Electronic Supplementary Material (ESI) for RSC Advances

Supplementary Information

Efficient Enzymatic Synthesis of Mangiferin Glycosides in Hydrophilic Organic Solvents

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Analytical Methods

HPLC Analysis: HPLC analysis was conducted using a Dionex P680A HPLC system with a Discovery (ODS) column (250×4.6 mm, 5 μm) and a UV detector at 316 nm. Glycosides were separated from their respective aglycones using a linear gradient of methanol/0.1% formic acid (v/v) in H_2O: 20-60% at 1 mL/min over 20 min.

LC-HRMS Analysis: LC-HRMS was performed on a Waters ACQUITY UPLC system equipped with a binary solvent delivery manager and a sample manager, coupled with a Waters Micromass Q-TOF Premier Mass Spectrometer equipped with an electrospray interface (Waters Corporation, Milford, MA).

NMR Analysis: ^{1}H, ^{13}C and 2D-NMR spectra of glycosides were obtained using a Bruker AV-500 spectrometer (Switzerland), operating at 500 MHz. Samples were dissolved in DMSO-d_6 at room temperature with tetramethylsilane (Me_4Si) as the chemical shift reference.

SDS-PAGE of β-Fructofuranosidase

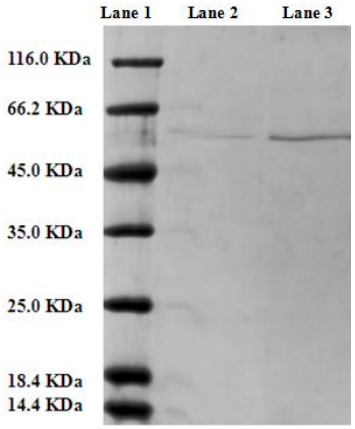

Figure S1. SDS-PAGE of culture from *Arthrobacter arilaitensis* NJEM01 and purified β-fructofuranosidase. Lane 1, molecular-mass standards; Lane 2, supernatant of culture (incubated 24h); Lane 3, purified enzyme.

Specificity of flavonoid substrate for glycosylation

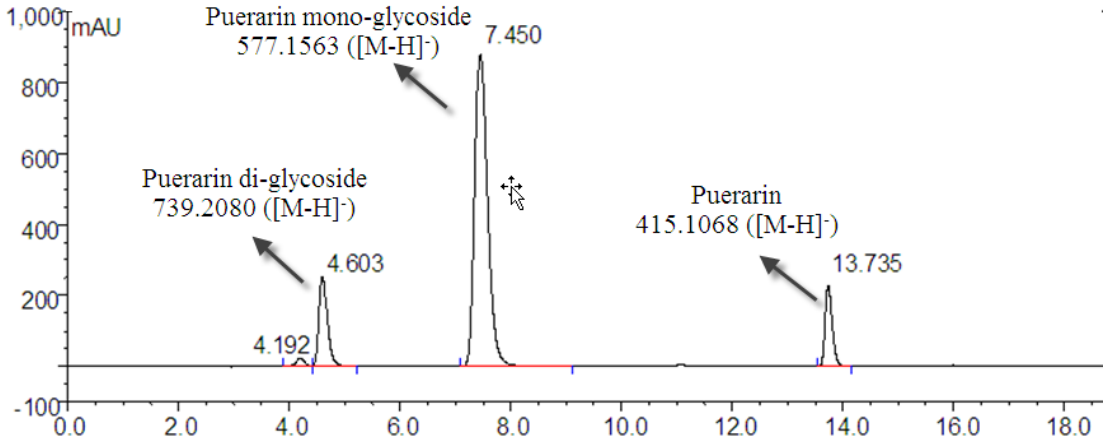

Figure S2. HPLC and MS analysis of puerarin glycosides.

