

TAMARILLO IN NORTH SUMATERA: NUTRIENT CONTENT

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Abstract

Tamarillo (local name Terung Belanda) is a well known fruit in North Sumatera, Indonesia. It is widely cultivated in areas surrounding The Toba Lake. The diversity and chemical content of this fruit were determined in four districts around Toba Lake; The Karo, Dairi, Samosir, and Humbang Hasundutan districts. The chemical content obtained from freshly picked fruits from all four areas were ascorbic acid (32 – 35.5 g/100 g) using dye titration method, protein (1.60 – 1.97 % w/w) using semi micro Kjeldahl, fat (0.10-0.70 % w/w) using soxhlet extraction, carbohydrate (10.0-12.7 % w/w) using Luff Schrool, ash (0.8-0.89 %w/w) using furnace and water (84.2-86.2 %w/w) using oven method.

Key words: Diversity, nutrition, tamarillo, terung belanda, Toba Lake.

A. INTRODUCTION

The tree tomato, *Cyphomandra betacea* Sendt. (*C. hartwegi* Sendt.; *Solanum betaceum* Cav.) is the best-known of about 30 species of *Cyphomandra* (family Solanaceae). It is native to the subtropical Andes (Biodiversity International, 2013). Among its various regional names are: *tomate*, *tomate extranjer* (Guatemala); *tomate de palo* (Honduras); *arvore do tomate*, *tomate de arvore* (Brazil) and *pepino de arbol* (Colombia). In 1970 the construed name "tamarillo" was adopted in New Zealand and has become the standard commercial designation for the fruit. The plant is a small, half-woody, reaching 10 to 18 ft (3-5.5 m) in height. The leaves are muskily odorous, evergreen, alternate, heart-shaped at the base, ovate, pointed at the apex, softly hairy, with conspicuous coarse veins. Borne in small, loose clusters near the branch tips, the fragrant flowers, 1/2 to 3/4 in (1.25-2 cm) wide, have 5 pale-pink or lavender, pointed lobes, 5 prominent yellow stamens, and green-purple calyx. The long-stalked, pendent fruit, borne singly, or in clusters of 3 to 12, is smooth and egg-shaped. Skin color may be solid deep-purple, blood-red, orange or yellow, or red-and-yellow, and may have faint dark, longitudinal stripes. Flesh color varies accordingly from orange-red or orange to yellow or cream-yellow. The seeds are thin, nearly flat, circular, larger and harder than those of the true tomato and distinctly bitter. The fruit has a slightly resinous aroma and the flavor suggests a mild or underripe tomato with a faintly resinous aftertaste (Morton, 1987).

In Indonesia, tamarillo is known as Terung Belanda. In North Sumatera, Indonesia, it is widely cultivated in Karo, Dairi, Humbang Hasundutan, Samosir, Toba Samosir, North

Tapanuli and Simalungun districts. All of these districts are surrounding the Toba Lake. The fruit is usually consumed as fresh fruit, juice and spice for some traditional dish by the locals. Toba Lake is located in the centre of North Sumatera. It is located at 903 – 1981 m above sea level. The average temperature is between 18 – 20 °C. This condition is in accordance with the perfect grow condition of tamarillo. Latest finding on tamarillo strongly suggest the exceptional function of this fruit. Tamarillo exhibits a protective effect against high fat diet induced obesity in rat model (Kadir, 2015). It is also possesses high capacity of antioxidant (Espin, 2015). Tamarillo is rich in natural pigmen, antocyanins, which is related to chronic deseases prevention (Rajendral, 2014; Mertz, 2009).

Despite the use of tamarillo, it is well known that some chemical content in fruit vary with some factors, including climatic/environmental conditions, maturity state and position on the tree, handling and storage and ripening stage, ascorbic acid content in lemon fruits for instance (Nojovan, 2008 and Holcombe, 1992). Another factor affecting the chemical content is the cultivation area (Wijayanti, 2010). Diversity of the plant also influencing its chemical content, such as found in the red fruit of Papua (Murtiningrum, 2012). Variation of chemical contents implies the variation of effect gained from consuming the fruit.

To the best of our knowledge, there is no report on the diversity and chemical content of tamarillo in North Sumatera. Therefore, this study is aimed to determine the diversity and chemical content of tamarillo from some areas of Toba Lake surrounding (Karo, Dairi, Humbang Hasundutan and Samosir districts) in North Sumatera Province.

B. MATERIALS AND METHODS

1. Study area

The selected study areas are the central area for tamarillo cultivation in North Sumatera Province. The areaswere (1) Dairi, (2) Humbang hasundutan, (3) Karo and (4) Samosir districts as can be seen in Figure 1. Every districts was represented by three subdistricts. This study used exploratory survey which was included: inventory of tamarillo accessions that are known by the name of their local community and observation in the community to examine the use of this fruit based on the society knowledge.

2. Chemical content analysis

Laboratory analysis was conducted to study the physical characteristics and chemical composition of tamarillo. Analysis of chemical composition on the tamarillo includes the vitamin C content (dye titration), water content (oven method), ash (furnace method), fat (Soxhlet extraction), protein (micro Kjeldahl), carbohydrate (Luff-Schoorl) (SNI 01-2891-1992). Sample for the laboratory analysis is freshly taken from the tree. The fruit was sorted to ensure the similar ripening stage by observing the friut skin colour. Selected fruits must have deep red purple colour.

