

BENZOFURANS AND STEROL FROM THE SEEDS OF *Styrax obassia*

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Two benzofurans (**1**, **2**) along with five known compounds (**3**–**7**) were isolated from the seeds of *S. obassia*. Their structures were elucidated as methyl 3-[7-methoxy-2-(3',4'-methylenedioxyphenyl)-5-benzofuranyl]-propionate (**1**), methyl 3-[2-(3',4'-methylenedioxyphenyl)-5-benzofuranyl]-propionate (**2**), egonol (**3**), egonolacetate (**4**), egonol-2-methylbutanoate (**5**), 7-demethoxyegonol-2-methylbutanoate (**6**), and stigmasterol (**7**) on the basis of their comprehensive spectroscopic analysis including 2D NMR data. Compounds **1**, **2** are obtained for the first time from nature, while this is the first record of compound **7** from the *Styrax* species.

Key words: *Styrax obassia*, Styracaceae, benzofuran, sterol.

Styrax obassia, also known as 'fragrant snowbell', is a member of the Styracaceae family. It is a shrub or tree native to tropical and subtropical regions, with the majority in eastern and southern Asia [1, 2]. The genus *Styrax* is different from other genera of this family due to the production of resinous material, usually secreted when the barks and trunks are injured by sharp objects [1]. This resin, in the past considered a miraculous remedy in several parts of Asia and America, has been used in traditional medicine to treat inflammatory diseases [3]. Its resin was used by Romans, Egyptians, Phoenicians, and Ionians as incense and in therapeutics [4]. The pericarps are used as washing soap (skin elastic material), cough medicine, and as a piscicidal agent [5]. *Styrax* species contain egonol, a natural benzofuran, which is known to be an effective pyrethrum synergist [6, 7]. Earlier chemical studies on several *Styrax* species have revealed them to be a rich source of arylpropanoids, triterpenoids, and their glycosides [6–12] with various biological activities such as antisweat [5], antimicrobial [7], antiproliferative [11], cytotoxic [12], and matrix metalloproteinase-1 inhibitor [13]. However, careful literature survey of *Styrax* species revealed that *S. obassia* has not been studied much so far except for a few short reports [6, 8]. Phytochemical investigation of *S. obassia* seeds led us to isolate two benzofurans which we established to be methyl 3-[7-methoxy-2-(3',4'-methylenedioxyphenyl)-5-benzofuranyl]-propionate (**1**) and methyl 3-[2-(3',4'-methylenedioxyphenyl)-5-benzofuranyl]-propionate (**2**), along with five known compounds egonol (**3**), egonolacetate (**4**), egonol-2-methylbutanoate (**5**), 7-demethoxyegonol-2-methylbutanoate (**6**), and stigmasterol (**7**). Compounds **1**, **2** have been previously obtained as intermediate products for the synthesis of 2-phenylbenzofurans [14–16]; however, this is the first report of compounds **1**, **2** from any natural source, while compound **7** is being reported for the first time from the *Styrax* species. This paper deals with the isolation and structure elucidation of compounds **1**–**7** by their comprehensive spectroscopic analysis, including 2D NMR, and comparison of their spectral data with those of related compounds.

Compound **1** was obtained as a white powder and exhibited UV absorbance in MeOH at 238 and 316 nm. The IR spectrum of compound **1** showed bands at 2935, 1736, 1603, 1481, 1232, and 941 cm^{−1} for the presence of aliphatic CH₂, an ester, unsaturated ring, substituted furan ring, cyclic ether, and methylenedioxy groups respectively in the molecule. Compound **1** showed a molecular ion peak at *m/z* 354 ([M]⁺, base ion) in the EIMS spectrum; its molecular formula could be determined as C₂₀H₁₈O₆ by its HREIMS spectrum. The ¹H and ¹³C NMR signals of compound **1** were assigned by interpretation of the DEPT, COSY, HMQC, and HMBC, spectra (Table 1).

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