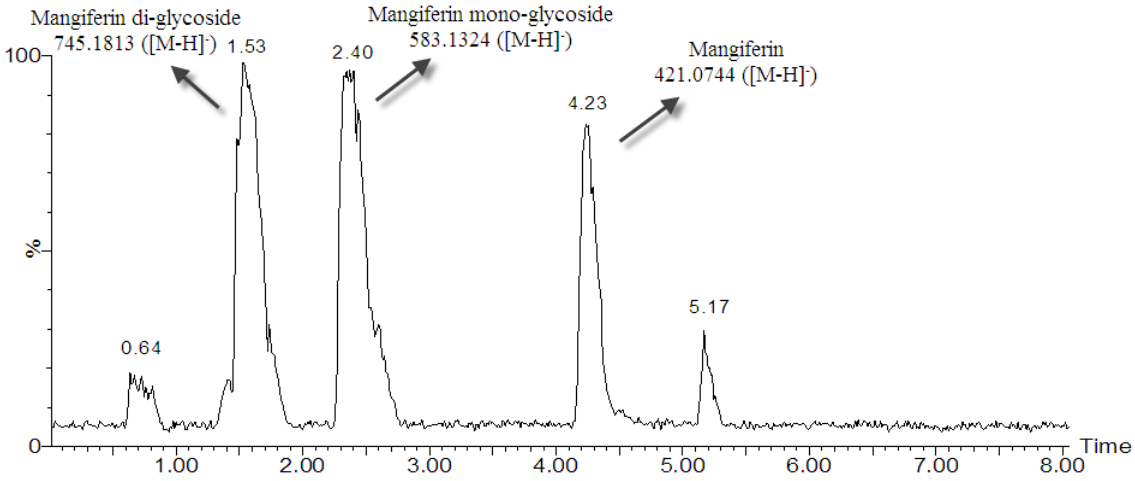

Figure S3. LC-MS analysis of mangiferin glycosides.