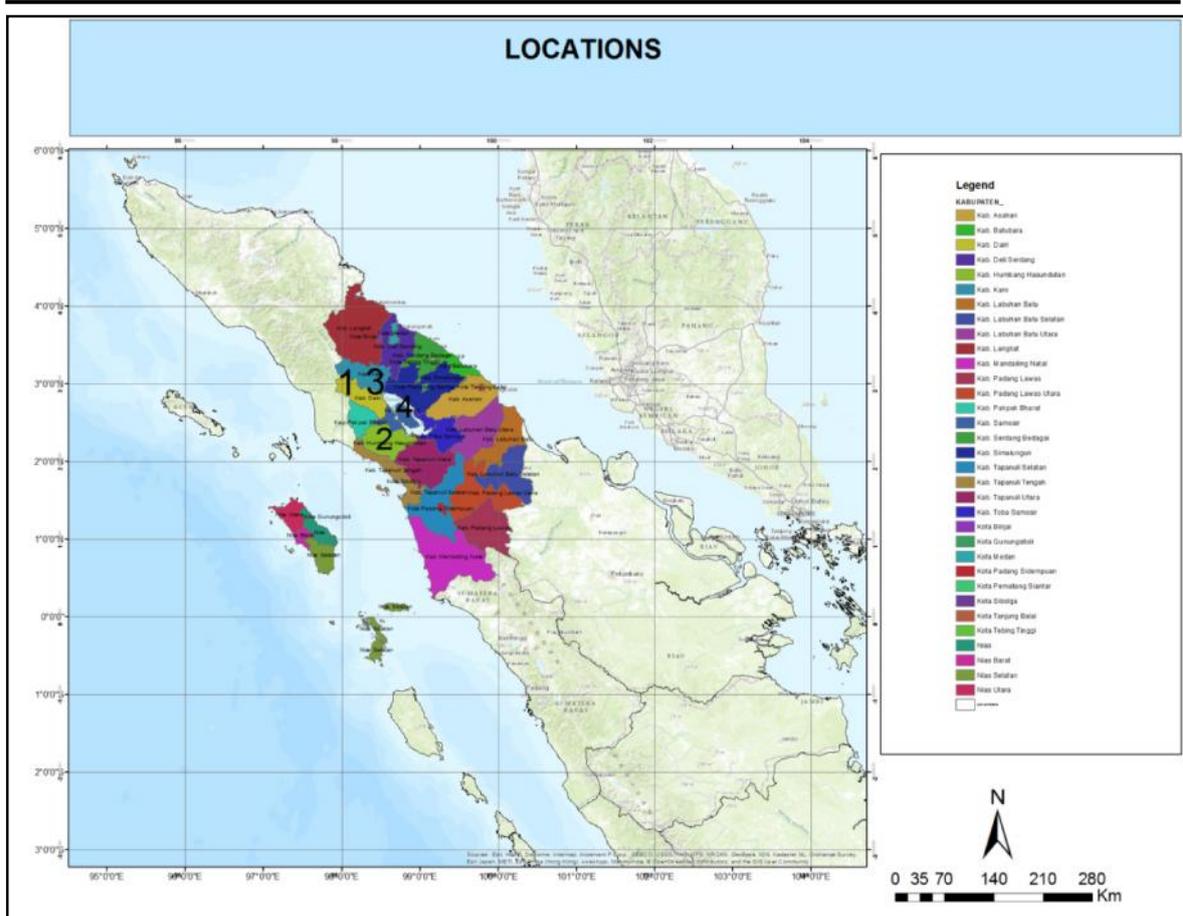


Figure 1. Location of Toba Lake indicating the sampling sites of *Solanum bataceum*

C. RESULTS AND DISCUSSION

The tamarillo was taken from four different areas surrounding the Toba Lake. All four areas have different height (Sidikalang (Dairi) is located at 1,066 m above sea level, Kabanjahe (Karo) is located at 3,000 m above sea level, Pangururan (Samosir) is located at 1,000 m above the sea level and Dolok sanggul (Humbang hasundutan) is located at 2,000 m above sea level. Besides the difference in height, rain frequency is also different among the four places. The environmental difference among all four areas is assumed to play a role in the nutrient content of the fruit.

The ascorbic acid, protein, fat, carbohydrate, ash and water of 100 g of tamarillo mesocarp were determined and the result is listed in Table 1.

Table 1. The chemical content in g of 100 g of tamarillo

Content	Karo	Dairi	Samosir	Humbang Hasundutan
Ascorbic acid (mg/100 g)	32.0	35.2	35.5	32.5
Protein (% w/w)	1.79	1.97	1.60	1.67
Fat (% w/w)	0.56	0.70	0.39	0.10
Carbohydrat (% w/w)e	10.0	10.0	10.7	12.7
Ash (% w/w)	0.86	0.89	0.87	0.80
Water (% w/w)	86.2	85.9	85.9	84.2

D. CONCLUSION

The nutrient content in tamarillo from Karo, Humbang Hasundutan, Dairi and Samosir are different among each other. The ascorbic acid content range from 32 – 35.5 g/100 g, protein (1.60 – 1.97 % w/w), fat (0.10-0.70 % w/w), carbohydrate (10.0-12.7 % w/w), ash (0.8-0.89 %w/w) and water (84.2-86.2 %w/w).

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