Title: Isolation of Syringaresinol from Paraserianthes falcataria (L.) Nielsen

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Abstract—A survey of lignans in *Paraserianthes falcataria* (= *Albizia falcataria*) which is one of the most important fast growing trees in tropical Asia was carried out, and syringaresinol was isolated from the methanol extracts of heartwood.

**Key words:** Lignan, *Paraserianthes falcataria* (= *Albizia falcataria*), Syringaresinol

### Introduction

*Paraserianthes falcataria* (= *Albizia falcataria*) is known as one of the typical fast growing tropical trees. During the last decade, huge numbers of this plant have been planted in Indonesia, and its large-scale utilization as wood-based materials and pulping are now beginning. However, little has been known about wood extractives or secondary metabolites of this species.

On the other hand, the bark of Japanese *Albizia julibrissin* (nemunoki in Japanese) has long been utilized as a folk medicine to reduce human stresses, and diglucoside of syringaresinol (Fig. 1) was found to be, at least, one of the active principles 1-3). Both (-)- and (+)-syringaresinol diglucosides have been known to reduce the normal physiological responses of the mammalian body to stress 4,5. Another *Albizia* species, *Albizia myriophylla*, was also found to contain several lignan glycosides 6).

Thus it seemed likely that *P. falcataria* (= *A. falcataria*) also contained biologically active syringaresinol glycosides. From the viewpoint of wood chemistry, it is important to analyze components of wood extractives of commercially important trees. In addition, if *P. falcataria* contains syringaresinol glycosides, especially biologically active syringaresinol diglycoside, the extracts of the plant might be utilized for tonics. Thus, it is of importance from the viewpoint of total utilization of *P. falcataria*.

The aim of this research was to examine whether *P. falcataria* contains biologically active syringaresinol derivatives or not. As the first step, the analysis of methanol extracts of various parts of *P. falcataria* was carried out and syringaresinol was isolated from the heartwood.

### Experimental

**Instruments and chromatography**

$^1$H-NMR spectra were taken with a JNM-LA400MK FT-NMR System (JEOL Ltd.) with tetramethylsilane as an internal standard. Chemical shifts and coupling constants (J) were expressed in $\delta$ and Hz, respectively. Gas chromatography-mass spectrometry (GC-MS) was conducted as previously described 7,8). Silica gel thin-layer chromatography (TLC) employed Kieselgel 60 F$_{254}$ (Merck, 20X20 cm, 0.25 mm).

**Chemicals**

An authentic sample of syringaresinol was prepared by $\beta$-glucosidase-catalyzed hydrolysis of syringaresinol diglucoside 6). All chemicals used were of reagent grade, unless otherwise stated.

**GC-MS analysis of methanol extracts**

Bark, sapwood and heartwood of *Paraserianthes falcataria* (L.) Nielsen [syn. *Albizia falcataria* (L.) Fosberg.] which was collected in Indonesia in 1997 were pulverized individually, and extracted with hot methanol as previously described 7,10). These methanol extracts (as trimethylsilyl ether derivatives) were subjected to GC-MS analysis directly or after treatment with $\beta$-glucosidase as previously described 7,11-12).

**Isolation of syringaresinol**

Heartwood powder of *P. falcataria* was extracted with hot methanol. The methanol extracts were subjected to repeated purification with silica gel column chromatography and silica gel TLC to afford syringaresinol.
A

Albizia julibrissin

(-)-Syringaresinol-4,4'-bis-O-\beta-D-glucopyranoside

B

Paraserianthes falcataria

(=Albizia falcataria)

Syringaresinol

Fig. 1. Syringaresinol and its glycoside isolated from Albizia spp.

H8), ca. 3.9 (2H, m, 2 × H9), 3.90 (12H, s, 4 × OCH3), 4.28 (2H, dd, J = 7.0, J = 8.9, 2 × H9), 4.72 (2H, d, J = 3.9, 2 × H7), 6.58 (4H, s, aromatic) with that of authentic sample.

This is the first report of isolation of syringaresinol from P. falcataria, and these results suggest that this plant contains biologically active syringaresinol diglucoside and a potential application of this plant to tonics or pharmaceutical usage.

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References