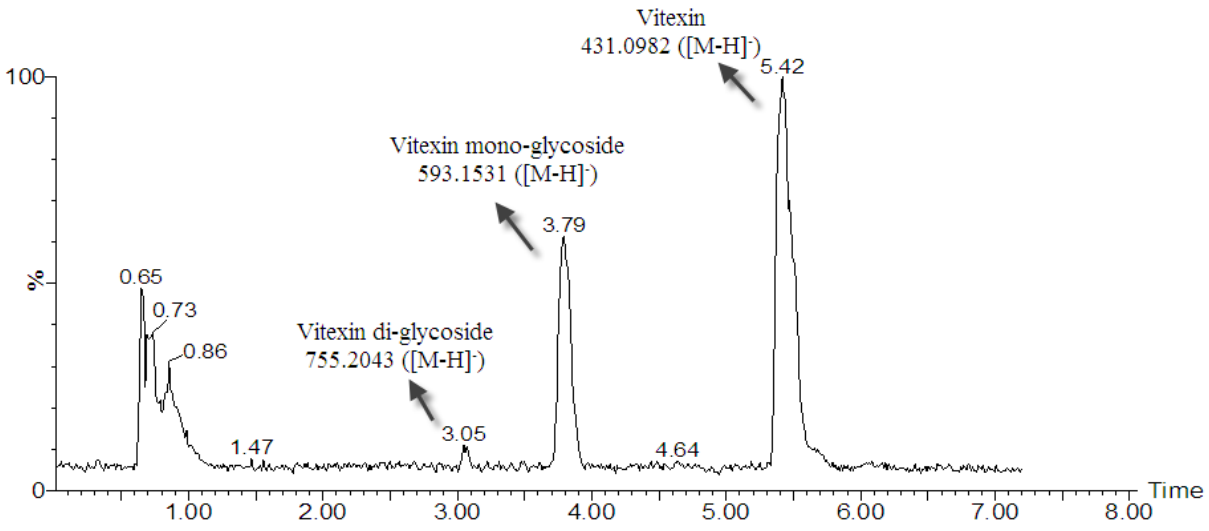

Figure S4. LC-MS analysis of vitexin glycoside

Identification of Mangiferin Glycosides by ^{1}H-NMR, ^{13}C-NMR and HR-MS

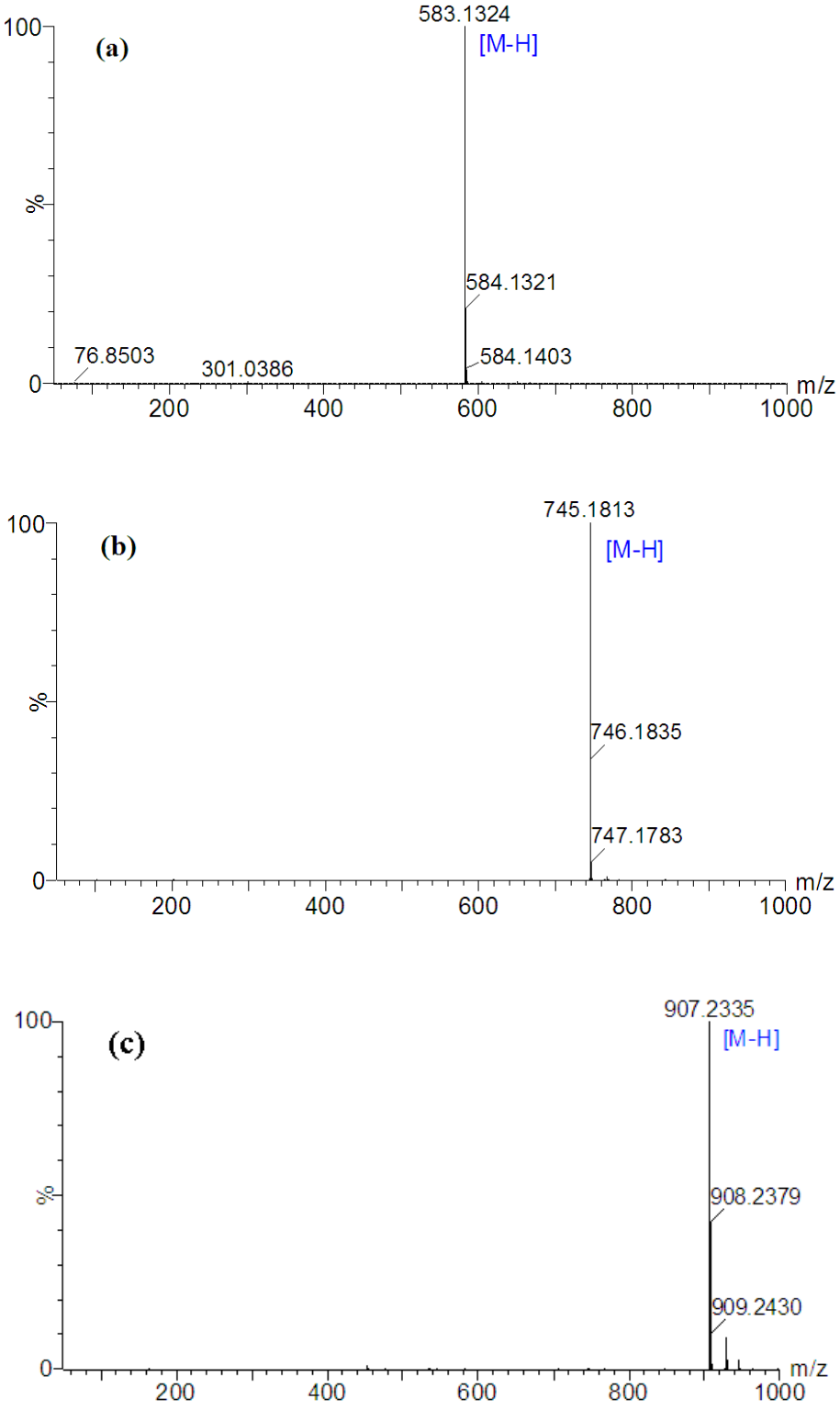

Figure S5. HRMS analysis of mangiferin glycosides.

(a)β-D-fructofuranosyl-(2→6)-mangiferin (M1) (HRMS: 583.1324 ([M-H^{+}]$^{-}$) ($C_{25}H_{27}O_{16}$, calc.583.1299, [M-H^{+}]$^{-}$)),

(b)β-D-difructofuranosyl-(2→6)-mangiferin (M2) (HRMS: 745.1813 ([M-H^{+}]$^{-}$) ($C_{31}H_{37}O_{21}$, calc.745.1827, [M-H^{+}]$^{-}$)),

(c) β-D-trifructofuranosyl-(2→6)-mangiferin (M3) (HRMS: 907.2335 ([M-H^{+}]$^{-}$) ($C_{37}H_{47}O_{26}$, calc.907.2356, [M-H^{+}]$^{-}$)).

