Supporting Information

Anibamine and its Analogs; Potent Antiplasmodial Agents
from *Aniba citrifolia*

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$^1$H spectrum of anibamine (1).

$^1$H, gHSQC, gHMBC and NOESY spectra for anibamine B (2).

$^1$H, $^{13}$C, gHSQC, gHMBC and NOESY spectra for anibomarin A (3).

$^1$H, gHSQC, gHMBC, NOESY spectra and circular dichroism spectra for anibignan I (5).

$^1$H, gHSQC and gHMBC spectra for compounds 7-12.

Syntheses and characterization data of compounds 24, 26-30, 32-34, 36, and 38-40.
Compound 1 (\textsuperscript{1}H NMR, CDCl\textsubscript{3})
Compound 2 (\(^1\)H NMR, CDCl\(_3\) )
Compound 2 (gHSQC, CDCl₃)
Compound 2 (gHMBC, CDCl₃)
Compound 2 (NOESY, CDCl₃)
Compound 3 (\(^1\text{H NMR, CDCl}_3\))
Compound 3 (\textsuperscript{13}C NMR, CDCl\textsubscript{3})
Compound 3 (gHSQC, CDCl₃)
Compound 3 (gHMBC, CDCl₃)
Compound 3 (NOESY, CDCl₃)
Compound 5 ($^1$H NMR, CDCl$_3$)
Compound 5 ($^{13}$C NMR, CDCl$_3$)
Compound 5 (gHSQC, CDCl₃)
Compound 5 (gHMBC, CDCl₃)
Compound 5 (NOESY, CDCl₃)
Compound 5 (ECD)
Compound 7 (\(^{1}\text{H} \text{NMR, CDCl}_3\) )
Compound 7 (gHSQC, CDCl$_3$)
Compound 7 (gHMBC, CDCl₃)
Compound 8 (\(^1\)H NMR, CDCl\(_3\))
Compound 8 (gHSQC, CDCl₃)
Compound 8 (gHMBC, CDCl₃)
Compound 9 (¹H NMR, CDCl₃)
Compound 9 (gHSQC, CDCl₃)
Compound 9 (gHMBC, CDCl₃)
Compound 10 (\(^1\)H NMR, CDCl₃)
Compound 10 (gHSQC, CDCl₃)
Compound 10 (gHMBC, CDCl₃)
Compound 11 (^1^H NMR, CDCl₃)
Compound 11 (gHSQC, CDCl₃)
Compound 11 (gHMBC, CDCl₃)
Compound 12 (\(^1\)H NMR, CDCl\(_3\))
Compound 12 (gHSQC, CDCl₃)
Compound 12 (gHMBC, CDCl₃)
General synthetic methods

All reagents used for reaction were purchased from Sigma-Aldrich. Nuclear magnetic resonance (NMR) spectra was recorded as $^1$H (400 MHz) and $^{13}$C (100 MHz) at room temperature on a Varian Mercury NMR spectrometer (400 MHz). The Analtech Uniplate F254 plates were used for TLC analyses. Silica gel column (230-400 mesh, Merck) was applied for chromatographic purification. IR spectra were recorded with Nicolet iS10 instrument (Thermo Scientific). MS analysis was carried out with Applied Bio Systems 3200 Q trap with a turbo V source for TurbolonSpray. The procedures for the synthesis of all compounds followed those of previous publications.\textsuperscript{1-4}

3,5-Di((E)-dec-1-en-1-yl)-2,4,6-trimethylpyridine (24)

Compound 24 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford compound 24 as a colorless oil.

