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Screening of the leaves of *Camellia japonica* L. for antibacterial activities as a novel antimicrobial agents

P. Barciela(1); A.G. Pereira(1),(2); E. Yuksek(1); A. Silva (1),(3); M. Carpena(1); M. F. Barroso (3); M.A. Prieto(1),*

(1) Universidade de Vigo, Nutrition and Bromatology Group, Department of Analytical Chemistry and Food Science, Instituto de Agroecoloxía e Alimentación (IAA) – CITEXVI, 36310 Vigo, Spain.

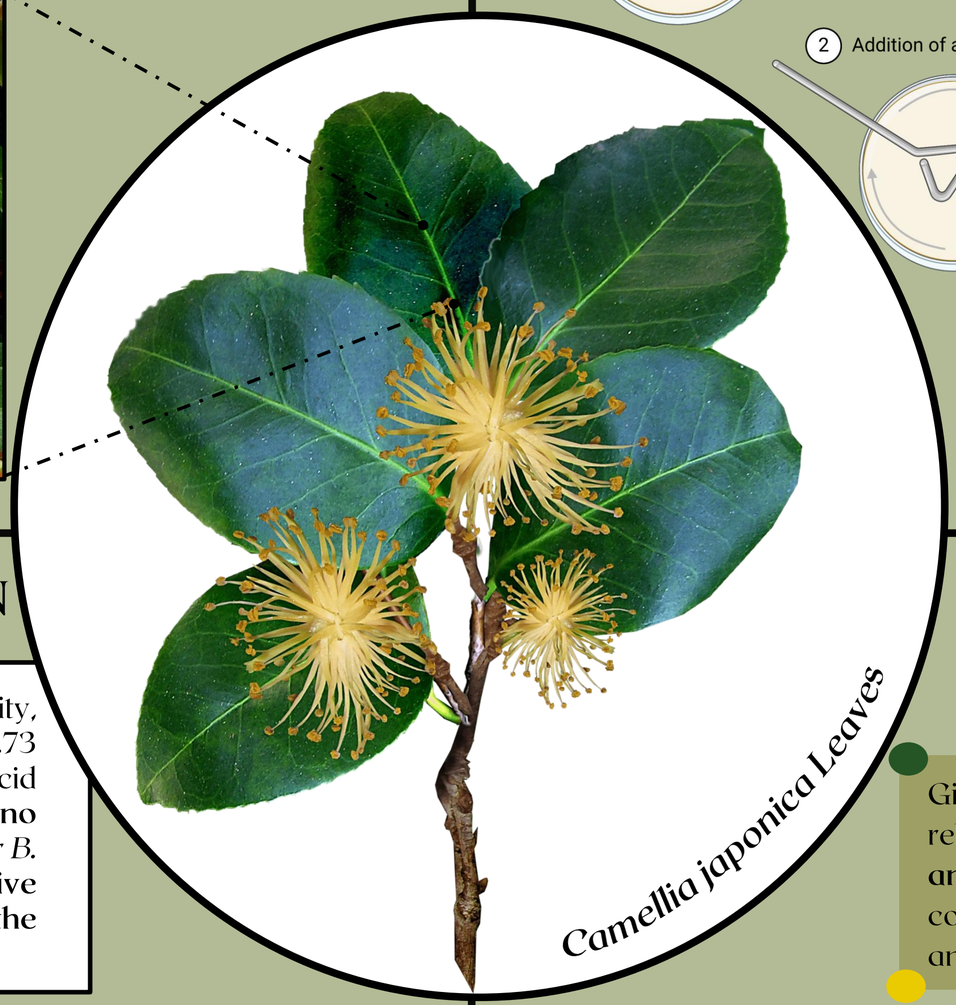
(2) Investigaciones Agroalimentarias Research Group, Galicia Sur Health Research Institute (IIS Galicia Sur). SERGAS-UVIGO

(3) REQUIMTE/LAQV, Instituto Superior de Engenharia do Porto, Instituto Politécnico do Porto, Rua Dr. António Bernardino de Almeida 431, 4200-072 Porto, Portugal.

*Corresponding author: M.A. Prieto (mprieto@uvigo.es).