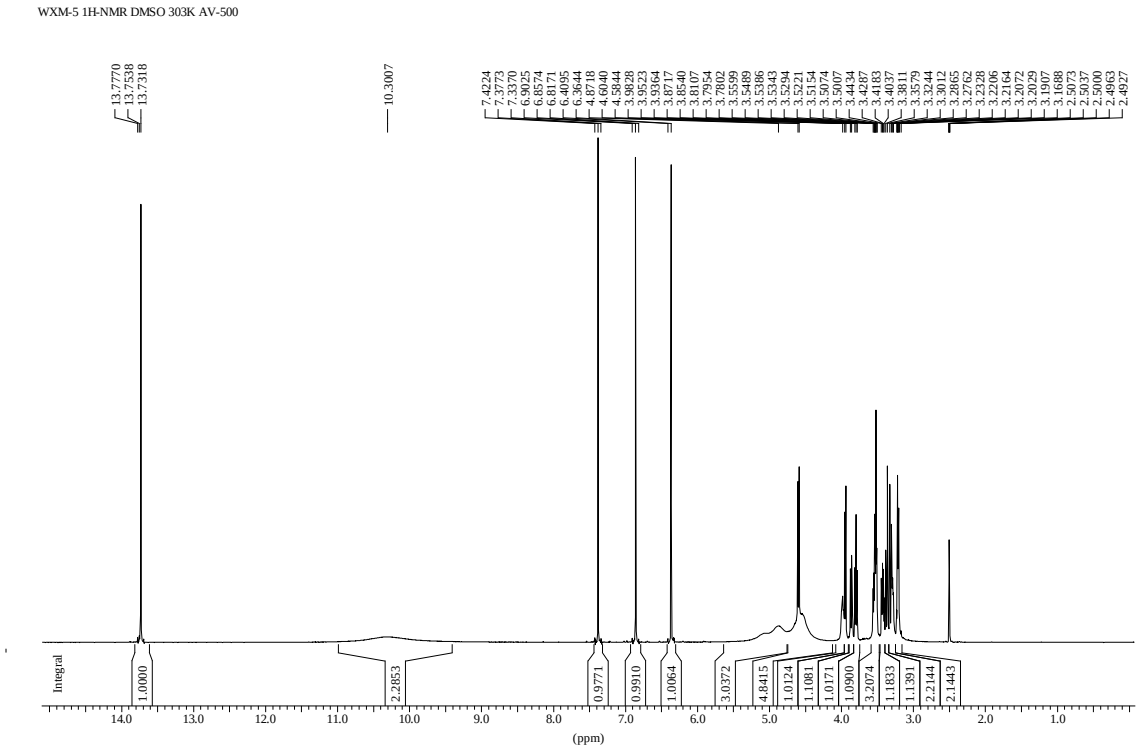

Figure S6. ^{1}H-NMR spectrum of β-D-fructofuranosyl-(2→6)-mangiferin.

