antibiotics

MDPI

Article

Silver Antibacterial Synergism Activities with Eight Other Metal(loid)-Based Antimicrobials against *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*

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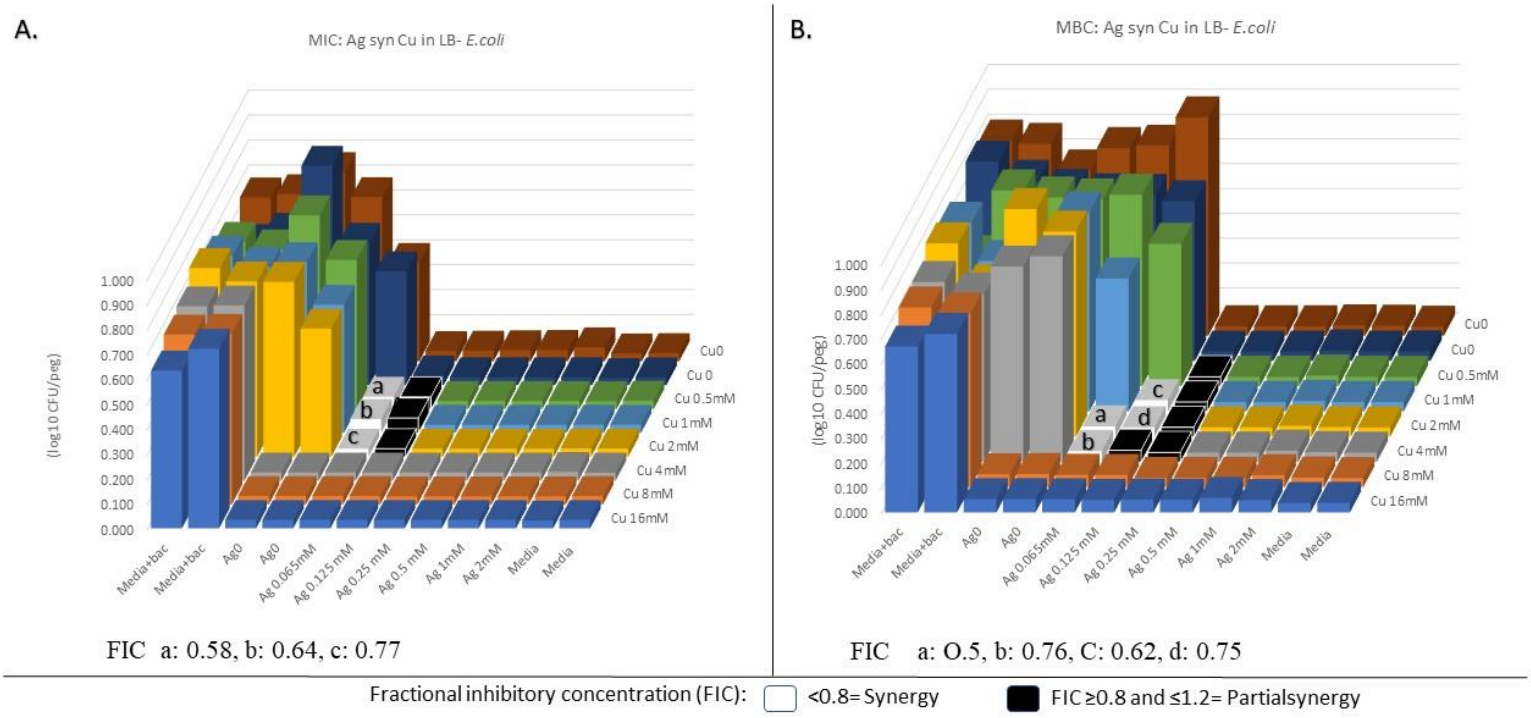


Figure S1. *E. coli* in LB media. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$).

