Supplementary Information

Antibacterial Activity and mechanism of plant flavonoids to gram-positive bacteria predicted from their lipophilicities

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Figures S1 to S6

Fig. S1 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to *Staphylococcus aureus* (left line) or *Bacillus subtilis* (right line), of compounds **1** to **19**[10].

Fig. S2 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to *S. aureus* ATCC 25923 (left line) or *S. epidermidis* ATCC 12228 (right line), of compounds **20** to **27**[11].

Fig. S3 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to methicillin-resistant *Staphylococcus aureus* (MRSA) 6975 (upper row), MRSA 630 (middle row) or MRSA 6205 (lower row), of compounds **21** to **24**, and **26** to **33**[12].

Fig. S4 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to MRSA 209P (left line) or *B. subtilis* NBRC 3134 (right line), of compounds **34** to **44**[13].

Fig. S5 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to MRSA (left line) or methicillin-susceptible *S. aureus* (right line), of compounds **17**, **45** to **54**[14].

Fig. S6 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to MRSA G31 (left line) or G47 (right line), of compounds **55** to **66**[15].
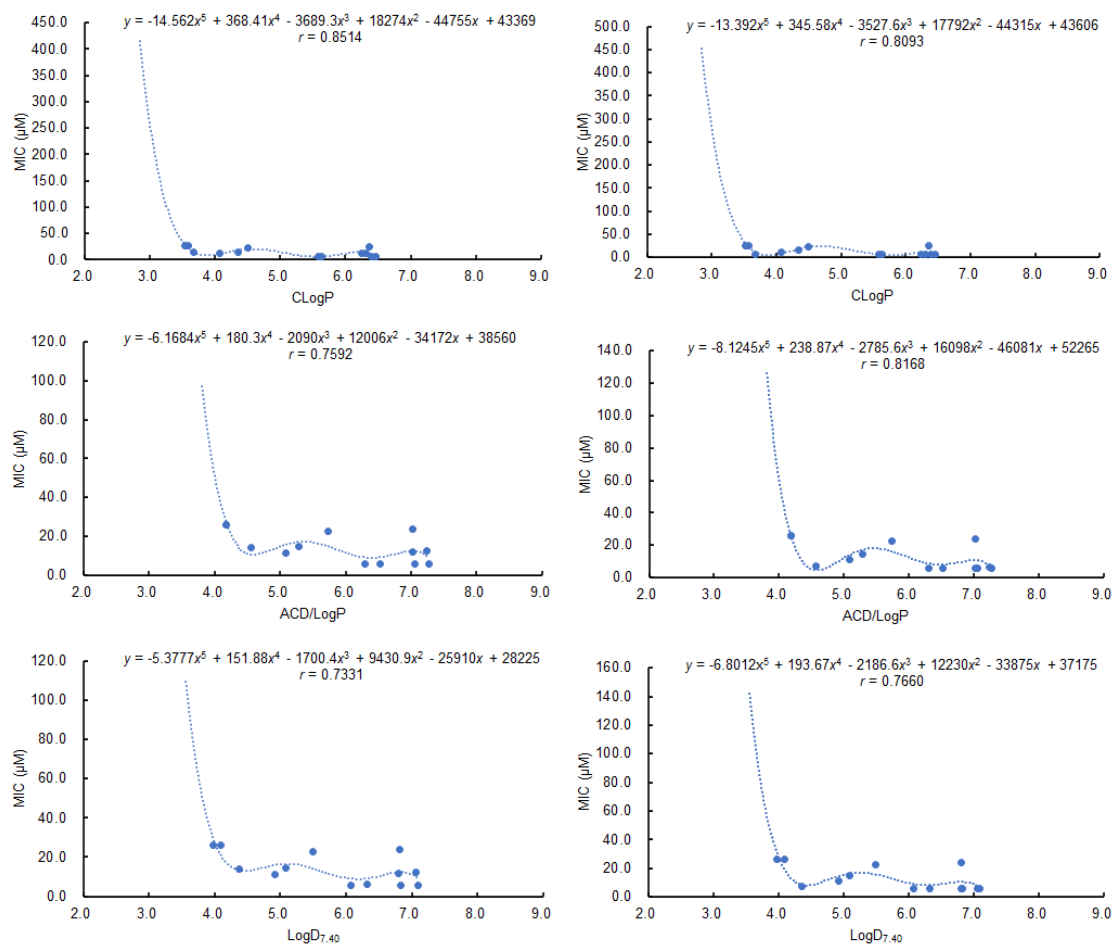
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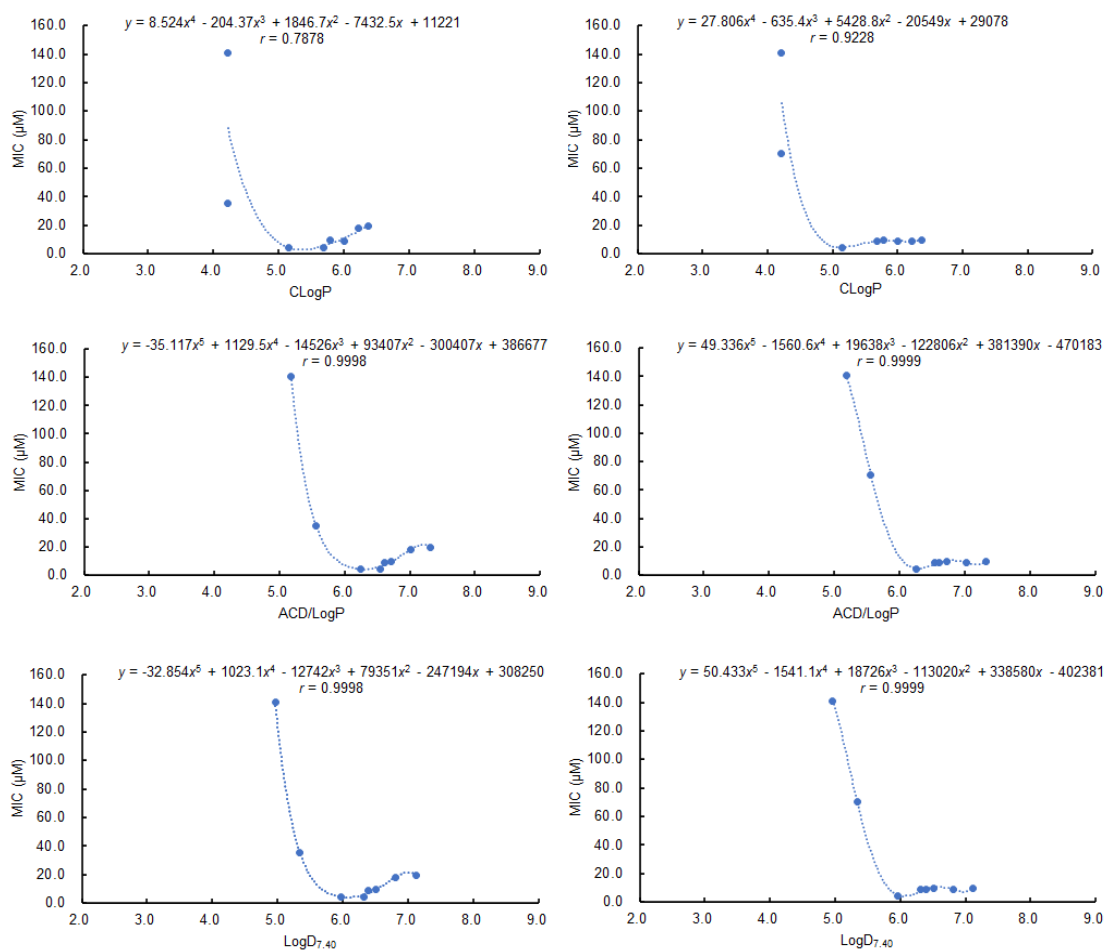
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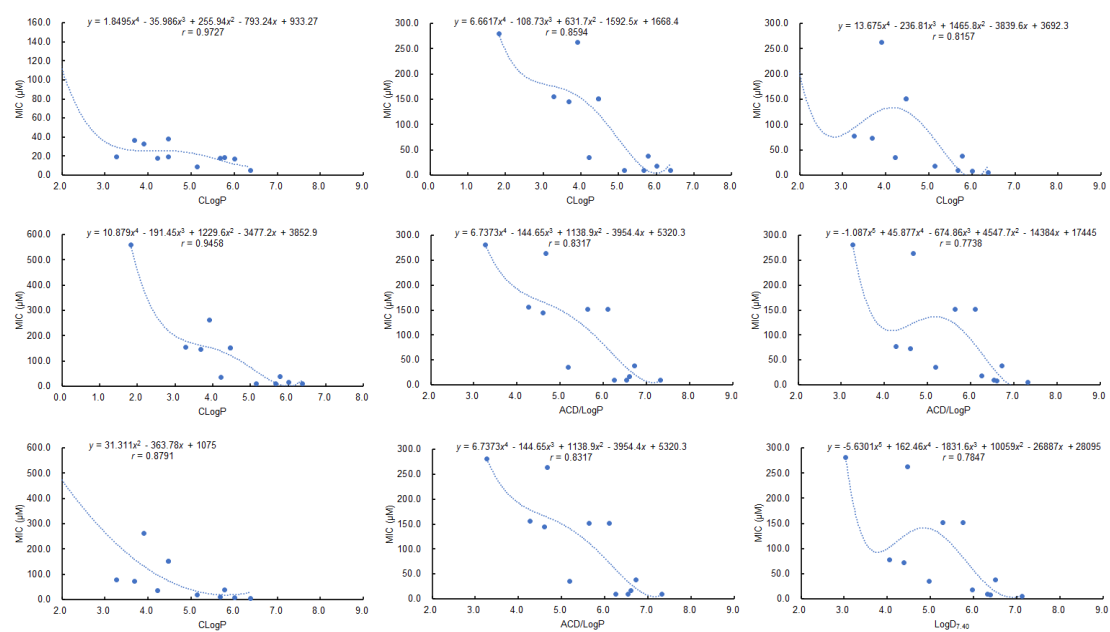
Top-left: $y = 1.8495x^4 - 35.986x^3 + 255.94x^2 - 793.24x + 933.27$, $r = 0.9727$