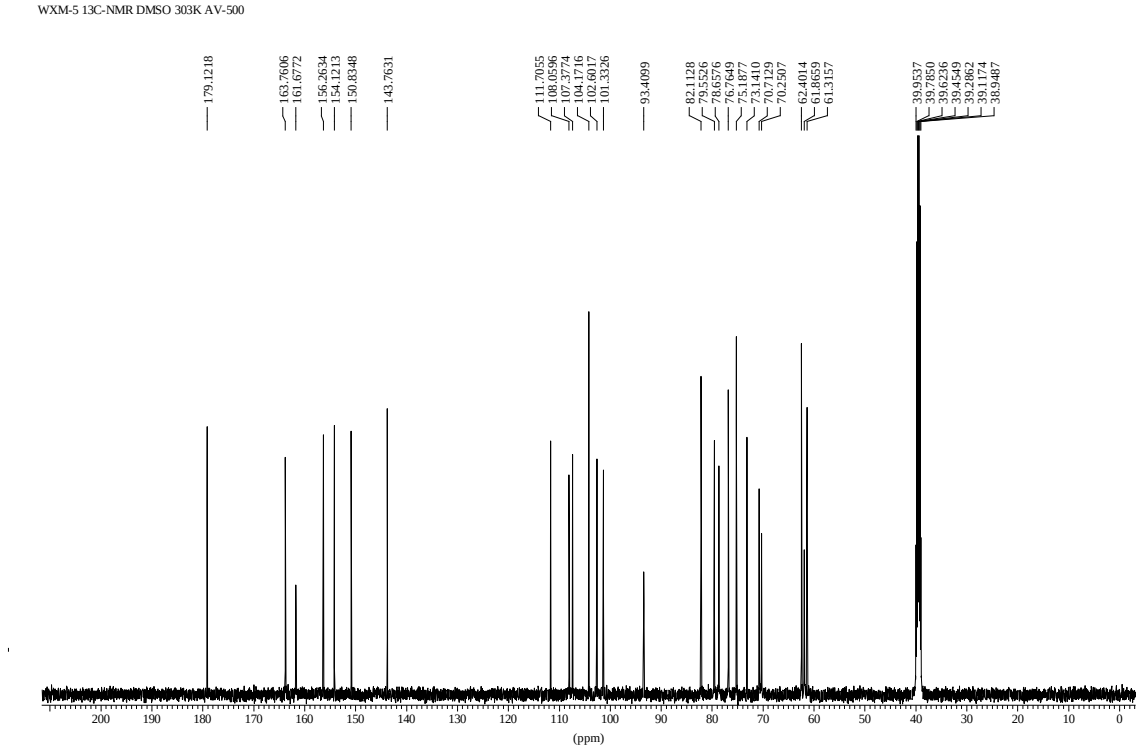

Figure S7. ^{13}C-NMR spectrum of β-D-fructofuranosyl-(2→6)-mangiferin.

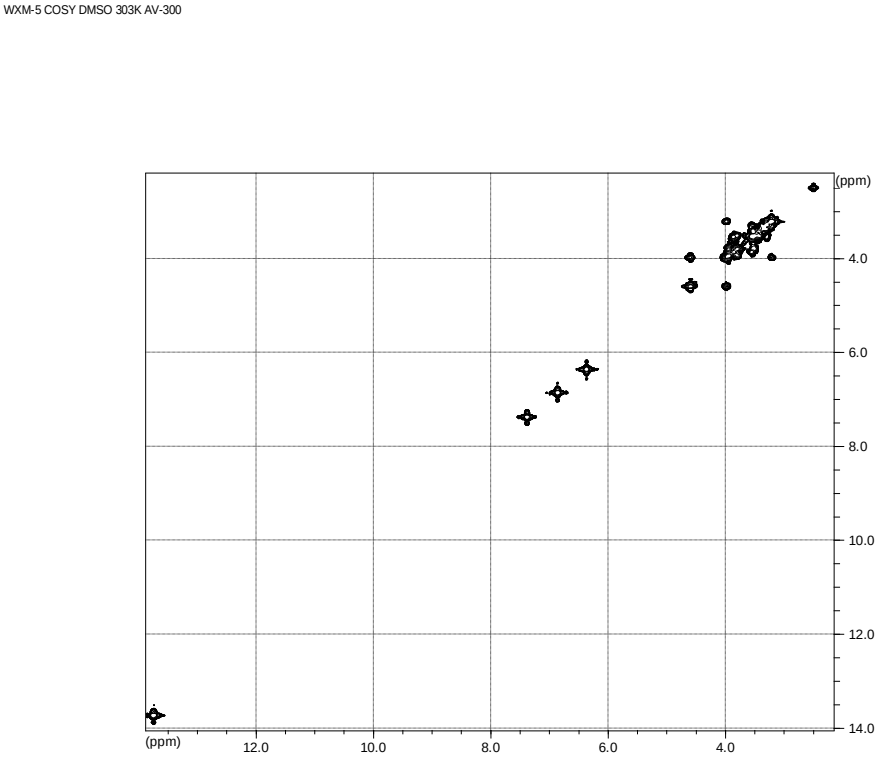

Figure S8. 2D ^{1}H-^{1}H COSY spectrum of β-D-fructofuranosyl-(2→6)-mangiferin.

