

**CHAPTER**

**6**

***MORINGA OLEIFERA***

**CULTIVATION AWARENESS IN**

**MALAYSIA**

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**6.1 INTRODUCTION**

*Moringa oleifera* is widely known as ‘drumstick tree’ or ‘horseradish tree’ (Ortega & Campos, 2019). Due to its ability to endure serious drought and mild frost conditions, this tree can be found to be planted all across the world (Gopalakrishnan et al., 2016). This drumstick tree is a member of kingdom Plantae, order of Brassicales, family of Moringaceae, genus of *Moringa*, and its species is *Moringa oleifera* (Raja et al., 2016). *Moringa* species originated in Asia and is very popular in warm countries such as Malaysia and other countries with warm climates (Mallenakuppeet al., 2019). There are many names associated with this plant based on its functionality, benefits, physical characteristics, nutrition, and taste.

According to Raja et al. (2016), some of the names include ‘drumstick tree’ (due to its slender pods, long, and triangular shape), ‘horseradish tree’ (the roots are found to have a similar taste to horseradish), and ‘benoil tree’ (benzoin can be extracted from the tree). Not only that, but this tree is also widely known as ‘Tree of Life’ or

‘Miracle Tree’ as it is considered an important tree that is used in the treatment of various diseases (Okoye et al., 2014). New food and feed products are being developed for the market as a result of technological improvement, state-of-the-art facilities, and economic needs.

## **6.2 GEOGRAPHICAL DISTRIBUTION AND GROWING CONDITION**

*Moringa oleifera* is the most studied species compared to others in the genus of Moringa of Moringaceae family, which contains 13 species in total (Leone et al., 2015). This species is originated in Agra and Oudh, or specifically in the northwest region of India and south of the Himalayan Mountains. Currently, it is now cultivated across the Middle East and was introduced in Eastern Africa at the beginning of 20th century (Mallenakuppe et al., 2019). In Nigeria, *Moringa oleifera* is found to be widely distributed through all ecological zones, with its ability to adapt to various climate conditions (Popoola & Obembe, 2013).

### **6.2.1 Types of Soil**

Combining its ability to adapt to various climates and its beneficial uses to treat many diseases, Moringa is favored by many as the tree has a low demand. On top of that, the tree is fast growing and has a high germination rate of 85% (Raja et al., 2016). To prove that this tree is capable of growing in any condition, Mashela (2016) cultured Moringa in three different types of soil. Fungi can alter plant synthesis of chemicals that are bioactive against chronic illnesses in humans in addition to boosting plant nutrition in terms of minerals. The growth response of Moringa can be seen in Table 6.1.

**Table 6.1** Effects of different types of soil towards the growth of *Moringa oleifera* (Source: Mashela, 2016)

Type of Soil	Growth Response
Calcareous	(1) Reduced dry shoot mass (33%), chlorophyll content (36%), and dry root mass (47%) (2) Increased root length (28%)
Clay	(1) Increased dry shoot mass (66%), leaf number (25%), and root length (26%)
Sandy	(1) Increased dry shoot mass (42%) (2) Reduced dry root mass (51%)

Calcareous soil exhibits a high content of carbonate in the form of micritic and microsparitic crystal (Mucher et al., 2018). As this type of soil has a low content of nitrogen and magnesium which are needed for plant growth, the effects can be seen in the reduction of certain plant attributes which are dry root and shoot mass, and the chlorophyll content. Apart from the decreased in certain attributes, calcareous soil has apparently increased the length of the root. This can be explained by the abundance amount of calcium that is linked to cell elongation and cell division. On the contrary, clay soil showed a significant increase in *Moringa* attributes as it is known that this type of soil can retain water which will aid in the process of cation exchange, resulting in the improvement of plant growth (Mashela, 2016). The sandy soil on the other hand, has been proven to have higher mineralization rate than other types of soil (Pahla et al., 2013), which is the reason why the dry shoot mass of *Moringa* is increased.

However, calcareous, clay and sandy soil is not the best type of soil to grow *Moringa*. Although this tree can grow in many types of soil, a well-drained loam to clay loam is the ideal soil to be used (Adebayo et al., 2017) due to its high cation exchange capacity and the ability to prevent a drastic change in the pH of the soil (Regni et al., 2017). Another important point to take note of is that this species can tolerate