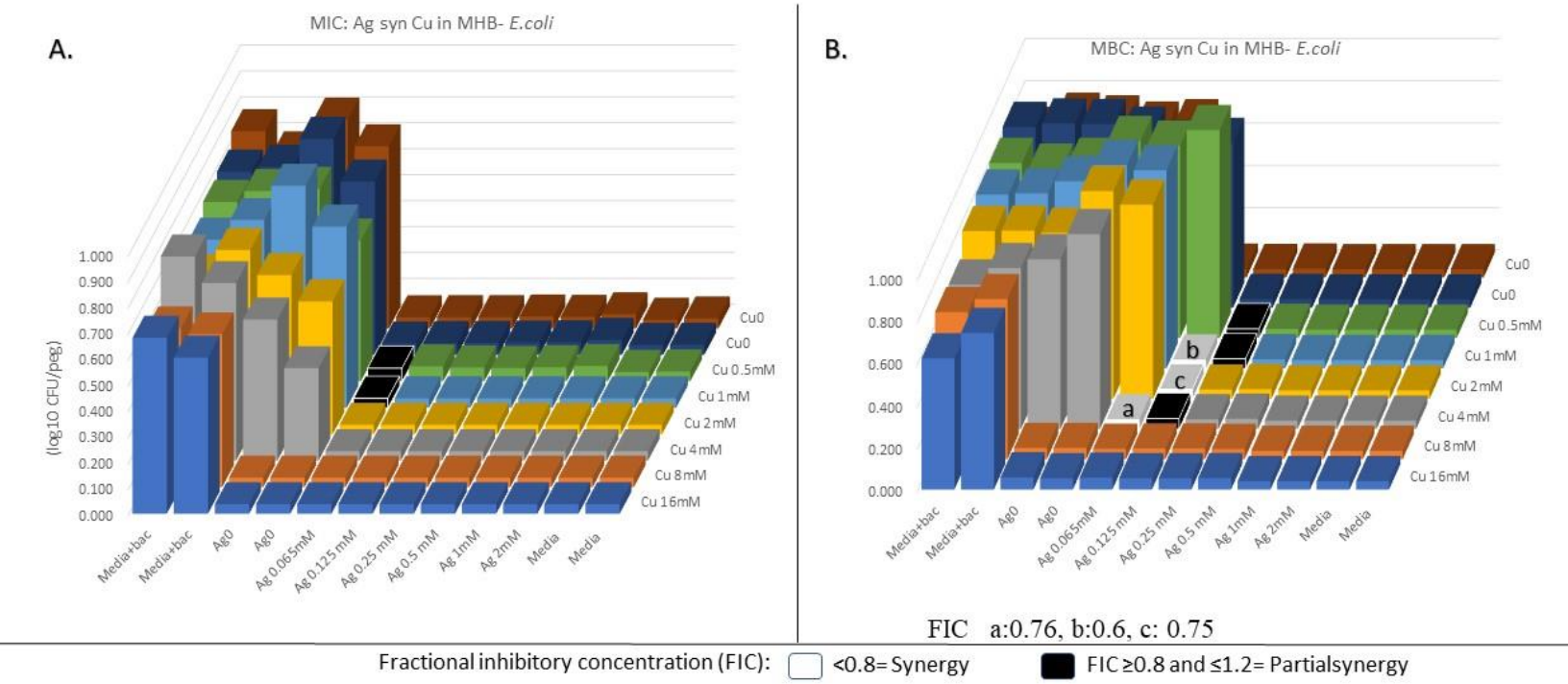
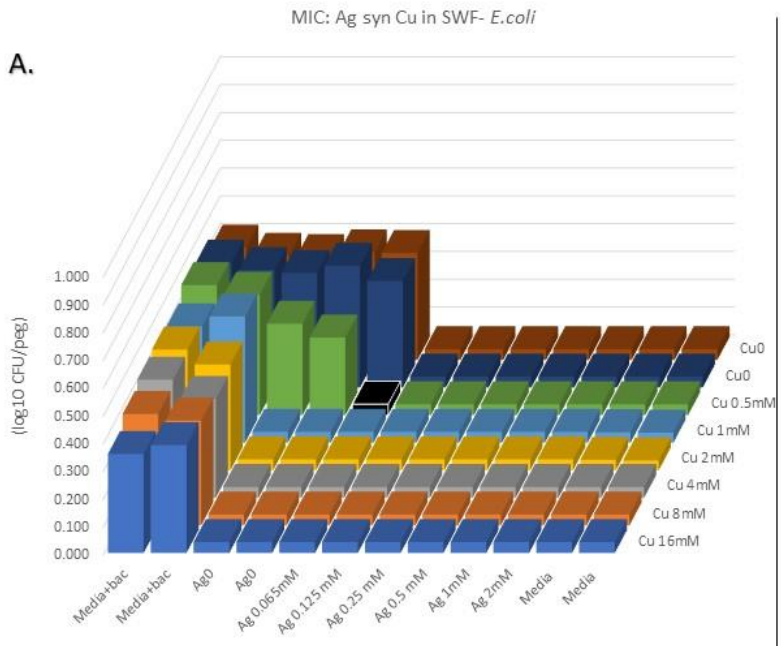
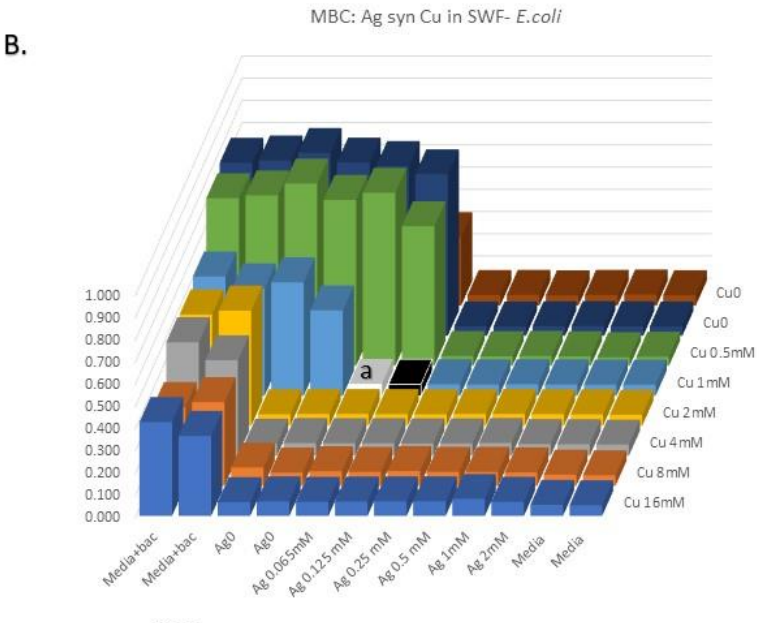


Figure S2. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *E. coli* in MHB media.





a: 0.76

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S3. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *E. coli* in simulated wound fluid (SWF) media.

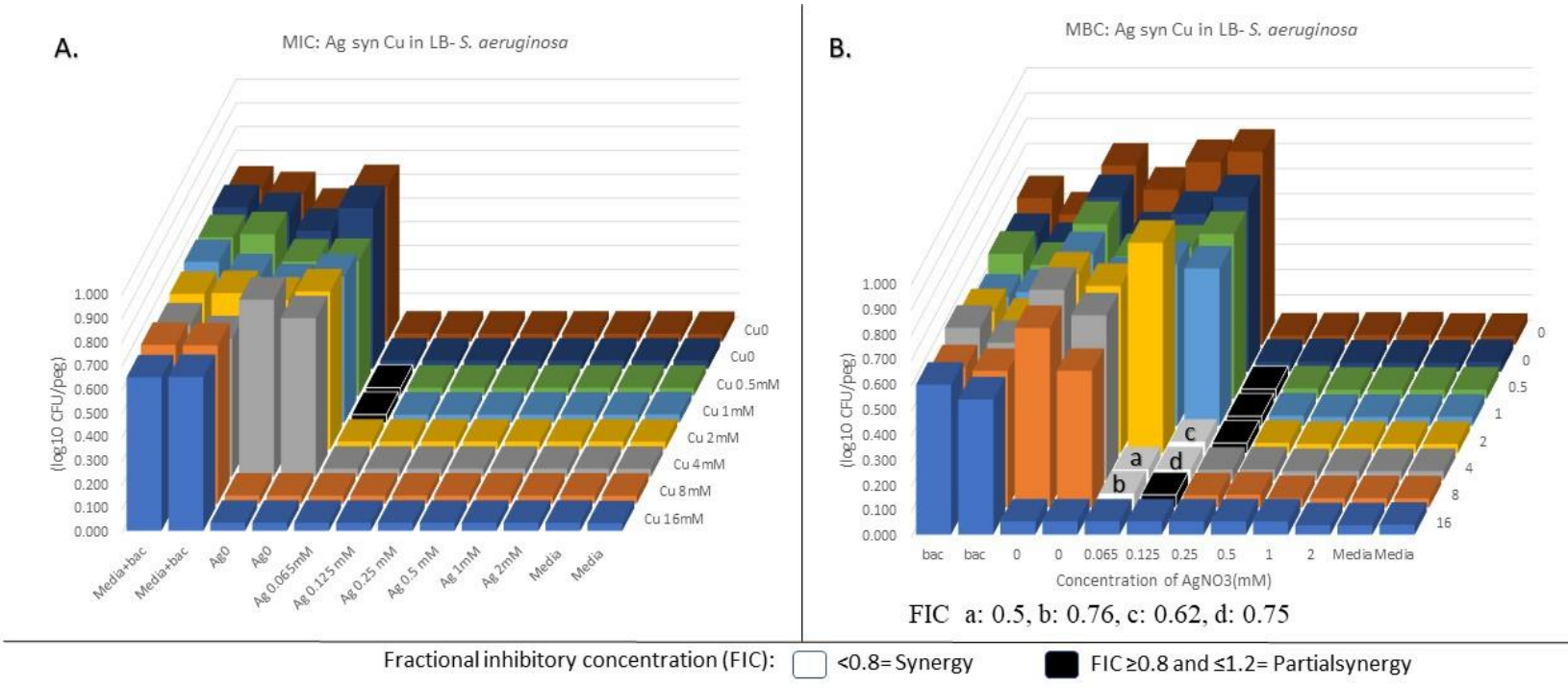


Figure S4. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *P. aeruginosa* in LB media

