



ANTIOXIDATIVE AND IMMUNOMODULATING POTENTIAL OF THE MUSHROOM *Phellinus linteus*



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INTRODUCTION

Phellinus linteus is a popular medicinal mushroom that is widely used in Asian countries, **Figure 1**. A number of studies have confirmed that *P. linteus* possesses exceptional biological potential useful for pharmacological applications, including anticancer and anti-inflammatory activities, as well as antidiabetic, hepatoprotective, and neuroprotective effects. The objective of the present study was to evaluate antioxidant and immunomodulatory activities of hot water polysaccharide extract obtained from the medicinal mushroom *Phellinus linteus* (Berk. et Curt.) Teng.

MATERIALS AND METHODS

Dried hot water extract of wild type *P. linteus* was kindly provided by Amazing Grace Health Industries (Bangkok, Thailand). FT-IR was used to study the polysaccharide profile of the extract. Its antioxidant potential was measured by the conjugated diene method in the linoleic acid model system. Immunomodulation was tested *in vitro* by measuring the synthesis of interferon-gamma (IFN- γ) in healthy human peripheral blood mononuclear cells (PBMCs) using enzyme linked immunosorbent assay (ELISA).



Figure 1. *Phellinus linteus* (Berk. et Curt.) Teng

RESULTS

The FT-IR spectrum of *P. linteus* hot water extracted polysaccharides showed a typical carbohydrate pattern, **Figure 2**. Among bands characteristic of glycosidic structures, a spectrum showed wide band at 3000 cm⁻¹ and above, a band at 1155 cm⁻¹ corresponding to C–O–C stretching, and a weak band at 890 cm⁻¹, revealing α -linked glycosyl residues of the main chain, i.e. an axial C1–H. The band at 1044 cm⁻¹ also indicated the presence of β -linkages in the glucosidic chain. A small amount of proteins was also observed with characteristic absorptions at 1635, 1540 and 1412 cm⁻¹. Measurements of antioxidant properties in linoleic acid model system revealed relatively high antioxidant activity with EC₅₀ value of 7.11 mg/mL, **Table 1**. After 48 h of *P. linteus* polysaccharide extract incubation, the IFN- γ titer displayed immunosuppressive effect, 32.6 pg/mL. The IFN- γ titer for the suspension of PBMCs in PBS, which was used as a positive control, was found to be 135.2 pg/mL. Differences in IFN- γ contents in *P. linteus* extract vs. model control were strongly significant ($p < 0.05$).

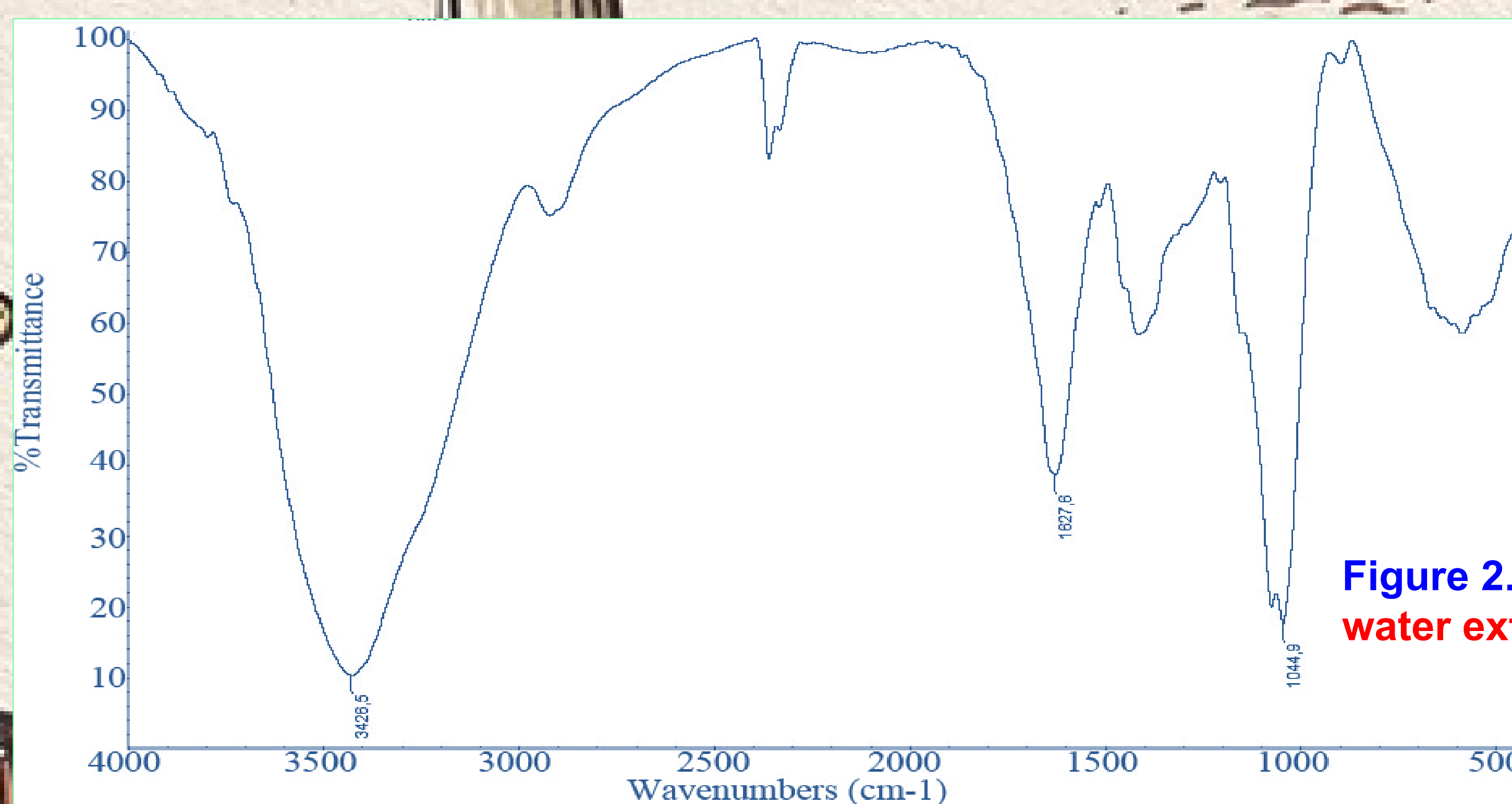


Figure 2. FT-IR spectrum of *P. linteus* hot water extracted polysaccharides

Table 1. Antioxidant and immunomodulatory activities of *P. linteus* hot water extracted polysaccharides

	<i>P. linteus</i> extract	Positive controls
Antioxidant activity, EC ₅₀ (mg/mL) (prevention of LPx)	7.11 +/- 0.5	Ascorbic acid 1.64 +/- 0.1
Immunomodulatory potential, IFN- γ titer after 48 h (pg/mL)	32.6 +/- 2.1	phosphate buffered saline (PBS, pH 7.2) 135.2 +/- 7.3

CONCLUSIONS

The results of this study suggest that the polysaccharide extract of *P. linteus* acts as a natural antioxidant and possesses immunomodulatory properties. Therefore, it can be a suitable raw material for the development of antioxidant food additives. In addition, due to the possible immunosuppressive effect *P. linteus* polysaccharide extract is particularly interesting and could find application in suppression of autoimmune diseases such as rheumatoid arthritis.

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