Top-middle: $y = 6.6617x^4 - 108.73x^3 + 631.7x^2 - 1592.5x + 1668.4$, $r = 0.8594$

Top-right: $y = 13.675x^4 - 236.81x^3 + 1465.8x^2 - 3839.6x + 3692.3$, $r = 0.8157$

Middle-left: $y = 10.879x^4 - 191.45x^3 + 1229.6x^2 - 3477.2x + 3852.9$, $r = 0.9458$

Middle-middle: $y = 6.7373x^4 - 144.65x^3 + 1138.9x^2 - 3954.4x + 5320.3$, $r = 0.8317$

Middle-right: $y = -1.087x^5 + 45.877x^4 - 674.86x^3 + 4547.7x^2 - 14384x + 17445$, $r = 0.7738$

Lower-left: $y = 31.311x^2 - 363.78x + 1075$, $r = 0.8791$

Lower-middle: $y = 6.7373x^4 - 144.65x^3 + 1138.9x^2 - 3954.4x + 5320.3$, $r = 0.8317$

Lower-right: $y = -5.6301x^5 + 162.46x^4 - 1831.6x^3 + 10059x^2 - 26887x + 28095$, $r = 0.7847$

Fig. S3 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (*x*) and the MIC (*y*) to methicillin-resistant *Staphylococcus aureus* (MRSA) 6975 (upper row), MRSA 630 (middle row) or MRSA 6205 (lower row), of compounds **21** to **24**, and **26** to **33**[12].
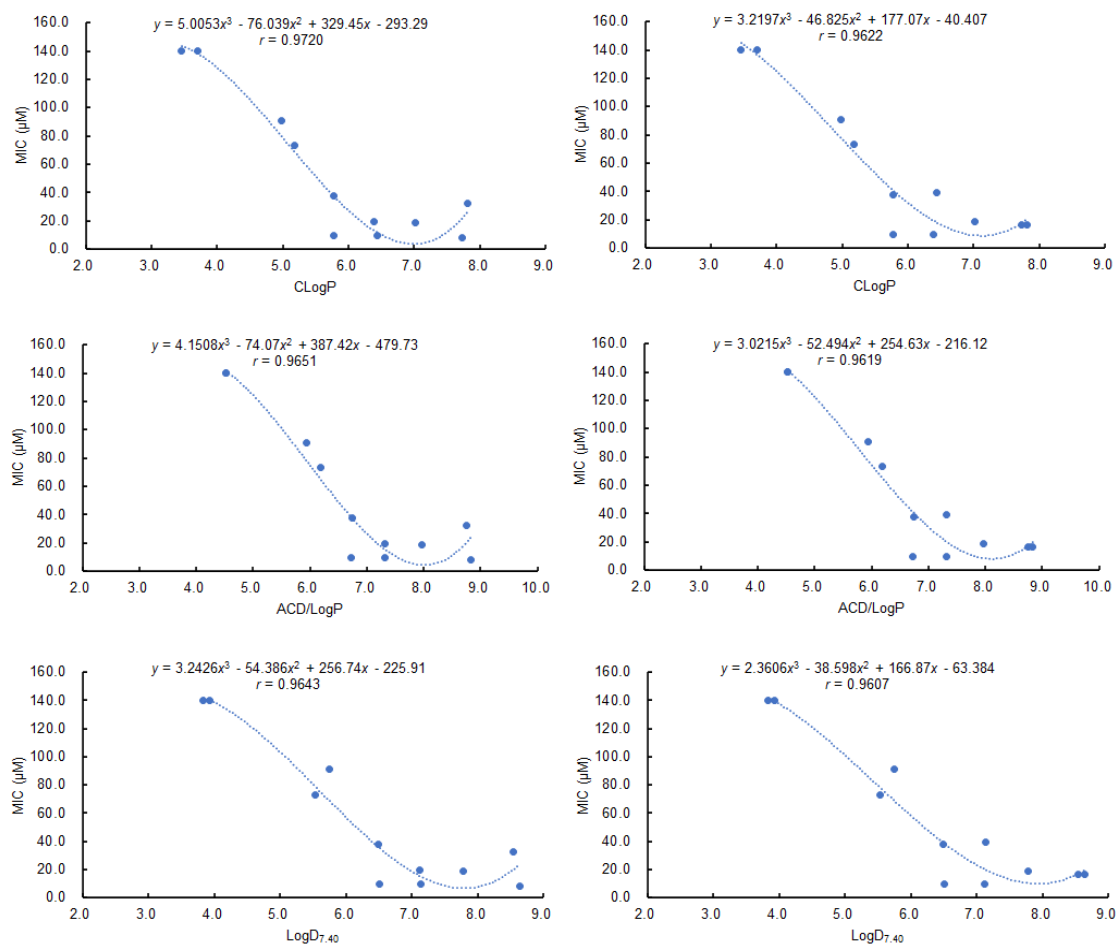
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Left column (MRSA 209P):
- $y = 5.0053x^3 - 76.039x^2 + 329.45x - 293.29$, $r = 0.9720$ (CLogP)
- $y = 4.1508x^3 - 74.07x^2 + 387.42x - 479.73$, $r = 0.9651$ (ACD/LogP)
- $y = 3.2426x^3 - 54.386x^2 + 256.74x - 225.91$, $r = 0.9643$ (LogD$_{7.40}$)