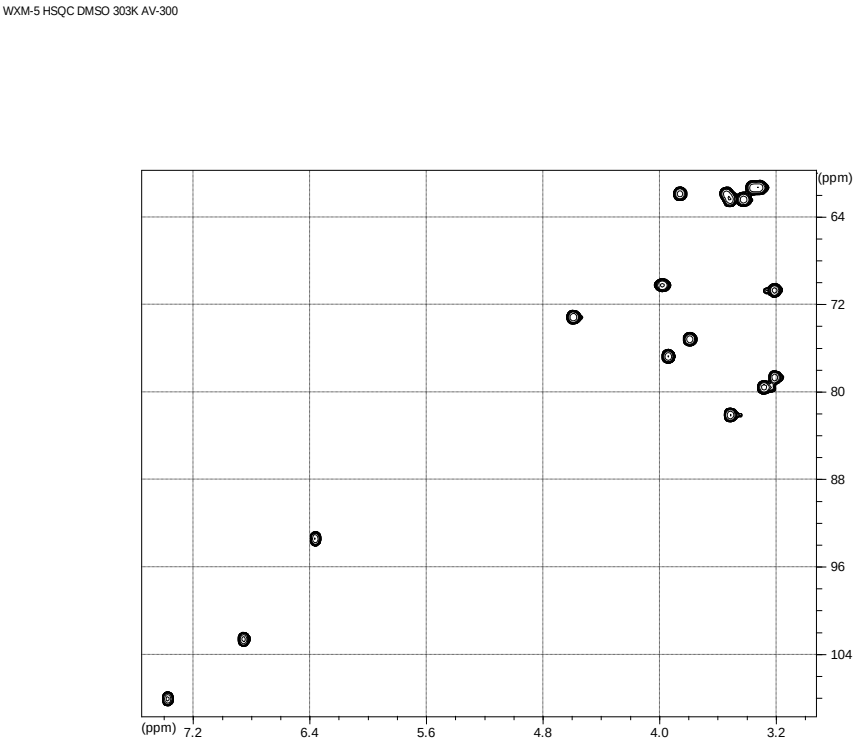

Figure S9. 2D ^{1}H-^{13}C HSQC spectrum of β-D-fructofuranosyl-(2→6)-mangiferin.

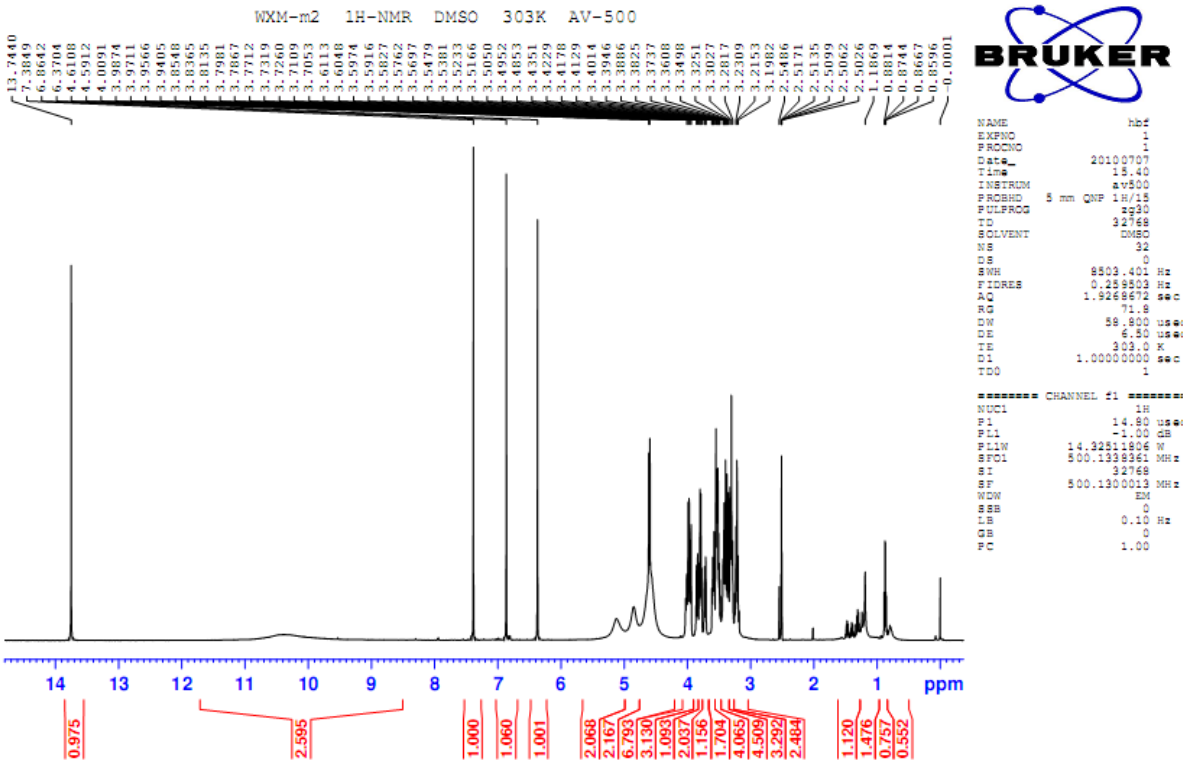

Figure S10. [1]H-NMR spectrum of β-D-difructofuranosyl-(2→6)-mangiferin.