IR (diamond, cm\textsuperscript{-1}) $\nu_{\text{max}}$ 2955, 2922, 2852, 1551, 1444, 1408, 1370, 1019, 972; $^1$H NMR (400 MHz, CDCl\textsubscript{3}): 6.28-6.24 (m, 2H), 5.66-5.59 (m, 2H), 2.45 (s, 6H), 2.26-2.19 (m, 7H), 1.50-1.44 (m, 4H), 1.38-1.29 (m, 21H), 0.90-0.87 (m, 6H); $^{13}$C NMR (100 MHz, CDCl\textsubscript{3}): $\delta$. 152.67, 142.91, 137.06, 130.72, 126.16, 77.38, 77.25, 77.04, 76.72, 33.37, 31.90, 29.47, 29.34, 29.32, 29.21, 23.64, 22.69, 17.88, 14.11; MS $m/z$ 398.3785 [M+ H$^+$] (calcd. for C\textsubscript{28}H\textsubscript{48}N\textsuperscript{+}, 398.3781).

(E)-3-(dec-1-en-1-yl)-2,4,6-trimethylpyridine (26)

Compound 26 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford compound 26 as a colorless oil.

IR (diamond, cm\textsuperscript{-1}) $\nu_{\text{max}}$ 295, 2922, 2853, 1592, 1556, 1455, 1385, 1025, 971, 858, 721; $^1$H NMR (400 MHz, CDCl\textsubscript{3}): 6.084 (s, 1H), 6.28-6.24 (m, 1H), 5.72-5.64 (m, 1H), 2.48-2.44 (m, 6H), 2.26-2.20 (m, 5H), 1.51-1.44 (m, 2H), 1.38-1.29 (m, 10 H), 0.90-0.87 (m, 3H); $^{13}$C NMR (100 MHz, CDCl\textsubscript{3}): $\delta$. 155.19, 154.68, 145.08, 137.08, 130.10, 125.41, 122.38, 33.45, 31.91, 29.47, 29.34, 29.32, 29.20, 24.01, 23.65, 22.69, 20.31, 14.11; MS $m/z$ 260.2363 [M+ H$^+$] (calcd. for C\textsubscript{18}H\textsubscript{30}N\textsuperscript{+}, 260.2372).
Compound 27 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford compound 27 as a colorless oil.

IR (diamond, cm⁻¹) νmax 2955, 2922, 2853, 1550, 1455, 1119, 971, 722; ¹H NMR (400 MHz, CDCl₃): 6.31-6.24 (m, 2H), 5.67-5.57 (m, 2H), 3.41 (t, J = 6.72 Hz, 2H), 3.32 (s, 3H), 2.81-2.77 (m, 2H), 2.46 (s, 3H), 2.26-2.19 (m, 7H), 1.96-1.89 (m, 2H), 1.51-1.44 (m, 4H), 1.38-1.29 (m, 21H), 0.90-0.87 (m, 6H); ¹³C NMR (100 MHz, CDCl₃): δ. 155.93, 152.98, 143.04, 137.02, 130.70, 130.58, 126.23, 125.83, 77.34, 77.02, 76.71, 72.66, 58.41, 33.38, 33.35, 32.4931.92, 31.90, 29.50, 29.47, 29.42, 29.34, 29.32, 29.28, 29.20, 23.74, 22.68, 18.07, 14.11; MS m/z 456.4209 [M+ H]⁺ (calcd. for C₃₁H₅₄NO⁺, 456.4200).

Compound 28 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford compound 27 as a colorless oil.

IR (diamond, cm⁻¹) νmax 2955, 2922, 2853, 1553, 1441, 1378, 971, 722; ¹H NMR (400 MHz, CDCl₃): 6.29-6.22 (m, 2H), 5.81-5.74 (m, 1H), 5.68-5.61 (m, 1H), 2.48 (s, 3H), 2.39 (s, 3H), 2.27-2.21 (m, 2H), 2.12 (s, 3H), 1.82-1.76 (m, 2H), 1.52-1.45 (m, 2H), 1.39-1.19 (m, 23H), 0.90-0.84 (m, 6H); ¹³C NMR
(100 MHz, CDCl₃): δ 153.10, 152.70, 143.18, 137.01, 134.49, 130.36, 129.42, 126.06, 125.89, 33.40, 31.90, 31.86, 29.47, 29.40, 29.34, 29.32, 29.28, 29.22, 28.92, 28.68, 23.68, 23.15, 22.68, 22.65, 17.56, 14.11, 14.09; MS m/z 398.3788 [M+ H]+ (calcd. for C₂₈H₄₈N+, 398.3781).