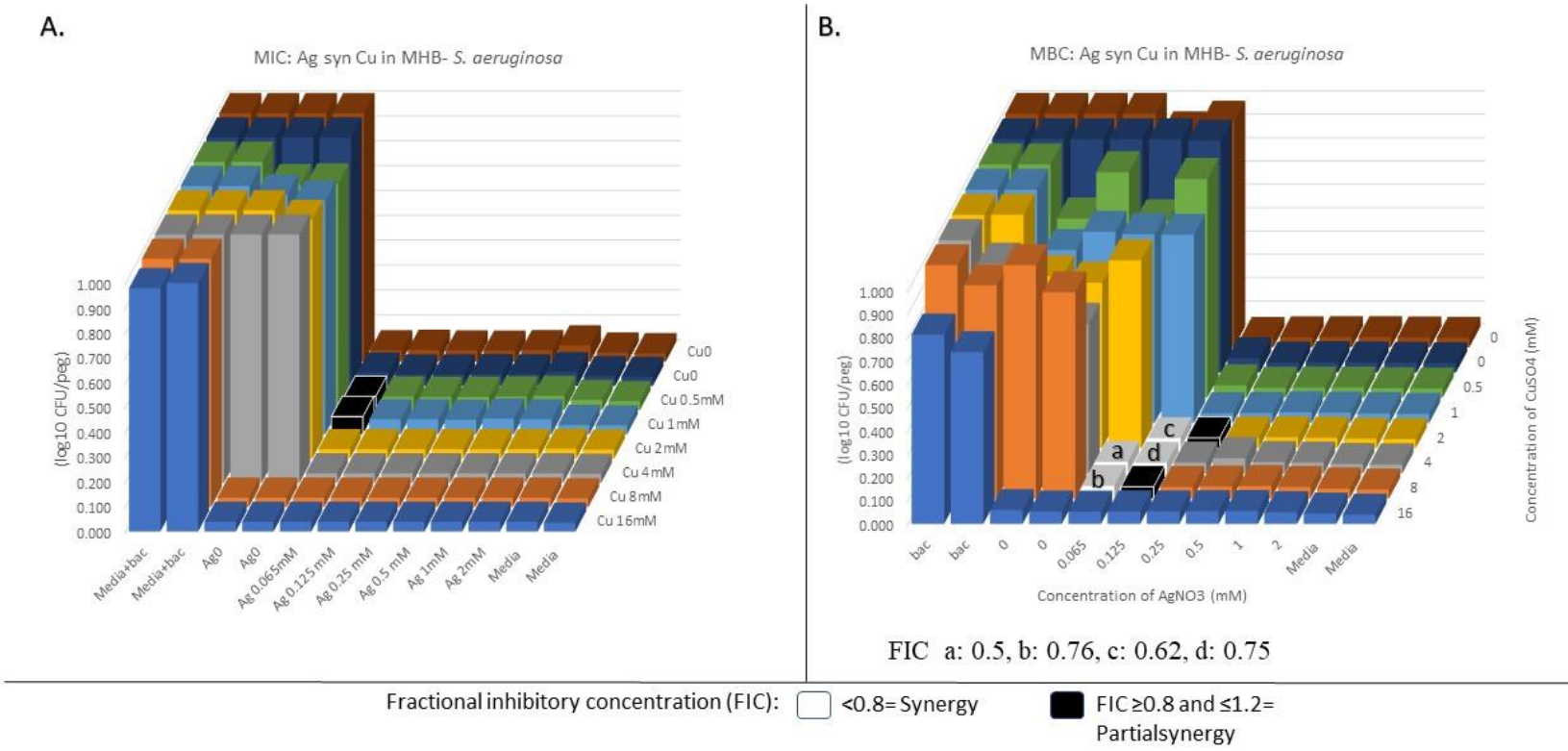


Figure S5. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *P. aeruginosa* in MHB media.

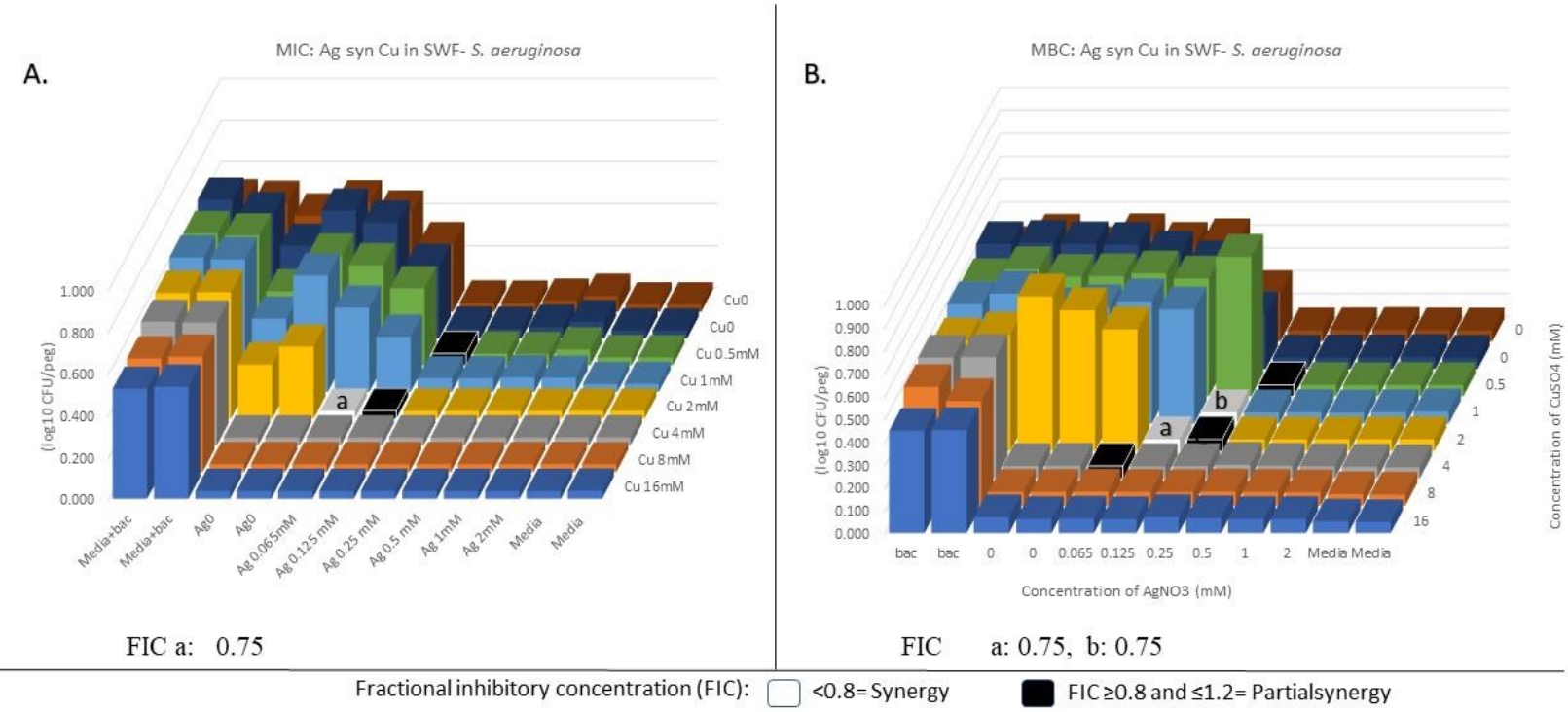


Figure S6. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *P. aeruginosa* in SWF media.