I. INTRODUCTION

- Antimicrobial resistance (AMR) is a present reality, causing over 1 million deaths annually, according to the **WHO**, and threatening global public health by reducing the effectiveness of treatments.
- The spread of AMR is linked to factors like the **overuse of antibiotics and its global dissemination**, highlighting the need for **alternative antimicrobial solutions.**
- Plant-derived compounds offer promising **natural antimicrobial alternatives,** with mechanisms of action distinct from conventional antibiotics.
- *Camellia japonica* L., a perennial shrub native to **East Asia,** is valued for its **ornamental** and **medicinal uses,** but while its seed oil is known for **cosmetic** and **culinary applications, its leaves remain underexplored for antimicrobial properties.**



2. OBJECTIVES AND METHODOLOGY

- Evaluate the natural antibacterial activity of *Camellia japonica* L. **leaves against food-borne pathogens.**
- Assess the effectiveness of a **simple and economical maceration extraction method** for obtaining antibacterial compounds.

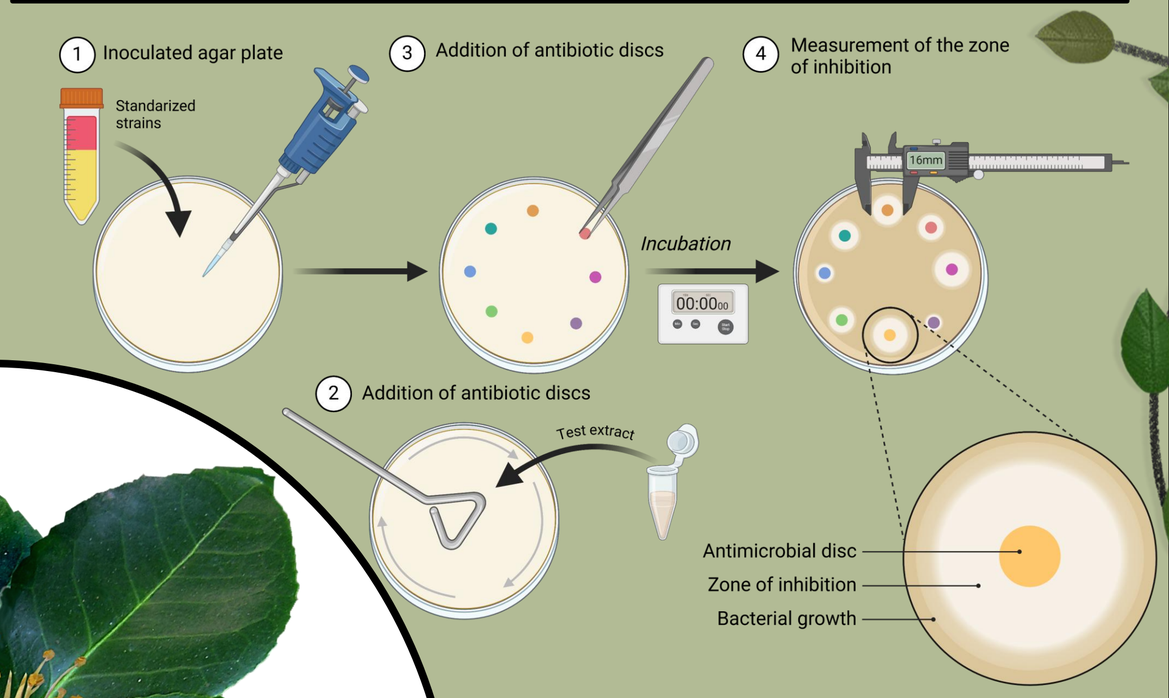


Figure 1. Illustration of the measurement of antimicrobial activity using the **agar disc diffusion method.** Bacteria are grown in a **Petri dish** and the **inhibition zones** (IZ) produced by the addition of extract are measured.

