

CHAPTER

3

EXTRACTION FOR SIRIH OIL

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3.1 GLOBAL INTEREST OF SIRIH

Malaysia, nestled within its lush tropical rainforest habitats, stands as a veritable treasure trove of natural resources, notably medicinal plants. In particular, Peninsular Malaysia and Sabah, boast a staggering recorded count of approximately 1,300 medicinal plant species out of a total of 7,411 plant species (Abu bakar et al., 2018). Sirih, scientifically known as *Piper betle* Linnaeus, within the Malaysian community, occupies a place of both cultural and medicinal importance.

Sirih, which is characterized by its distinctive heart-shaped leaves, has been a cornerstone of traditional medicine in Malaysia and beyond for centuries. Its historical use is well-documented in ancient texts and indigenous knowledge. This plant is renowned for its diverse phytochemical composition, including phenolics, flavonoids, alkaloids, and other bioactive molecules, which have gained attention for their impressive antioxidant properties to offer potential solutions to a wide range of health problems.

In recent years, there has been a significant worldwide resurgence in the investigation of medicinal plants for their therapeutic potential. However, challenges arise due to the limited storage time and inadequate transportation system for sirih, resulting in substantial waste,

particularly during the rainy season. Sirih may remain unsold or be sold at reduced prices. To tackle this issue, extracting its bioactive compounds either as essential oils or other products could be a promising solution to stabilize market prices in the near future.

Nowadays, researchers are also showing a growing interest in the diverse range of plant-based remedies. This renewed fascination arises from the recognition of botanical resources playing a crucial role in addressing various health concerns. Assessments conducted by the World Health Organization (WHO) underscore the continued importance of plant-based remedies in healthcare. According to the research data, an overwhelming 80% of the global population continues to rely on conventional medicine as a fundamental aspect of their healthcare regimen. Significantly, a substantial portion of the conventional treatments incorporate plant extracts and their bioactive components.

This special attention is an invaluable contribution of sirih through the innovative supercritical fluid extraction (SFE) approach. Therefore, endeavor involves revealing the crucial role of plant extracts and active compounds in shaping global healthcare, while also highlighting the enduring symbiosis between humans and the therapeutic richness of the natural world.

3.2 SIRIH AND ITS TRADITIONAL USAGE

Many medicinal plants can be found in Malaysia; there is no doubt that *Piper* species are the most famous and widely used in conventional medical treatment. Sirih is traditionally used for the treatment of various diseases like bad breath, conjunctivitis, constipation, headache, itches, swelling of gum, cuts, and injuries. The most distributed *Piper* species in Malaysia is *Piper betle* from the *Piperaceae* family. It is a dioecious, annual creeper, climbing by many small adventitious rootlets, growing to a height of about one meter, and the leaves are alternate, simple, and yellowish green to bright green with glossy heart-shaped.

Sirih was taken to Malaysia and the surrounding countries in Southeast Asia, such as Thailand, Vietnam, and Myanmar, more than

2,500 years ago. It then reached Madagascar and East Africa much later and was introduced to the West Indies. It can be easily found in damp forests. Sirih continues to flourish in humid forest conditions with high relative humidity. It prefers deep, well-drained, friable loamy, and clayey soils, rich in organic matter with a pH of about 7 to 7.5. It flourishes in areas with 2250 mm to 4750 mm annual rainfall and is cultivated at altitudes up to 900 mm (Pradhan et al., 2013)

The plant of sirih, as shown in Figure 3.1 is an evergreen and shade-loving perennial root climber. It usually grows to a height of about one meter and is generally grown in hotter and damper parts of the tropical region.



Figure 3.1 The picture of sirih or *Piper betle*

Sirih has been revered since ancient times for its aromatic and astringent qualities, along with its reputed aphrodisiac effects. Its leaves are esteemed for their healing properties, traditionally utilized in treating a diverse range of ailments including bad breath, boils, abscesses, conjunctivitis, constipation, headaches, itching, mastitis, mastoiditis, leucorrhea, gum swelling, rheumatism, cuts, and injuries.

Fresh sirih exhibits a spectrum of therapeutic effects, including antimicrobial, antifungal, antiseptic, and anthelmintic properties. Its essential oil has been applied in the treatment of respiratory issues;