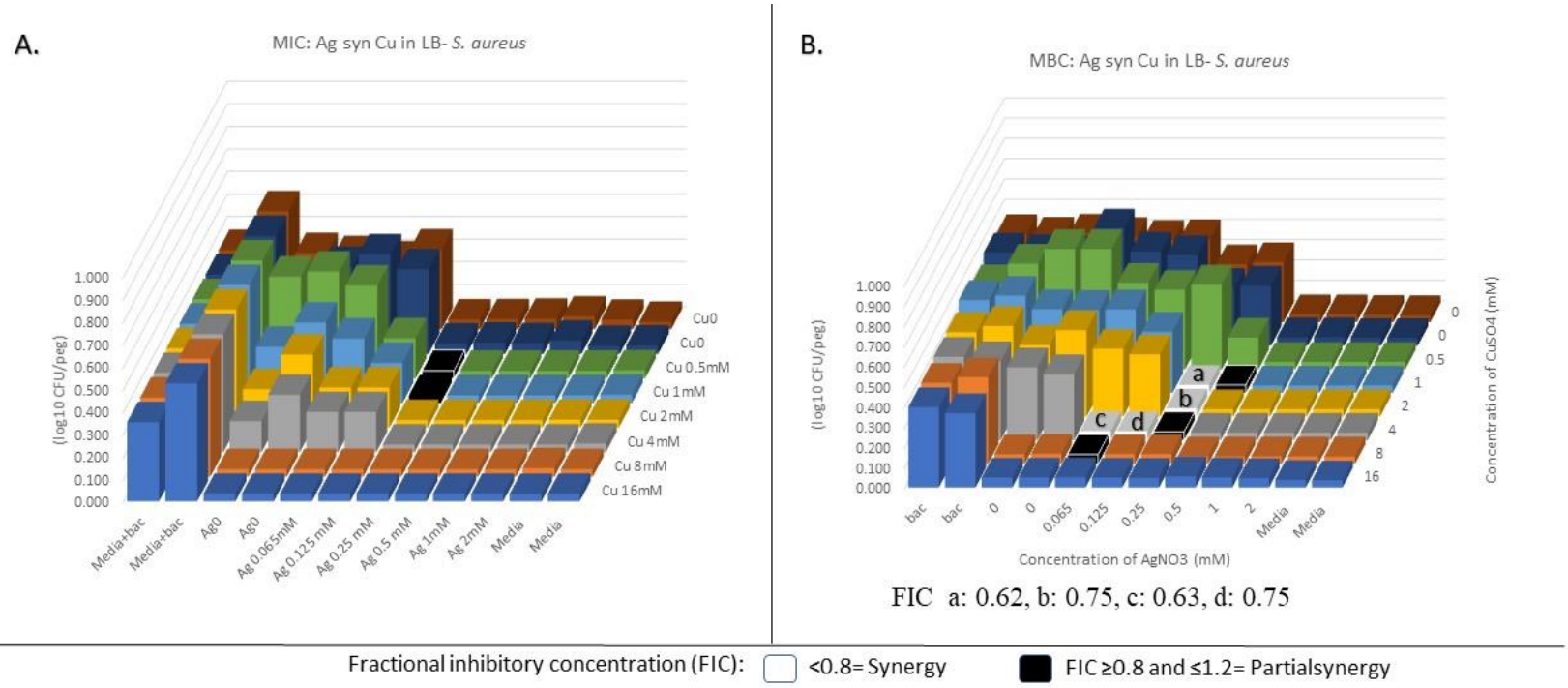


Figure S7. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *S. aureus* in LB media.

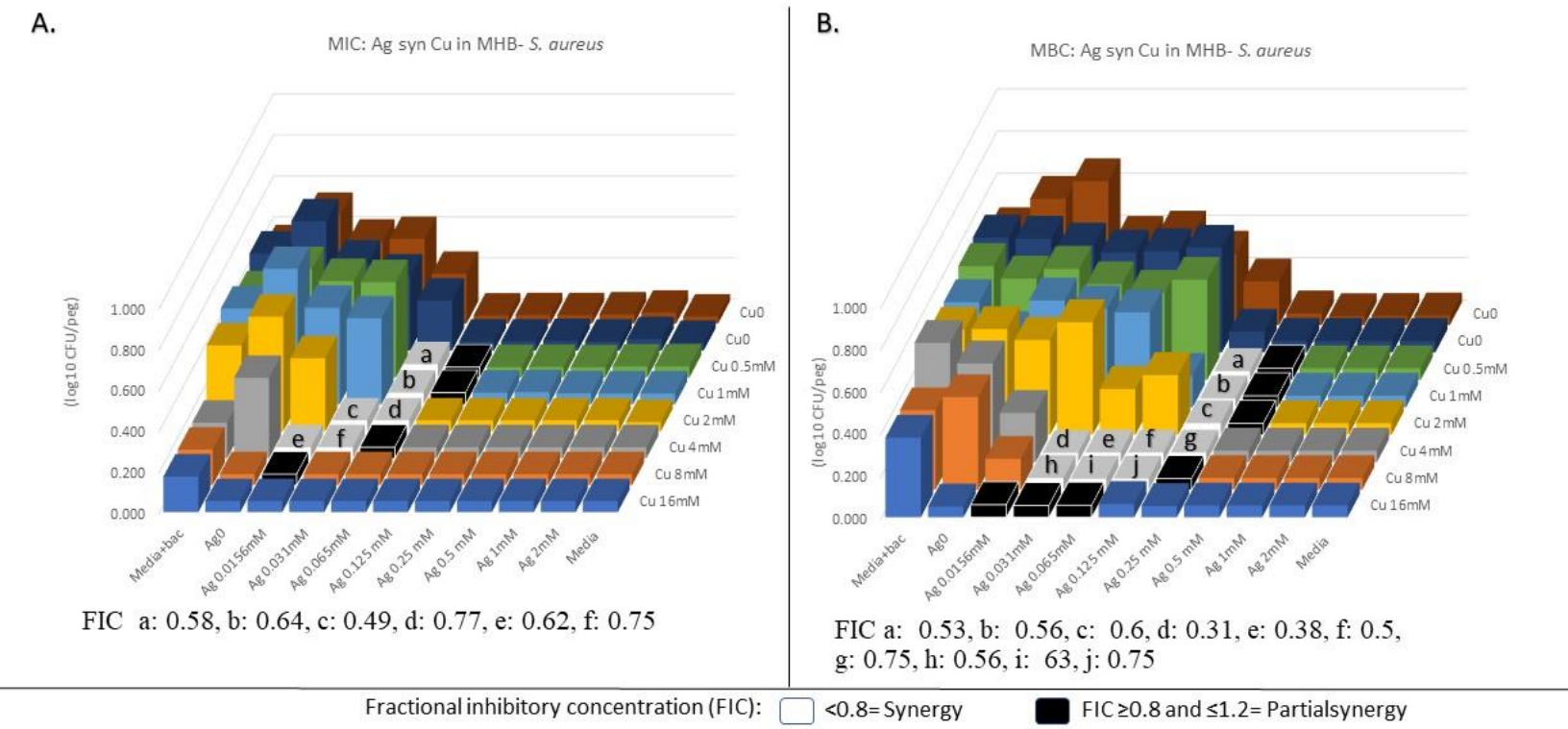


Figure S8. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *S. aureus* in MHB media.