Compound 29 was prepared by hydrogenation of 28 and was purified by chromatography on silica gel to afford 29 as a colorless oil.

IR (diamond, cm⁻¹) Vₘₐₓ 2915, 2850, 1566, 1467, 1417, 1371, 1019, 721; ¹H NMR (400 MHz, CDCl₃): 2.58-2.55 (m, 4H), 2.47 (s, 3H), 2.22 (s, 3H), 1.41-1.27 (m, 34H), 0.88 (t, J = 6.6 Hz, 6H); ¹³C NMR (100 MHz, CDCl₃): δ 152.34, 142.91, 132.28, 31.91, 30.14, 29.64, 29.62, 29.58, 29.47, 29.34, 29.28, 22.68, 22.57, 14.76, 14.11; MS m/z 402.4101 [M+ H]+ (calcd. for C₂₈H₅₂N+, 402.4094).

3-Decyl-2,4,6-trimethylpyridine (30)

![Chemical structure of 3-Decyl-2,4,6-trimethylpyridine](image)

Compound 30 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm⁻¹) Vₘₐₓ 2922, 2853, 1747, 1597, 1456, 1163, 1082, 857, 721; ¹H NMR (400 MHz, CDCl₃): 6.77 (s, 1H), 2.58-2.56 (m, 2H), 2.50 (s, 3H), 2.43 (s, 3H), 2.25 (s, 3H), 1.46-1.23 (m, 18H), 0.88 (t, J = 6.4 Hz, 6H); ¹³C NMR (100 MHz, CDCl₃): δ 155.49, 154.09, 145.23, 131.71, 122.88, 31.91, 30.10, 29.63, 29.62, 29.48, 29.34, 29.14, 28.80, 23.83, 22.69, 22.36, 19.20, 14.11; MS m/z 262.2525 [M+ H]+ (calcd for C₁₈H₃₁N+, 262.2528).

3-((E)-dec-1-en-1-yl)-5-((Z)-dec-1-en-1-yl)-2-(3-methoxypropyl)-4,6-dimethylpyridine (32)

![Chemical structure of 3-((E)-dec-1-en-1-yl)-5-((Z)-dec-1-en-1-yl)-2-(3-methoxypropyl)-4,6-dimethylpyridine](image)
Compound 32 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm\(^{-1}\)) \(\nu_{\text{max}}\) 2955, 2922, 2853, 1548, 1456, 1378, 1119, 970, 722; \(^1\)H NMR (400 MHz, CDCl\(_3\)): 6.32-6.21 (m, 2 H), 5.80-5.74 (m, 1 H), 5.66-5.59 (m, 1H), 3.42 (t, \(J = 6.72\) Hz, 2H), 3.33 (s, 3H), 2.83-2.79 (m, 2H), 2.38 (s, 3H), 2.26-2.21 (m, 2H), 2.11 (s, 1H), 1.98-1.91 (m, 2H), 1.82-1.76 (m, 2H), 1.52-1.47 (m, 2 H), 1.45-1.40 (m, 2H), 1.35-1.20 (m, 6H); \(^{13}\)C NMR (100 MHz, CDCl\(_3\)): \(\delta\) 156.31, 152.96, 143.31, 136.96, 134.42, 130.21, 129.42, 125.95, 125.72, 125.62, 58.38, 33.36, 32.46, 31.90, 31.84, 29.48, 29.46, 29.41, 29.38, 29.32, 29.30, 29.27, 29.25, 29.21, 29.19, 28.90, 28.68, 23.19, 22.67, 22.63, 17.72, 14.09, 14.06; MS \(m/z\) 456.4208 [M+ H]\(^+\) (calcd for C\(_{31}\)H\(_{53}\)NO\(_2\)*, 456.4200).

