

## DETERMINATION OF CARBOHYDRATES IN ERIOBOTRYA JAPONICA LEAVES USING THE HPLC METHOD

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### Abstract

This study investigates the carbohydrate composition of *Eriobotrya japonica* (loquat) leaves using high-performance liquid chromatography with refractive index detection (HPLC-RID). The major sugars identified in the aqueous leaf extract were glucose (7.248 mg/g), fructose (0.838 mg/g), and sucrose (0.03 mg/g), while maltose was not detected. The total carbohydrate content of the leaves was 8.116 mg/g. Glucose was the predominant carbohydrate, accounting for over 89% of the total sugar content. These findings provide new insights into the metabolic characteristics of *E. japonica* leaves and contribute to understanding their potential nutritional, pharmacological, and commodity-chemical significance.

**Keywords:** *Eriobotrya japonica*; loquat leaves; carbohydrates; glucose; fructose; sucrose; HPLC analysis; phytochemical composition.

### Introduction

*Eriobotrya japonica* (Thunb.) Lindl., commonly known as loquat, is a medicinal and nutritionally valuable plant widely used in traditional medicine across East and Central Asia. Previous phytochemical studies have revealed the presence of phenolic compounds, flavonoids, terpenoids, vitamins, amino acids, and organic acids in the leaves. However, the monosaccharide composition of *E. japonica* leaves remains insufficiently studied.

Carbohydrates play a fundamental role in plant physiology, participating in cellular energy metabolism, osmotic regulation, signal transduction, and the stabilization of secondary metabolites. Monosaccharides such as glucose and fructose also influence antioxidant activity and may contribute to the biological effects of plant extracts.

The present study aims to determine the carbohydrate profile of *E. japonica* leaves using validated HPLC-RID methodology and to evaluate the chemical and biological relevance of the identified sugars.

### Materials and Methods

*Plant Material:* Fresh leaves of *Eriobotrya japonica* were collected in May–June 2024 from cultivated trees in Uzbekistan. The leaves were air-dried at 40 °C and milled into a fine powder.

*Extraction Procedure:* Solvent: distilled water; Ratio: 1:20 (w/v); Extraction temperature: 80 °C; Extraction time: 2 h; Filtration and concentration under reduced pressure; Final samples were filtered through 0.45 µm membranes before HPLC

analysis.

**HPLC-RID Analysis:** Instrument: HPLC system equipped with RID; Column: Aminex HPX-87C carbohydrate analysis column; Column temperature: 80 °C; Mobile phase: deionized water; Flow rate: 0.6 mL/min; Injection volume: 20 µL; Standards: glucose, fructose, sucrose, maltose (Sigma-Aldrich); Quantification was performed using external standard calibration curves.

## Results

When the carbohydrate content of *Eriobotrya japonica* leaves was determined using the HPLC method, the following results were obtained (figure 1; table 1).

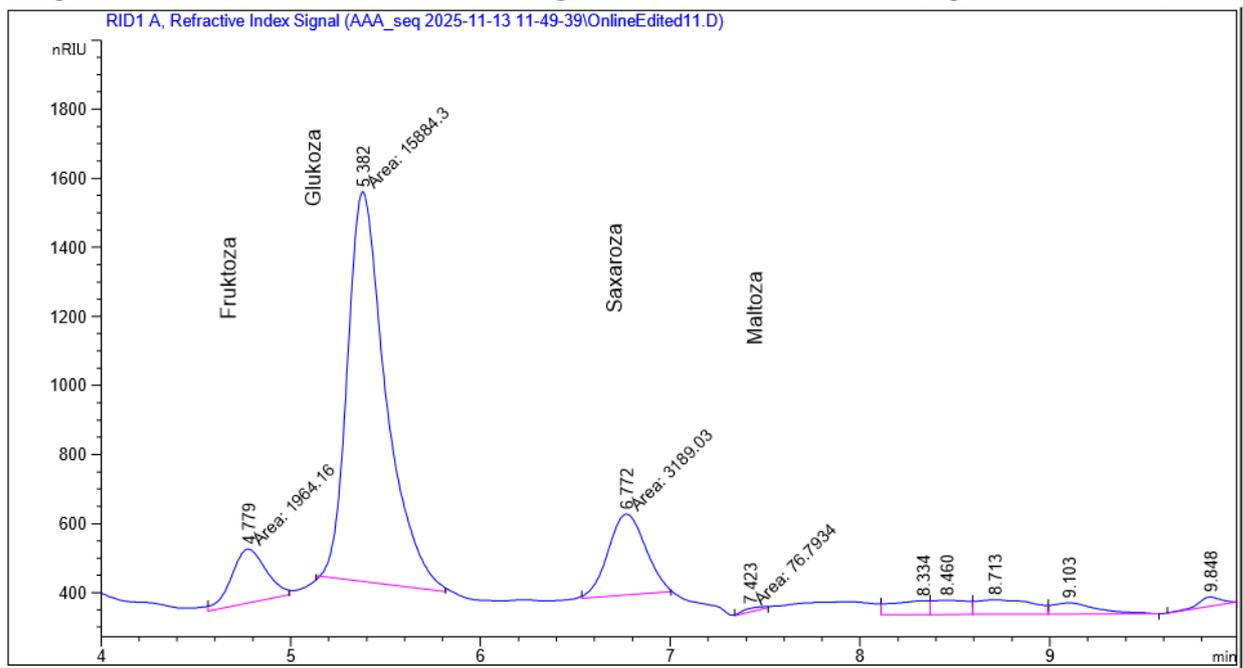


Figure 1. Chromatogram of carbohydrates in *Eriobotrya japonica* leaves.

Table 1.

### Carbohydrate content of *E. japonica* leaves

No	Carbohydrate	Content (mg/g)
1	Fructose	0.838
2	Glucose	7.248
3	Sucrose	0.030
4	Maltose	0.000
	Total	8.116 mg/g

Glucose is the dominant sugar, accounting for 89.3% of total carbohydrates.

Fructose contributes about 10.3%.

Sucrose is present only in trace amounts.

The absence of maltose suggests limited starch-degradation pathways in loquat leaves.

The overall low carbohydrate concentration aligns with known data that loquat

leaves are rich in polyphenols rather than sugars.

### Discussion

The predominance of glucose in *E. japonica* leaves is consistent with typical carbohydrate distribution in evergreen Rosaceae species such as *Prunus amygdalus*, *Prunus persica*, and *Malus domestica*. The relatively low total sugar content indicates that *E. japonica* leaves allocate more metabolic resources toward secondary metabolite biosynthesis, including flavonoids and phenolic acids.

These findings correlate with previously reported strong antioxidant and anti-inflammatory properties of loquat leaf extracts, suggesting that monosaccharides may play a supportive role in stabilizing bioactive compounds and maintaining cellular osmotic balance during leaf maturation.

From a commodity-chemical perspective, the low sugar content is advantageous for producing stable aqueous extracts and phytopharmaceutical formulations because reduced sugar levels minimize microbial growth and improve shelf life.

### Conclusion

The study demonstrated that *Eriobotrya japonica* leaves contain a low overall carbohydrate level, with glucose identified as the major sugar. Fructose and sucrose were present in minor amounts, while maltose was not detected. These results provide a basic chemical profile of the leaf carbohydrates and can support future research on the nutritional and pharmacological potential of loquat leaf extracts.

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