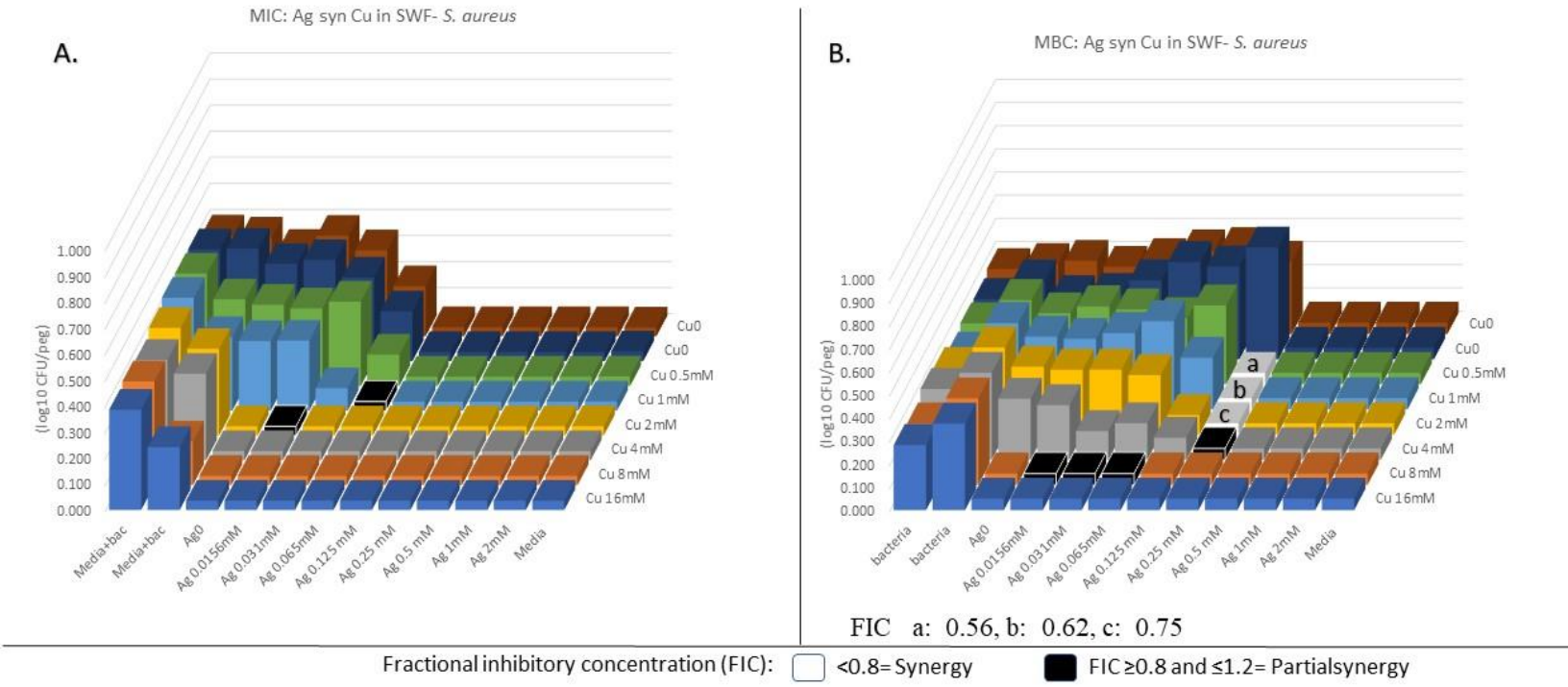


Figure S9. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) against *S. aureus* in SWF media.

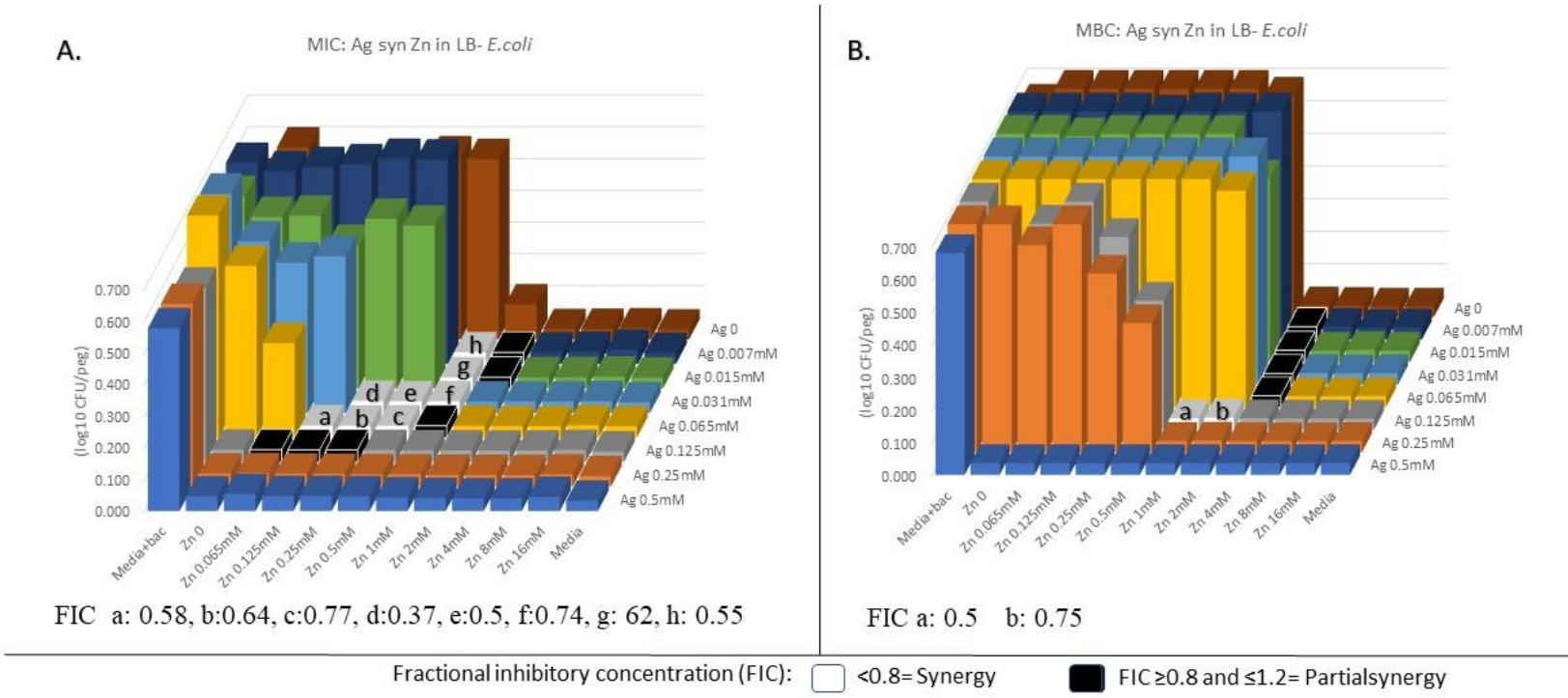


Figure S10. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *E. coli* in LB media.