Right column (B. subtilis NBRC 3134):
- $y = 3.2197x^3 - 46.825x^2 + 177.07x - 40.407$, $r = 0.9622$ (CLogP)
- $y = 3.0215x^3 - 52.494x^2 + 254.63x - 216.12$, $r = 0.9619$ (ACD/LogP)
- $y = 2.3606x^3 - 38.598x^2 + 166.87x - 63.384$, $r = 0.9607$ (LogD$_{7.40}$)

Fig. S4 Polynomial regression analyses for the physicochemical parameters CLogP, ACD/LogP or LogD$_{7.40}$ (x) and the MIC (y) to MRSA 209P (left line) or *B. subtilis* NBRC 3134 (right line), of compounds **34** to **44**[13].
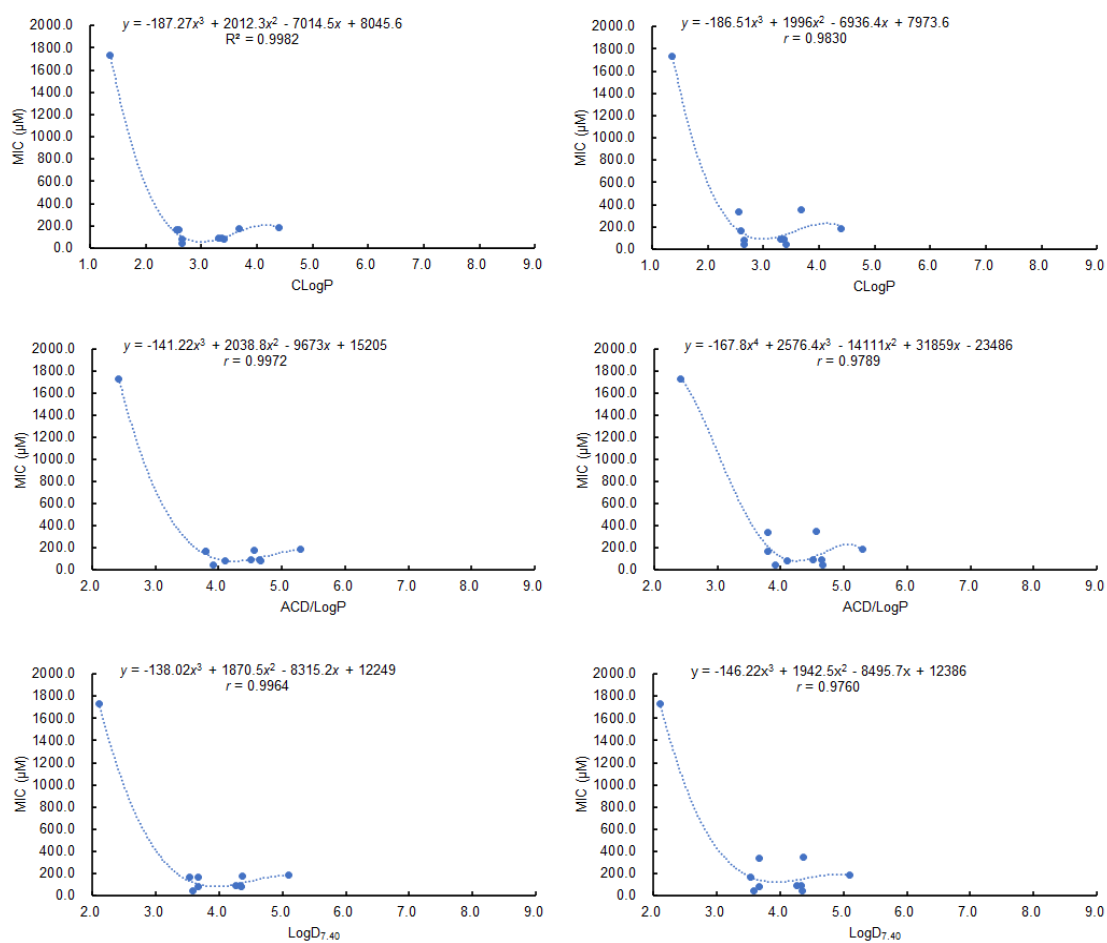
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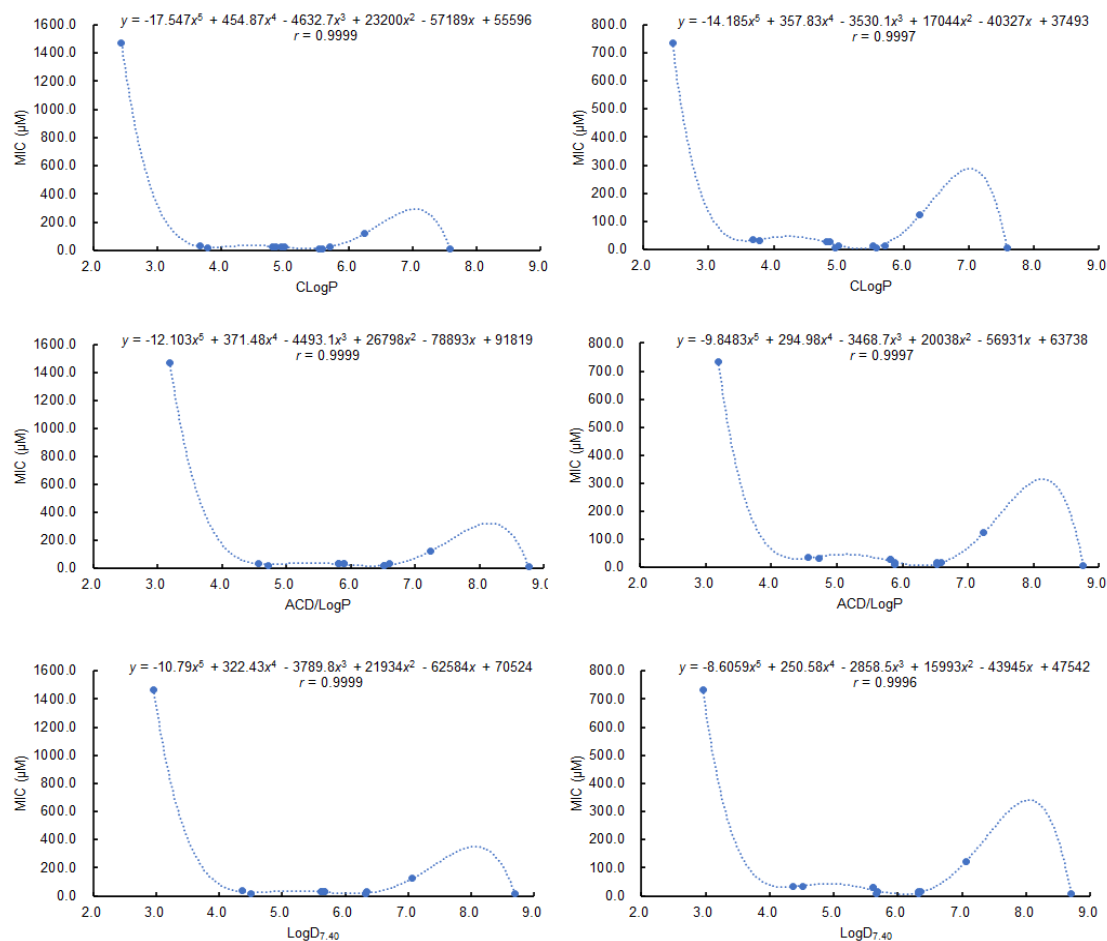
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Acknowledgements

Author contributions

G.Y. initiated the project, hypothesis and design, analyzed the data and obtained regression equations, wrote the manuscript, took part in the search and collection of flavonoids data, prepared the figures and tables; Y.G. performed the search and collection of flavonoids data, took part in the preparation of figures and tables; H.Y., S.L., Y.S. and S.C. took part in the data processing and analysis. All authors reviewed the manuscript.

Additional Information

Competing Interests: The author declare that they have no competing interests.