Isolation of Syringaresinol from *Paraserianthes falcataria* (L.) Nielsen*1

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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 principles1-3). Both (-)- and (+)-syringaresinol diglucosides have been known to reduce the normal physiological responses of the mammalian body to stress4,5. Another *Albizia* species, *Albizia myriophylla*, was also found to contain several lignan glycosides6). Thus it seemed likely that *P. falcataria* (= *A. falcataria*) also contained biologically active syringaresinol glycosides.

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**

1H-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 δ and Hz, respectively. Gas chromatography-mass spectrometry (GC-MS) was conducted as previously described7). Silica gel thin-layer chromatography (TLC) employed Kieselgel 60 F254 (Merck, 20×20 cm, 0.25 mm).

**Chemicals**

An authentic sample of syringaresinol was prepared by β-glucosidase-catalyzed hydrolysis of syringaresinol diglucoside9). 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 described8,10). These methanol extracts (as trimethylsilyl ether derivatives) were subjected to GC-MS analysis directly or after treatment with β-glucosidase as previously described7,11-12).

**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.

Results and Discussion

Preliminary GC-MS analysis of the methanol extracts of bark, sapwood and heartwood of *P. falcataria* suggested that glycosides of syringaresinol was present in the methanol extracts of the sapwood and bark, while syringaresinol was present in the methanol extracts of the heartwood (data not shown). Next, syringaresinol (Fig. 1) was isolated from the methanol extracts of the heartwood, and the structure was confirmed by comparing the 1H-NMR spectrum (δ (CDCl3), 3.09 (2H, m, 2×
A

**Albizia julibrissin**

(-)-Syringaresinol-4,4’-bis-O-β-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**