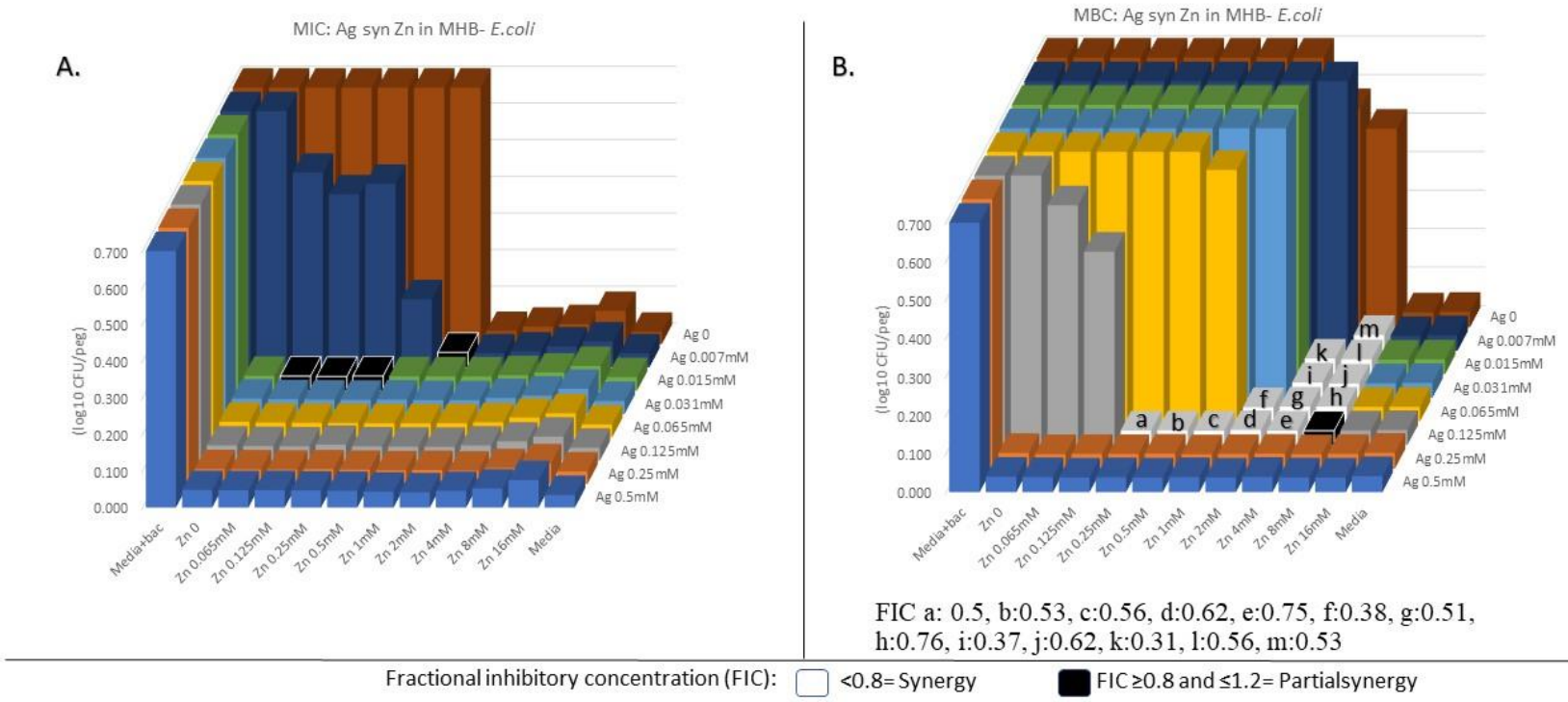
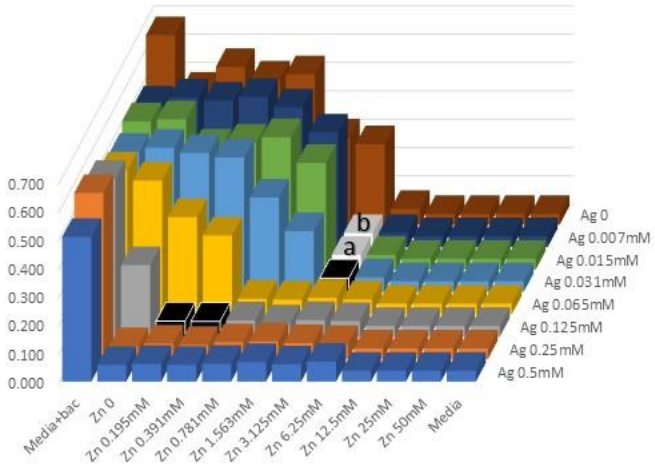


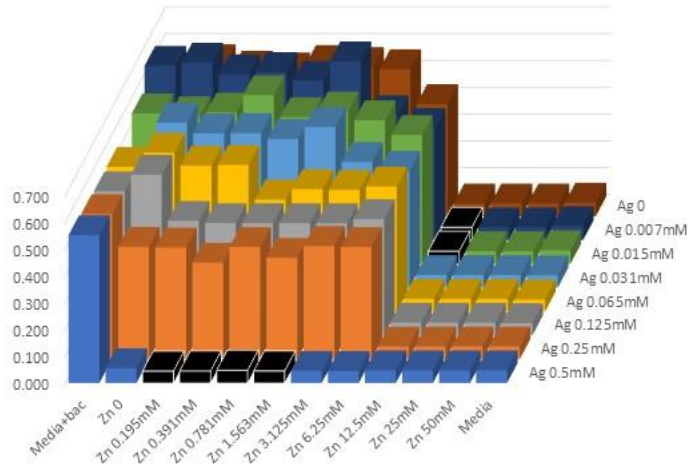
Figure S11. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *E. coli* in MHB media.

A.



