



## Structural characterization, degree of esterification and some gelling properties of Krueo Ma Noy (*Cissampelos pareira*) pectin

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### Abstract

Pectins extracted from Krueo Ma Noy (*Cissampelos pareira*) leaves mainly consisted of galacturonic acid with trace amount of neutral sugars. The dominant structure of Krueo Ma Noy pectin was established as a 1,4-linked  $\alpha$ -D-galacturonan by a combination of carboxyl reduction and methylation analysis, and confirmed by FT-IR spectroscopy. The degree of esterification of Krueo Ma Noy pectins was 41.7 and 33.7% for crude and dialyzed pectins, respectively. Krueo Ma Noy pectin has an average molecular weight of 55 kDa, radius of gyration of 15.2 nm and intrinsic viscosity of 2.3 dl/g. Krueo Ma Noy pectin exhibited gelling properties in aqueous solutions at 0.5% (w/v) at 5 °C. Gels were formed at concentrations of 1.0% (w/v) and above even at room temperature. The gel strength, melting point, and melting enthalpy of Krueo Ma Noy pectin increased with polysaccharide concentration.

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**Keywords:** Krueo Ma Noy pectin; *Cissampelos pareira*; FT-IR spectroscopy; Degree of esterification; HPSEC; DSC

### 1. Introduction

Pectin is a complex heterogeneous polysaccharide found in the primary cell walls of most plants, in which it provides mechanical strength and flexibility due to its interaction with other cell wall components. The dominant structural feature of pectin is a linear 1→4-linked chain of poly- $\alpha$ -D-galacturonic acid with varying degrees of esterification of the carboxylic groups. However, pectins also contain  $\alpha$ -L-rhamnopyranosyl residues in the backbone chain and branch chains of arabinan and galactan and their fine structure vary considerably. In the food industry, pectin is an important gelling agent and thickener. Its gelling properties are primarily dependent on the degree of esterification and the molecular weight of the polysaccharides (Barros et al., 2002; Manrique and Lajolo, 2002).

Krueo Ma Noy, *Cissampelos pareira*, is a woody, climbing vine from the family *Menispermaceae*. It is found throughout the warm regions of Asia, East Africa, and South America (Smitinand & Larsen, 1991). It is widespread in the northeast of Thailand. Krueo Ma Noy leaves (up to 30 cm in length) are commonly used as a herb by indigenous people due to their analgesic properties and they have been used for many years for ailments of women. The dark green gel formed after cold extraction of the leaves with water has been used by indigenous peoples as cooling medicine for treating fever. Local medicine also uses this plant for a number of ailments such as asthma and dysentery, as a diuretic and for treatment of traumatic pain (Mukerji & Bhandari, 1959). It is interesting to note that the formation of the gel occurs in a very short period of time after water extraction of the leaf. Singthong, Ningsanond, Cui, and Goff (2004) have recently shown that the polysaccharide responsible for gelation of Krueo Ma Noy extract is a pectin, but the structure of this pectin has not been determined.

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