5-((E)-Dec-1-en-1-yl)-3-((Z)-dec-1-en-1-yl)-2-(3-methoxypropyl)-4,6-dimethylpyridine (33)

Compound 33 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm\(^{-1}\)) \(\nu_{\text{max}}\) 2955, 2922, 2852, 1548, 1446, 1384, 1119, 971, 722; \(^1\)H NMR (400 MHz, CDCl\(_3\)): 6.29-6.25 (m, 2 H), 5.81-5.75 (m, 1 H), 5.69-5.62 (m, 1H), 3.45 (t, \(J = 6.72\) Hz, 2H), 3.32 (s, 3H), 2.72-2.70 (m, 2H), 2.48 (s, 3H), 2.27-2.21 (m, 2H), 2.12 (s, 1H), 1.94-1.87 (m, 2H), 1.81-1.76 (m, 2 H), 1.51-1.45 (m, 2 H), 1.39-1.20 (m, 23H), 0.90-0.84 (m, 6H); \(^{13}\)C NMR (100 MHz, CDCl\(_3\)): \(\delta\) 155.84, 1.53.28, 1.43.16, 136.96, 134.68, 130.43, 129.06, 126.12, 125.46, 72.71, 58.41, 33.40, 32.48, 31.88, 31.85, 29.45, 29.41, 29.35, 29.33, 29.30, 29.21, 28.89, 28.76, 23.73, 22.67, 22.64, 17.68, 14.09, 14.08; MS \(m/z\) 456.4210 [M+ H]\(^+\) (calcd for C\(_{31}\)H\(_{53}\)NO\(_2\)*, 456.4200).
Compound 34 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm$^{-1}$) $\nu_{\text{max}}$ 2922, 2852, 1590, 1456, 1392, 1118, 970, 721; $^1$H NMR (400 MHz, CDCl$_3$): 6.82 (s, 1H), 6.28-6.24 (m, 1H), 5.73-5.566 (m, 1H), 3.42 (t, $J = 8$ Hz, 2H), 3.34 (s, 3H), 2.76-2.72 (m, 2H), 2.48 (s, 3H), 2.26-2.22 (m, 5H), 2.01-1.93 (m, 2H), 1.51-1.44 (m, 2H), 1.38-1.26 (m, 10H), 0.90-0.87 (m, 2H); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 158.09, 155.32, 145.09, 137.11, 130.45, 125.43, 121.85, 72.24, 58.53, 34.40, 33.44, 31.90, 29.90, 29.46, 29.36, 29.31, 29.19, 23.64, 22.68, 20.41, 14.10; MS $m/z$ 318.2781 [M+ H$^+$] (calcd for C$_{21}$H$_{36}$NO$^+$, 318.2797).

(E)-3-(Dec-1-en-1-yl)-2-(3-methoxypropyl)-4,6-dimethylpyridine (36) and 3-decyl-2-(3-methoxypropyl)-4,6-dimethylpyridine (38)
Compounds 36 and 38 were synthesized as shown above. The final products were purified by chromatography on silica gel to afford the products as colorless oils.

**Compound 36:** IR (diamond, cm$^{-1}$) $\nu_{\text{max}}$ 2922, 2852, 1591, 1454, 1117, 968, 857, 721; $^1$H NMR (400 MHz, CDCl$_3$): 6.81 (s, 1H), 6.31-6.27 (m, 1H), 5.70-5.5.62 (m, 1H), 3.41 (t, $J$ = 8 Hz, 2H), 3.32 (s, 3H), 2.84-2.80 (m, 2H), 2.45 (s, 2H), 2.25-2.20 (m, 5H), 1.97-1.89 (m, 2H), 1.50-1.44 (m, 2H), 1.38-1.29 (m, 10H), 0.90-0.87 (m, 3H); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$. 158.44, 154.94, 145.32, 137.13, 129.99, 125.04, 122.40, 72.57, 58.39, 33.39, 32.46, 31.89, 29.48, 29.42, 29.33, 29.30, 29.24, 24.04, 22.67, 20.45, 14.09; MS $m/z$ 318.2788 [M+ H]$^+$ (calcd for C$_{21}$H$_{36}$NO$^+$, 318.2791).