FIC a: 0.51, b:0.54

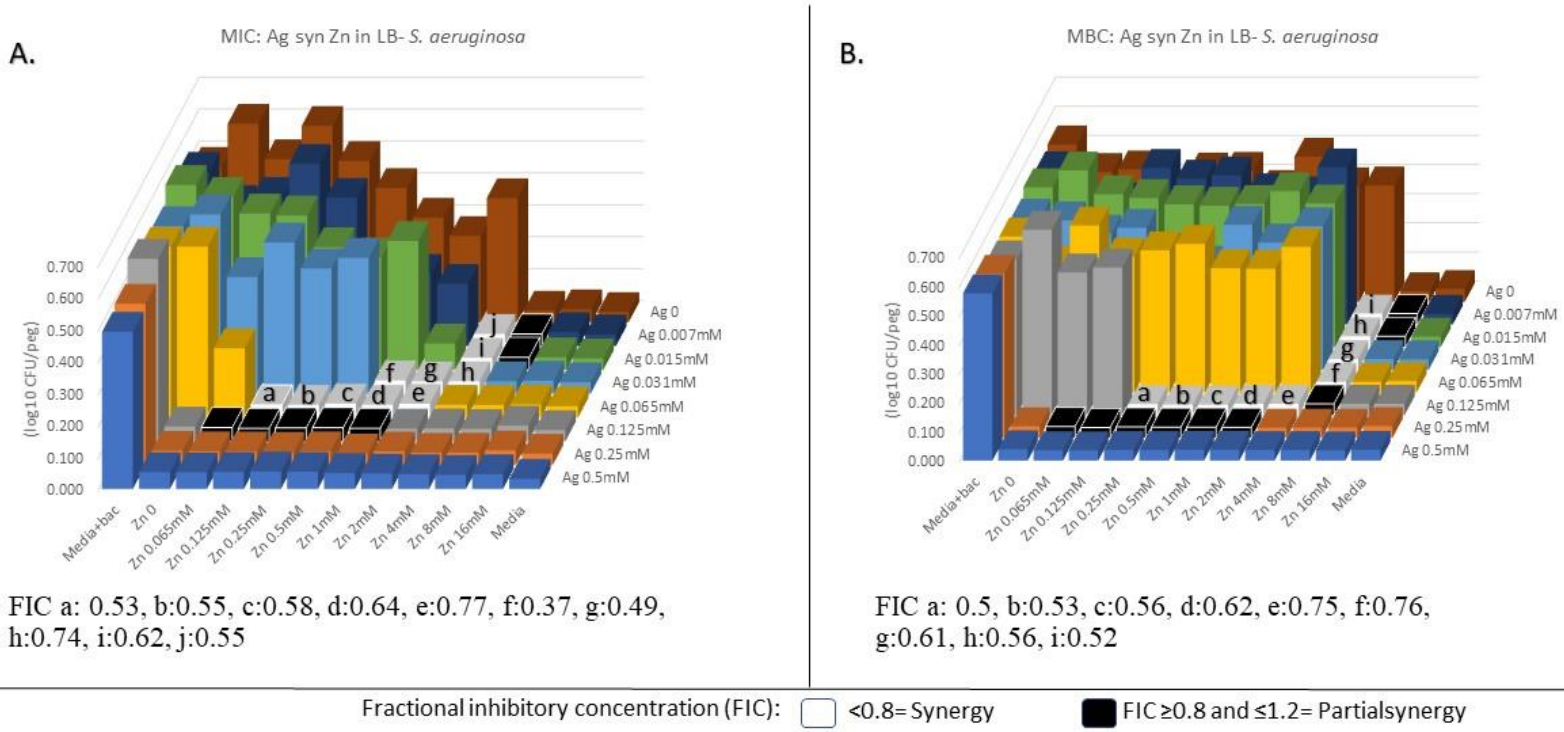
B.



FIC a: 1

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S12. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *E. coli* in simulated wound fluid (SWF) media.



FIC a: 0.53, b:0.55, c:0.58, d:0.64, e:0.77, f:0.37, g:0.49, h:0.74, i:0.62, j:0.55

FIC a: 0.5, b:0.53, c:0.56, d:0.62, e:0.75, f:0.76, g:0.61, h:0.56, i:0.52

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S13. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *P. aeruginosa* in LB media.

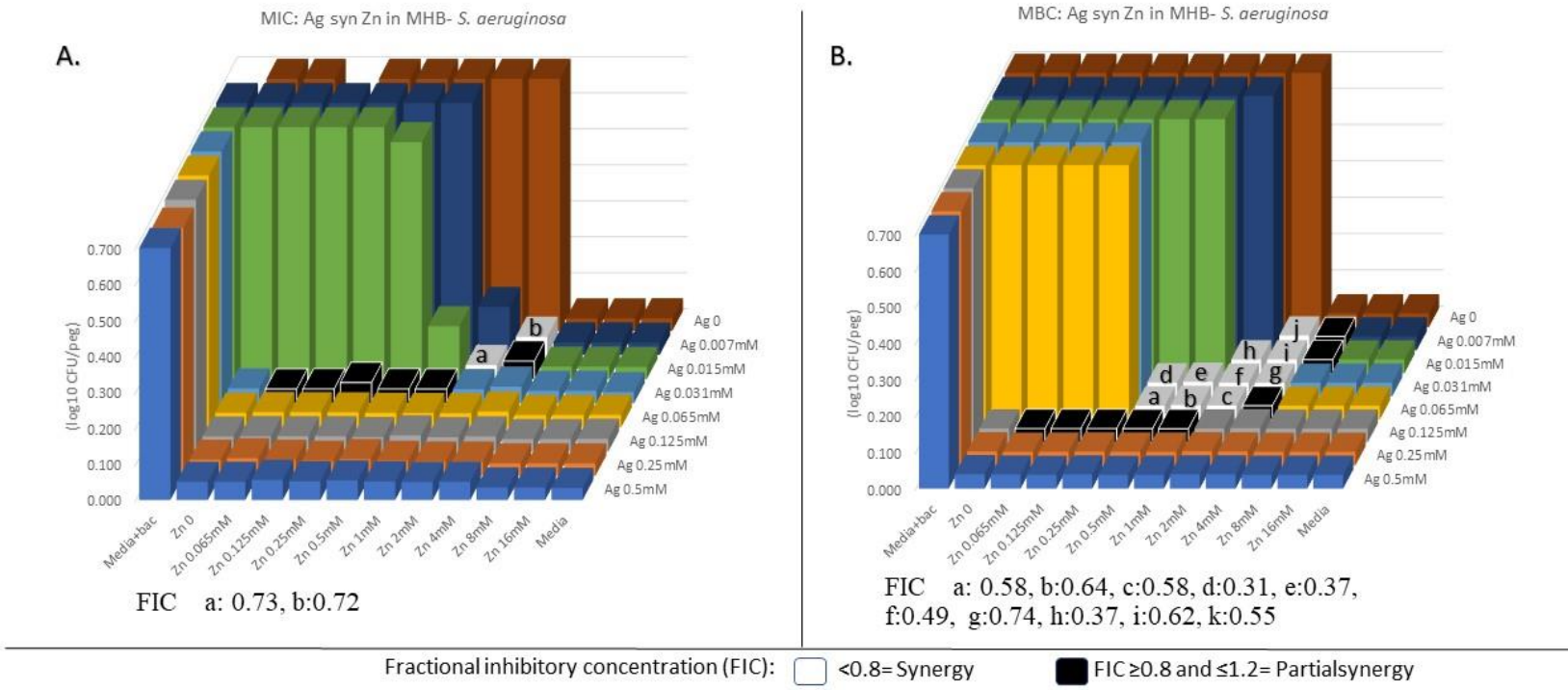


Figure S14. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *P. aeruginosa* in MHB media.

