SUPPLEMENTARY MATERIAL

Eburneolins A and B, New Withanolide glucosides from *Tricholepis eburnea*

Saima Maher\(^a\), Shagufta Rasool\(^a\), Rashad Mehmood\(^b\)\(^,*\), Shagufta Perveen\(^c\) and Rasool Bakhsh Tareen\(^d\)

\(^a\)H. E. J. Research Institute of Chemistry, International center for Chemical and Biological Sciences, University of Karachi, Karachi-75270, Pakistan

\(^b\)Department of Chemistry, Hazara University, Mansehra-21120, Pakistan

\(^c\)Department of Pharmacognocy, College of Pharmacy, King Saud University, PO Box 2457, Riyadh11451, Saudi Arabia

\(^d\)Department of Botany, University of Balochistan, Sariab Road, Quetta, Pakistan

\(*\)Corresponding author Email: rashadhej@gmail.com; Tel. +92-997-414136, Fax. +92-997-414111
Eburneolins A (1) and B (2), new withanolide glucosides, have been isolated from the \textit{n}-butanolic fraction of the 75\% methanolic extract of aerial parts of \textit{Tricholepis eburnea}. Their structures were elucidated through spectroscopic analysis including ESI-MS, 2D NMR and acid hydrolysis.

**Key words:** Asteraceae, \textit{Tricholepis eburnea}, withanolide glucosides, eburneolin A, eburneolin B
$^1$H NMR of Eburneolin A
$^{13}$C NMR of Eburneolin A
DEPT 90 of Eburneolin A
DEPT 135 of Eburneolin A
HMOC of Eburneolin A
COSY of Eburneolin A
HMBC of Eburneolin A
$^1$H NMR of Eburneolin B
$^{13}$C NMR of Eburneolin B
DEPT 90 of Eburneolin B
DEPT 135 of Eburneolin B
HMOC of Eburneolin B
COSY of Eburneolin B
HMBC of Eburneolin B
Table S1. $^1$H (600 MHz) and $^{13}$C (125 MHz) NMR in CD$_3$OD spectral data of compounds 1 and 2.

|   | $^1$H (J in Hz) |   | $^1$H (J in Hz) |
|---|-----------------|---|-----------------|
| 1 | 214.5 C         | 217.8 C                       |
| 2 | 46.8 CH$_2$     | 40.0 CH$_2$                   | 2.73 (1H, m)    | 2.09 (1H, m)    |
|   |                 |                               | 2.06 (1H, d, $J = 17.3$) |
| 3 | 76.9 CH         | 15.8 CH                       | 18.1 CH$_2$     | 0.08 (1H, t-like, $J = 4.5$) |
|   |                 |                               | 0.86 (1H, m)    |
| 4 | 38.8 CH$_2$     | 2.69 (1H, dd, $J = 6.3, 13.6$) | 2.48 (1H, d, $J = 13.6$) |
|   |                 |                               |                 |
| 5 | 136.4 C         | 53.0 C                        |                 |
| 6 | 127.0 CH        | 5.68 (1H, d, $J = 5.2$ Hz)   | 72.7 CH         | 1.30 (1H, m)    |
|   |                 |                               | 1.24 (1H, m)    |
| 7 | 26.4 CH$_2$     | 2.09 (2H, m)                 | 30.0 CH$_2$     | 1.30 (1H, m)    |
|   |                 |                               | 1.24 (1H, m)    |
| 8 | 33.1 CH         | 2.26 (1H, m)                 | 32.4 CH         |                 |
| 9 | 37.1 CH         | 2.14 (1H, dd, $J = 11.9, 6.3$) | 40.8 CH         | 1.93 (1H, m)    |
| 10| 54.5 C          | ---                          | 36.1 C          |                 |
| 11| 23.1 CH$_2$     | 2.08 (1H, m), 1.62 (1H, m)   | 21.6 CH$_2$     | 2.08 (1H, m)    |
|   |                 |                               | 1.93 (1H, m)    |
| 12| 33.1 CH$_2$     | 2.34 (1H, ddd, $J = 11.8, 5.7$, 5.7); 1.26 (1H, m) | 32.9 CH$_2$     | 2.32 (1H, m)    |
|   |                 |                               | 1.31 (1H, m)    |
| 13| 55.0 C          | ---                          | 48.6 C          |                 |
| 14| 84.4 C          | ---                          | 84.5 C          |                 |
| 15| 76.5 CH         | 3.82 (1H, dd, $J = 11.7, 6.7$) | 32.8 CH$_2$     | 1.81 (1H, m)    |
|   |                 |                               |                 |
| 16| 47.9 CH$_2$     | 2.91 (1H, dd, $J = 16.0, 6.7$); 1.59 (1H, dd, $J = 16.0, 11.7$) | 21.9 CH$_2$     | 1.83 (1H, m)    |
|   |                 |                               | 1.32 (1H, m)    |
| 17| 89.4 C          | ---                          | 50.2 CH         | 3.59 (1H, m)    |
| 18| 20.6 CH$_3$     | 1.33 (3H, s)                 | 17.8 CH$_3$     | 1.38 (3H, s)    |
| 19| 18.5 CH$_3$     | 1.31 (3H, s)                 | 15.4 CH$_3$     | 1.55 (3H, s)    |
| 20| 79.7 C          | ---                          | 75.2 C          |                 |
| 21| 19.7 CH$_3$     | 1.36 (3H, s)                 | 21.5 CH$_3$     | 1.44 (3H, m)    |
| 22| 82.9 CH         | 4.84 (1H, br s)              | 82.3 CH         | 4.42 (1H, m)    |
| 23| 35.7 CH$_2$     | 2.63 (1H, br d)              | 34.4 CH$_2$     | 2.74 (1H, m)    |
|   |                 | 2.51 (1H, br d)              |                 |
| 24| 153.4 C         | ---                          | 156.9 C         |                 |
| 25| 122.0 C         | ---                          | 123.7 C         |                 |
| 26| 169.1 C         | ---                          | 165.8 C         |                 |
| 27| 12.3 CH$_3$     | 1.84 (3H, s)                 | 63.3 CH$_2$     | 5.09 (1H, d, $J = 10.5$) |
|   |                 |                               |                 | 4.72 (1H, d, $J = 10.5$) |
| 28| 20.6 CH$_3$     | 1.95 (3H, s)                 | 20.4 CH$_3$     | 1.83 (3H, s)    |
| 1' | 103.1 CH        | 4.36 (1H, d, $J = 7.8$ Hz)   | 104.9 CH        | 4.97 (1H, d, $J = 7.8$) |
| 2' | 75.0 CH         | 3.13 (1H, dd, $J = 7.8, 8.6$) | 75.2 CH         | 4.01 (1H, m)    |
| 3' | 77.9 CH         | 3.33 (1H, d, $J = 5.2$)      | 78.6 CH         | 4.24 (1H, m)    |
| 4' | 71.6 CH         | 3.25 (1H, m)                 | 71.7 CH         | 4.37 (1H, m)    |
| 5' | 78.0 CH         | 3.25 (1H, d, $J = 4.6$)      | 78.5 CH         | 3.95 (1H, m)    |
| 6' | 62.7 CH$_2$     | 3.83 (1H, d, $J = 11.6$)     | 62.8 CH$_2$     | 4.53 (1H, dd, $J = 10.8, 4.6$) |
|   |                 | 3.63 (1H, dd, $J = 11.6, 4.6$) |                 | 4.37 (1H, d, $J = 10.8$ Hz) |
Figure S1: HMBC correlations of eburneolins A (1) and B (2)