3. RESULTS AND DISCUSSION

C. japonica **leaves** showed antimicrobial activity, with IZ of 11.87 mm against *P. aeruginosa* and 11.73 mm against *S. enteritidis,* compared to lactic acid (12.53 mm and 18.41 mm, respectively). However, **no activity** was observed against *E. coli, S. aureus,* or *B. cereus* (**Figure 1**), indicating a **selective antibacterial effect that varies depending on the bacterial strain tested.**

Table 1. Bioactive compounds of *C. japonica Leaves* related to its antibacterial potential.

Subclass	Compounds	Extraction	Identification	Bioactivities	Ref.
Phenolic acids					
Benzoic acid derivatives	Gallic acid	MetOH	GC-MS	Antimicrobial, anti-inflammatory, antioxidant, anticancer	(Lee et al., 2005)
Flavonoids					
Flavonols	Quercetin	MetOH	GC-MS	Antimicrobial, anti-inflammatory, anticancer, antioxidant	(Kim, Jeong and Shim, 2010)
Flavan-3-ols	(-)-epicatechin	Acetone 70%, 40 ºC	HPLC, NMR, GC-MS	Nd	(Jin Zhexiong, 2014)
		MetOH	GC-MS	Antimicrobial, anti-inflammatory, anticancer, antioxidant	(Moon and Kim, 2018)

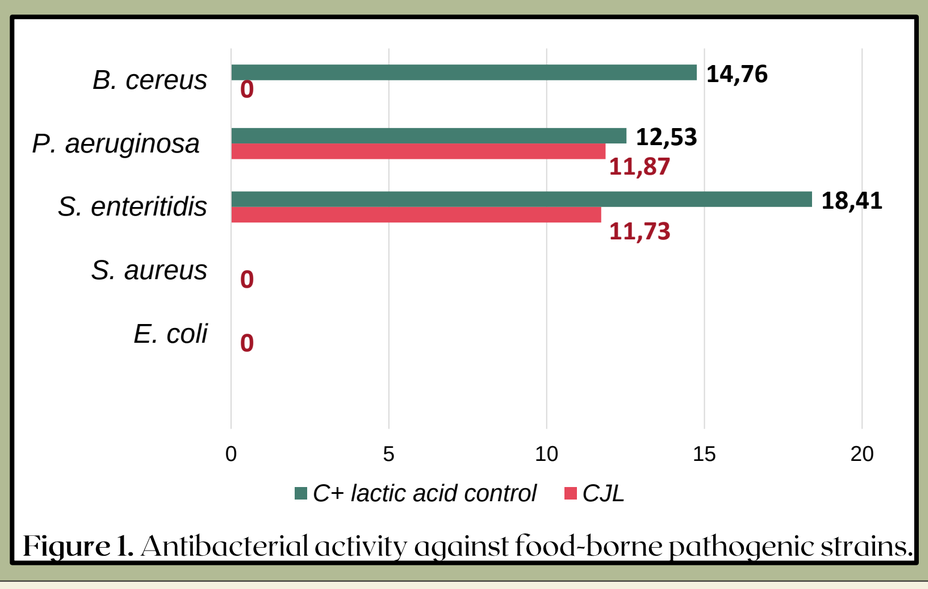


Figure 1. Antibacterial activity against food-borne pathogenic strains.

4. FINAL REMARKS AND FUTUR PERSPECTIVES

Given that it is **necessary** to establish the relationship between **chemical composition** and **antimicrobial activity. Table 1** lists the bioactive compounds in *C. japonica* **leaves** and their antimicrobial potential **based on the literature.**

Sharma et al., (2019), reported inhibition against *B. subtilis* and *P. aeruginosa* (15mm) only at 200 µg/ml, whereas streptomycin (10µg/ml) gave ZI of ~30mm. These results are partially consistent with ours, suggesting that *C. japonica* **leaves** exhibit **concentration-dependent** and strain-specific antimicrobial activity, **possibly reflecting selective mechanisms that warrant further investigation to identify responsible bioactive compounds.**

Camellia japonica L. leaves show potential as sources of **antibacterial compounds against foodborne pathogens.** However, despite promising preliminary results, considerable challenges remain before they become industrialized. It is essential to adopt a multidisciplinary approach, including in-depth **screening of the phytochemical composition** and a **comprehensive evaluation of the biological antimicrobial potential of these extracts.**

ACKNOWLEDGMENTS

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