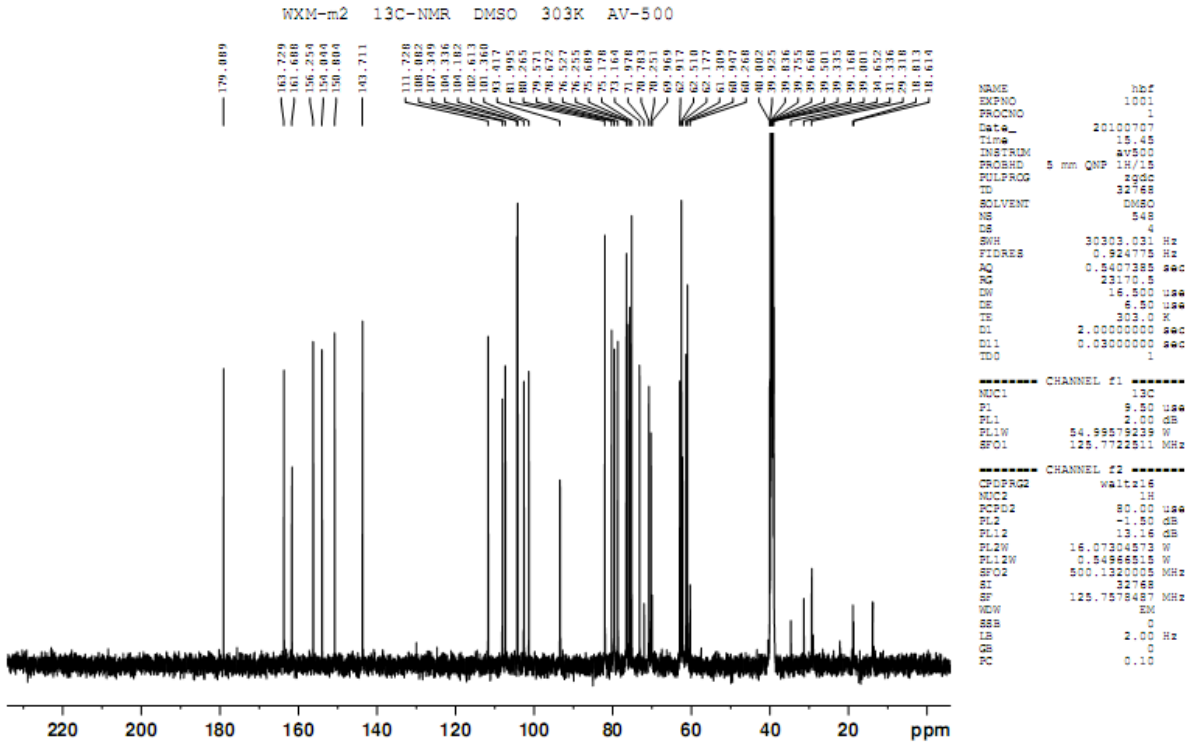

Figure S11. [13]C-NMR spectrum of β-D-difructofuranosyl-(2→6)-mangiferin.

