 1: Most common cancers in Malaysia
(Source: BERNAMA.com)

Moringa is packed with good stuff like vitamins and minerals that our bodies love. It's like a team of tiny helpers, including quercetin and kaempferol, that work together to keep our bodies healthy. Moringa might also help us fight infections and control sugar levels if we have diabetes.

Even though Moringa has a long history of helping people, scientists are still studying it to make sure we understand all the amazing things it can do and how it can make us even healthier.

The role of phytochemicals

Phytochemicals play a crucial role in promoting human health and protecting against various diseases. These non-nutritional compounds are abundantly found in plant-based foods such as fruits, vegetables, legumes, whole grains, herbs, and spices. Categorized into six main classes based on their chemical structures and characteristics, namely carbohydrates, lipids, phenolics, terpenoids, alkaloids, and other nitrogen-containing compounds, phytochemicals offer a wide array of benefits that extend beyond traditional nutritional value.

One of the primary contributions of phytochemicals is their potent antioxidant activity. Antioxidants are essential in counteracting the detrimental effects of free radicals, which are highly reactive molecules with unpaired electrons that can cause oxidative damage to cells and tissues. Free radicals are generated through various sources, including normal metabolic processes, exposure to environmental pollutants, and inflammatory responses. The presence of phytochemicals with antioxidant properties, such as phenolic acids, ascorbic acid (vitamin C), tocopherols (vitamin E), and bioflavonoids, helps to neutralize free radicals and prevent oxidative stress-induced cellular damage. By scavenging these harmful radicals, phytochemicals contribute to maintaining the integrity of important biomolecules like DNA, proteins, and lipids, thereby reducing the risk of chronic diseases like cancer, cardiovascular disorders, and neurodegenerative conditions.



Figure 2: *Moringa oleifera* leaves (Source: Torondel et al., 2014)

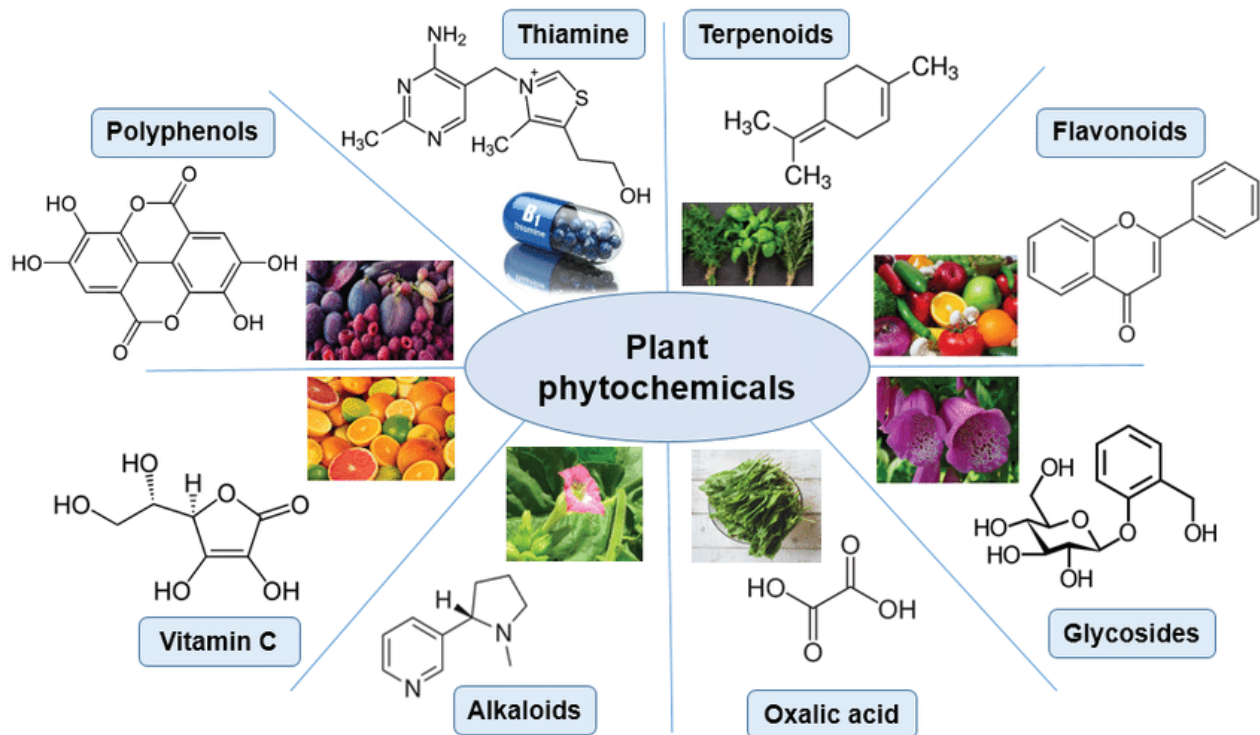


Figure 3: Plant phytochemicals. (Source: Scientific Figure on ResearchGate).

Inflammation, while a crucial part of the body's defense mechanism, can also lead to the production of reactive oxygen species (ROS) and free radicals. When leukocytes, such as macrophages and neutrophils, are activated during immune responses, they release ROS that can cause lipid peroxidation, protein degradation, and DNA mutations. Phytochemicals' ability to suppress inflammation and modulate immune responses can further mitigate the oxidative damage caused by excessive ROS production. By supporting the immune system's balanced function and controlling inflammation-induced oxidative stress, these compounds contribute to the prevention of chronic diseases and the maintenance of overall well-being.

Phytochemicals serve as potent defenders against disease and illness by virtue of their diverse antioxidant properties and anti-inflammatory effects. These non-nutritional compounds found in plant-based diets exhibit the ability to neutralize free radicals, protect cellular components, and promote optimal health. Incorporating a variety of fruits, vegetables, whole grains, and other plant-derived foods into one's daily diet can provide a rich source of phytochemicals, ultimately reducing the risk of oxidative stress-related diseases and supporting a vibrant and resilient life.

Consume a wide variety of fruits, vegetables, and whole grains of varying colours, since they contain a wide range of phytochemicals, nature's defences against diseases, and help you unlock the potential of nature's vitality in your daily diet. Choose a wide variety of plants, from berries to leafy greens, and prepare them in different ways to retain their beneficial ingredients. Add flavour to your food with spices and herbs, and let herbal drinks wrap you in comfort. Keep in mind that the powerful effects of phytochemicals can synergize with a holistic strategy that includes exercise, stress control, sound sleep, and professional guidance when necessary. Each deliberate action is a step towards a more rounded approach to health, one that welcomes the illuminating power of phytochemicals.