

## LOCAL VEGETABLES TRADITIONALLY USED FOR REDUCING HYPERGLYCEMIA IN SURAT THANI PROVINCE, THAILAND

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### ABSTRACT

**Objective:** High blood sugar can lead to diabetes, a chronic illness which is becoming a public health challenge in the 21<sup>st</sup> century in Thailand. The aim of this study was to survey the local vegetables traditionally used by traditional healers for reducing hyperglycemia and normally consumed in Surat Thani Province and to analyze the total phenolic content (TPC) in these local vegetables.

**Methods:** Data were collected using in-depth interview of traditional healers from nine districts of Surat Thani Province, and TPC of the extracts of vegetables collected was determined by Folin-Ciocalteu reagent method.

**Results:** A total of 16 local vegetables have been found to be used by traditional healers for reducing blood sugar: *Ocimum tenuiflorum* Linn., *Musa acuminata* Colla, *Cassia siamea* (Lam.) Irwin and Barneby, *Coccinia grandis* (L.) Voigt, *Pandanus amaryllifolius* Roxb., *Vigna unguiculata* (L.) Walp. subsp. *Unguiculata*, *Ipomoea aquatic* Forssk., *Phyllanthus emblica* Linn., *Solanum torvum* Sw., *Anacardium occidentale* Linn., *Momordica charantia* Linn., *Moringa oleifera* Lamk., *Archidendron jiringa* Nielsen, *Azadirachta indica* A. Juss. var. *Indica*, *Parkia speciosa* Hassk., and *Micromelum minutum* (G. Forst.) Wight and Arn. In addition, the TPC results showed that the extract of *A. occidentale* Linn. exhibited the highest TPC (8.0±0.11 mg gallic acid equivalent (GAE)/g fresh weight) followed by the extract of *M. minutum* (G. Forst.) Wight and Arn. (3.99±0.10 mg GAE/g fresh weight).

**Conclusion:** Local vegetables in Surat Thani were shown to be a good source of TPC, and the data from this study can serve as fundamental information for promoting consumption of selected local vegetables for diabetes prevention in the future.

**Keywords:** Local vegetables, Blood sugar, Total phenolic content, Surat Thani Province.

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### INTRODUCTION

Hyperglycemia is one of the characteristic features of the metabolic syndrome (also known as syndrome X), which is associated with an increased risk of developing type II diabetes [1]. According to the statistics of the International Diabetes Federation (2017), it is estimated that around 1 in 11 of the adult population globally have diabetes. This number of people with diabetes is increasing rapidly in every country due to an imbalance in dietary intake, physical inactivity, and excess body weight as well as to genetic and physiological factors [2]. Similarly to Thailand, data from the Ministry of Public Health in 2017 reported the prevalence of diabetes rose from 2.3% in 1991 to 8.9% or approximately 5 million individuals in 2014.

A number of studies have provided evidence that consumption of fruits and vegetables may reduce the risk of various diseases such as cancer [3] and cardiovascular disease [4], including type II diabetes mellitus, for example, El-Beshbishy and Bahashwan (2012) demonstrated that aqueous extract from basil (*Ocimum basilicum*) inhibit alpha-amylase and alpha-glucosidase activities, the enzymes involved in breaking down starch, *in vitro* [5]. In addition, the review of Reyad-ul-ferdous *et al.*, in 2015, suggested that extract of *Abutilon indicum*, plant grown extensively in Bangladesh, India, and Pakistan, can inhibit glucose absorption and stimulates insulin secretion in streptozotocin-induced diabetic rodents [6]. The authors also revealed that phenolic compounds in plants account for the observed beneficial effects of the extracts.

Medicinal plants have attracted public interest recently and have been proposed as an alternative approach to prevent and treat diabetes mellitus due to less side effects of natural products and toxicity of modern synthetic drugs used for reducing blood sugar in diabetic

patients such as acarbose, miglitol, or voglibose [7]. However, the evidence of beneficial effects of local vegetables, which are commonly consumed, especially in the area of Southern Thailand, is scarce and need more investigation. Therefore, the objectives of this study were (1) to survey the local vegetables used by traditional healers in Surat Thani Province for reducing hyperglycemia and (2) to determine the total phenolic content (TPC) in the extracts of these local vegetables.

### METHODS

#### The study area

The area of the survey is located between 8°38' and 9°34' latitudes and 98°58' and 99°56' longitudes in the Southern part of Thailand, Surat Thani Province. Nine districts across this region were randomly selected for data collection, including: Muang (no. 1), Kanchanadit (no. 2), Koh Samui (no. 4), Chaiya (no. 6), Khiri rat Nikhom (no. 8), Tha Chang (no. 11), Khian-Sa (no. 14), Wiang Sa (no. 15), and Phunphin (no. 17), as highlighted in Fig. 1.

#### Data collection

The study was conducted during March 2015–February 2016. Data related to the utilization of local vegetables for reducing hyperglycemia were first reviewed from the literature search of traditional remedies for the treatment of diabetes in Southern Thailand and then rechecked using in-depth interview of traditional healers from nine districts in Surat Thani Province. Local healers in each of the nine districts were selected purposively, based on data of registered folk medicinal practitioners of the Department of Thai Traditional Medicine, Surat Thani Provincial Health Office. Semi-structure questionnaire was used for collecting the ethnomedicinal data: Locality, vernacular plant names, plant parts used, method of preparation, and method of administration.