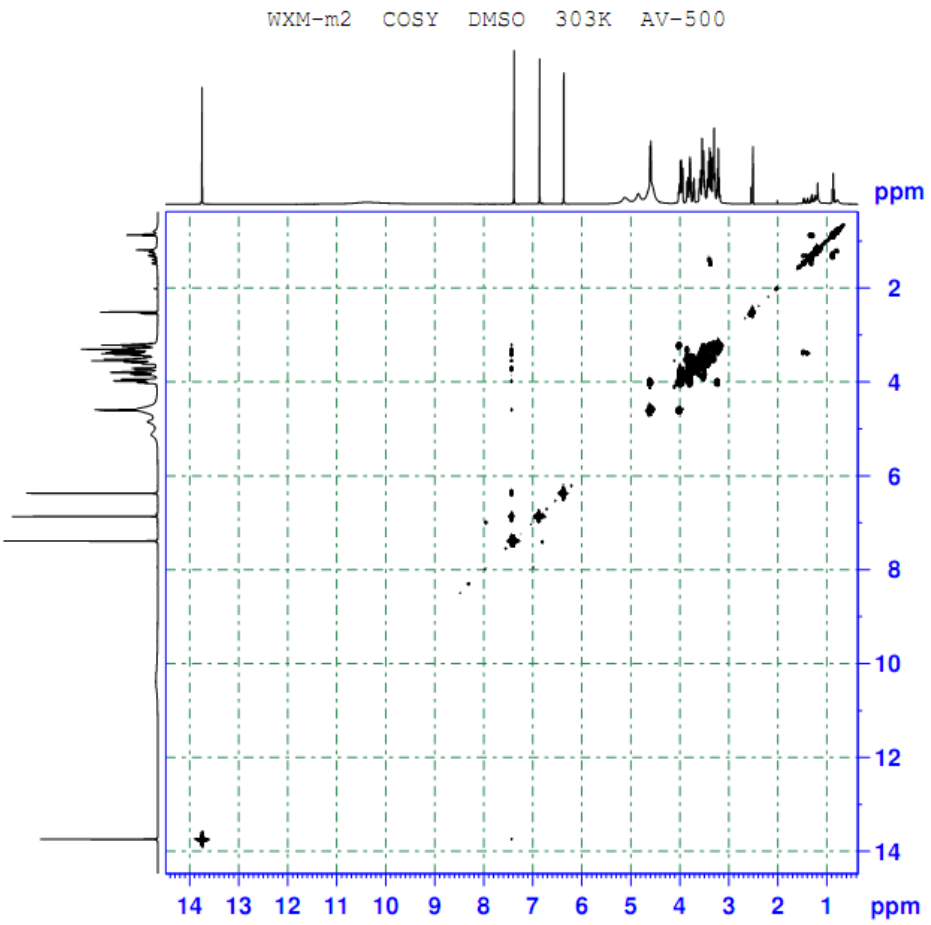

Figure S12. 2D ^{1}H-^{1}H COSY spectrum of β-D-difructofuranosyl-(2→6)-mangiferin.

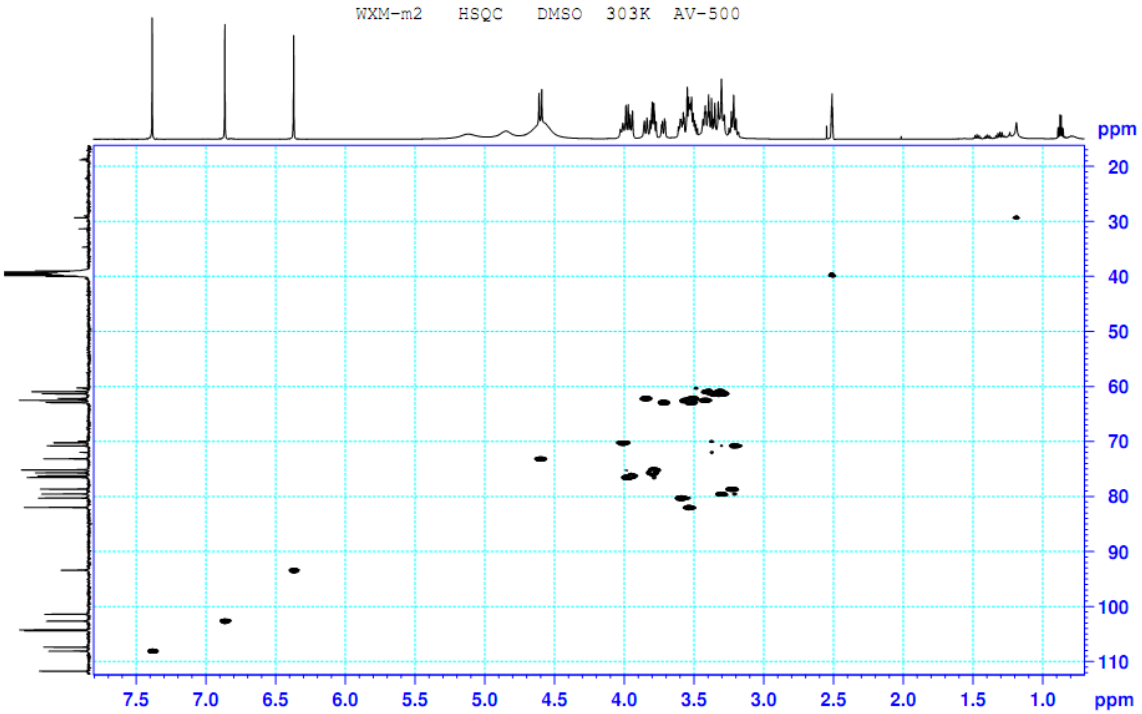

Figure S13. 2D ^{1}H-^{13}C HSQC spectrum of β-D-difructofuranosyl-(2→6)-mangiferin.