Note

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 *Albiz(z)ia 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 *Albiz(z)ia* species, *Albizzia 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 diglucoside, 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 δ 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, 20×20 cm, 0.25 mm).

Chemicals

An authentic sample of syringaresinol was prepared by β-glucosidase-catalyzed hydrolysis of syringaresinol diglucoside[9]. 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[8,10]. These methanol extracts (as trimethylsilyl ether derivatives) were subjected to GC-MS analysis directly or after treatment with β-glucosidase as previously described[7,10–12].

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 ^{1}H-NMR spectrum [δ ($CDCl_3$), 3.09 (2H, m, 2×

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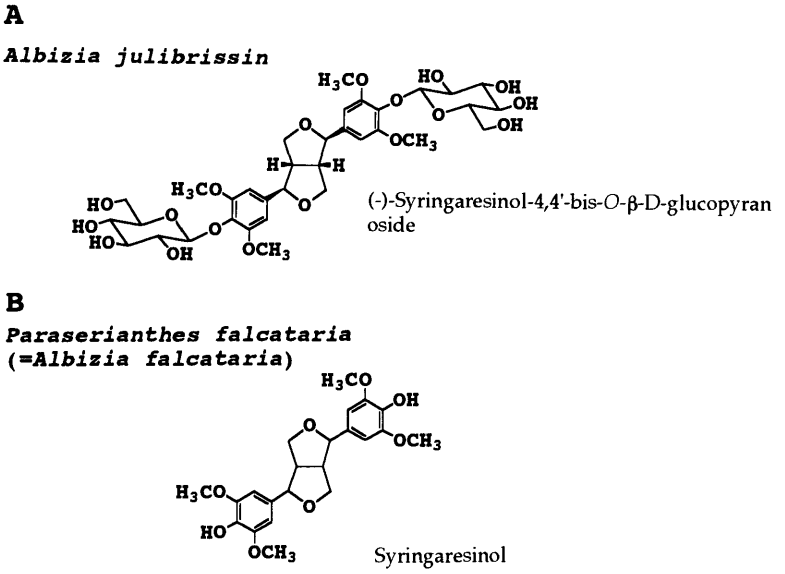

Fig. 1. Syringaresinol and its glycoside isolated from *Albizia* spp.

H8),ca. 3.9 (2H, m, 2×H9), 3.90 (12H, s, 4×OCH_3), 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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