**Compound 38:** IR (diamond, cm$^{-1}$) $\nu_{\text{max}}$ 2921, 2852, 1595, 1456, 1118, 857, 721; $^1$H NMR (400 MHz, CDCl$_3$): 6.76 (s, 1H), 3.44 (t, $J$ = 8 Hz, 2H), 3.34 (s, 3H), 2.83-2.79 (m, 2H), 2.59-2.56 (m, 2H), 2.42 (s, 3H), 2.25 (s, 3H), 1.98-1.93 (m, 2H), 1.49-1.24 (m, 17H), 0.90-0.87 (m, 3H); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$. 158.61, 154.31, 145.45, 131.36, 132.85, 72.64, 72.46, 58.44, 31.89, 31.48, 30.10, 30.04, 30.01, 29.62, 29.60, 29.41, 29.32, 28.20, 23.90, 22.67, 19.30, 14.09; MS $m/z$ 320.2943 [M+ H]$^+$ (calcd for C$_{21}$H$_{38}$NO$^+$, 320.2947).

**3-Decyl-6-(3-methoxypropyl)-2,4-dimethylpyridine (39)**

Compound 39 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm$^{-1}$) $\nu_{\text{max}}$ 2922, 2852, 1746, 1595, 1456, 1118, 864, 721; $^1$H NMR (400 MHz, CDCl$_3$): 3.42 (t, $J$ = 6.52 Hz, 2H), 3.34 (s, 3H), 2.74-2.70 (m, 2H), 2.58-2.54 (m, 4H), 2.51 (s, 3H), 2.26 (s, 1H), 2.00-1.93 (m, 2H), 1.47-1.24 (m, 18H), 0.88 (t, $J$ = 6.68 Hz, 6H); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$. 157.44, 155.53, 145.32, 132.11, 122.31, 72.25, 58.50, 34.20, 31.88, 30.10, 29.88, 29.60, 29.44, 29.32, 29.06, 28.84, 22.66, 22.29, 19.28, 14.08; MS $m/z$ 320.2957 [M+ H]$^+$ (calcd for C$_{21}$H$_{38}$NO$^+$, 320.2947).
3,5-Didecyl-2-(3-methoxypropyl)-4,6-dimethylpyridine (40)

Compound 40 was synthesized as shown above. The final product was purified by chromatography on silica gel to afford the product as a colorless oil.

IR (diamond, cm$^{-1}$) $v_{\text{max}}$ 2921, 2852, 1563, 1456, 1118, 950, 721; $^1$H NMR (400 MHz, CDCl$_3$): 3.45 (t, $J = 6.48$ Hz, 2H), 3.35 (s, 3H), 2.79-2.75 (m, 2H), 2.60-2.54 (m, 4H), 2.47 (s, 3H), 2.22 (s, 1H), 2.00-1.93 (m, 2H), 1.42-1.28 (m, 34H), 0.88 (t, $J = 6.6$ Hz, 6H); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 155.43, 152.58, 143.01, 132.17, 131.87, 72.57, 58.43, 31.90, 31.67, 30.88, 30.18, 30.16, 29.95, 29.64, 29.62, 29.45, 29.43, 29.33, 29.21, 28.95, 22.67, 22.61, 14.83, 14.09; MS $m/z$ 460.4517 [M+ H]$^+$ (calcd for C$_{31}$H$_{58}$NO, 460.4512).

References