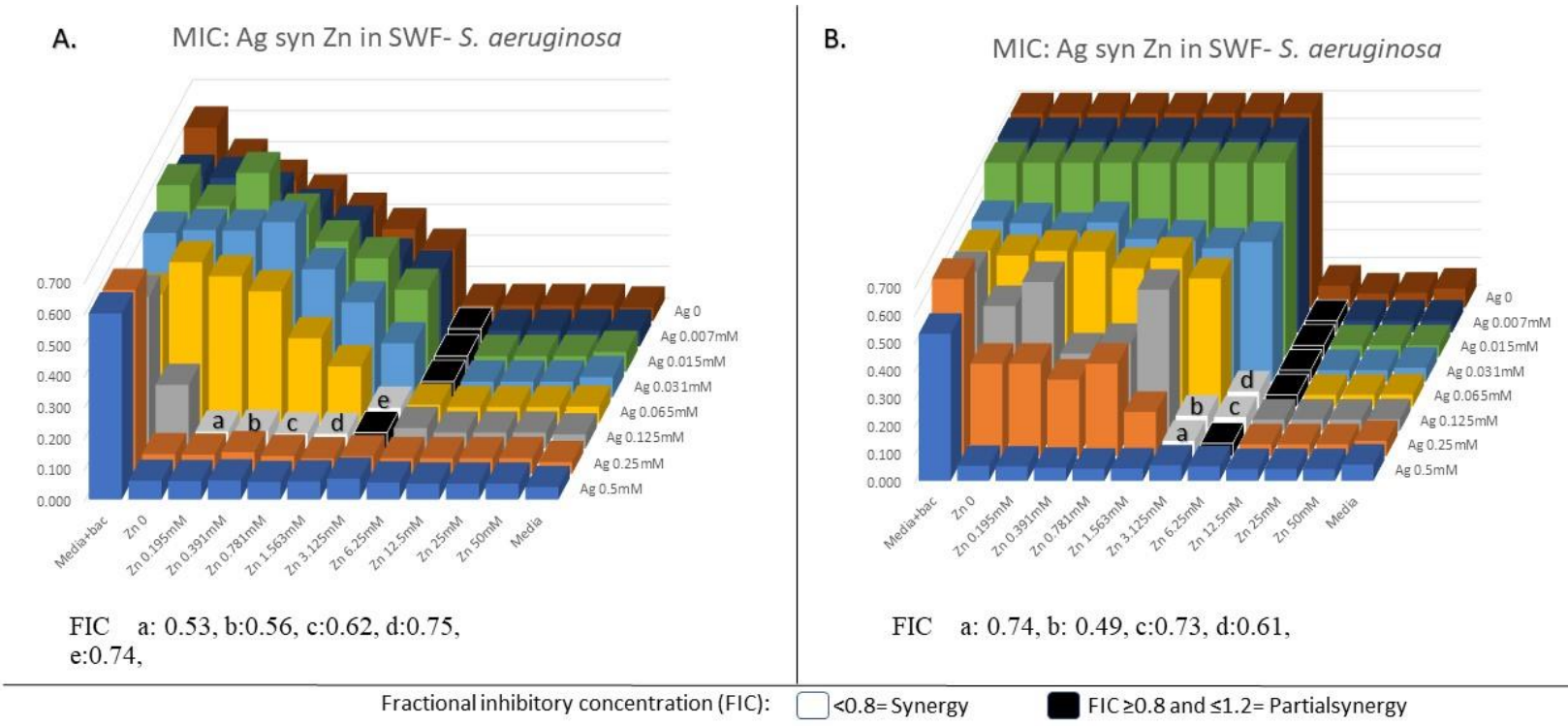


Figure S15. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *P. aeruginosa* in SWF media.

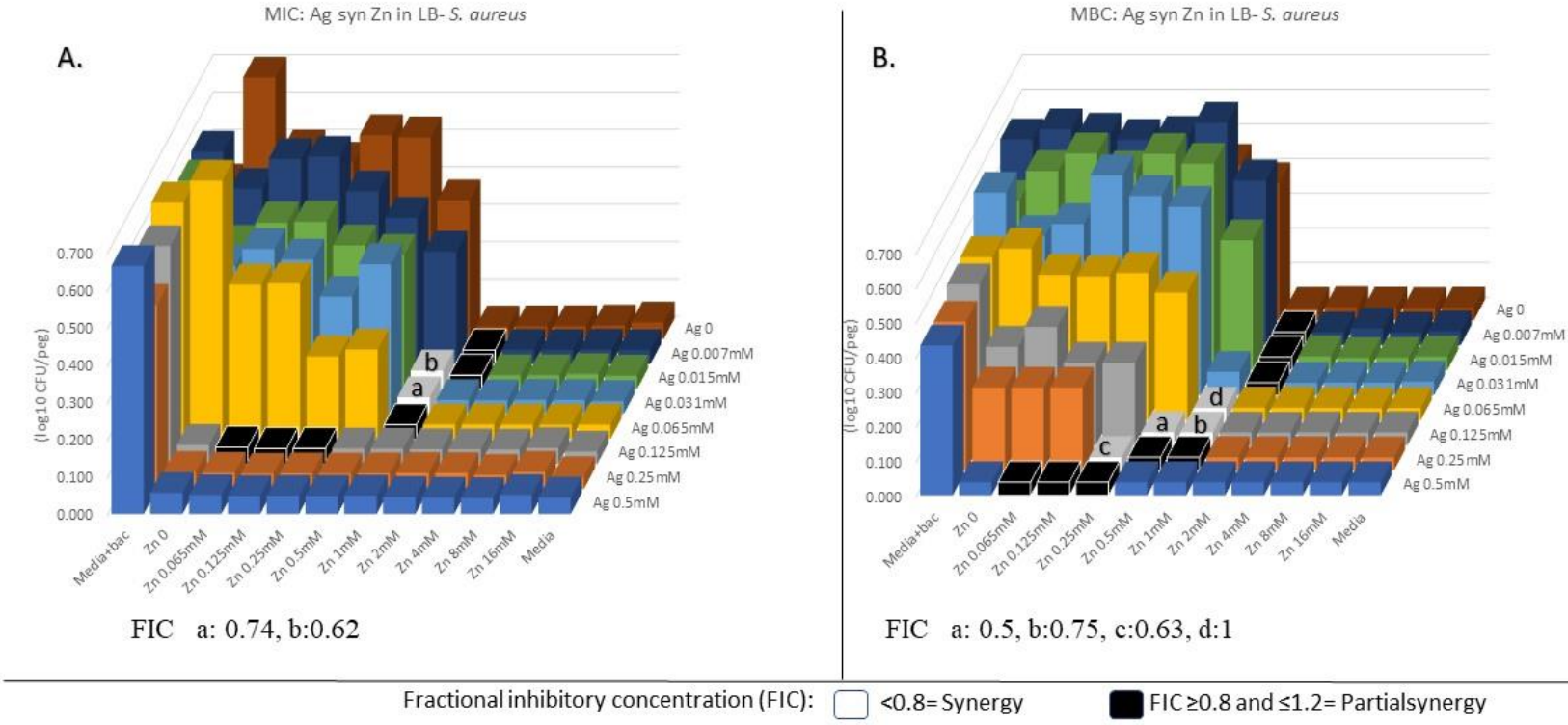


Figure S16. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *S. aureus* in LB media.

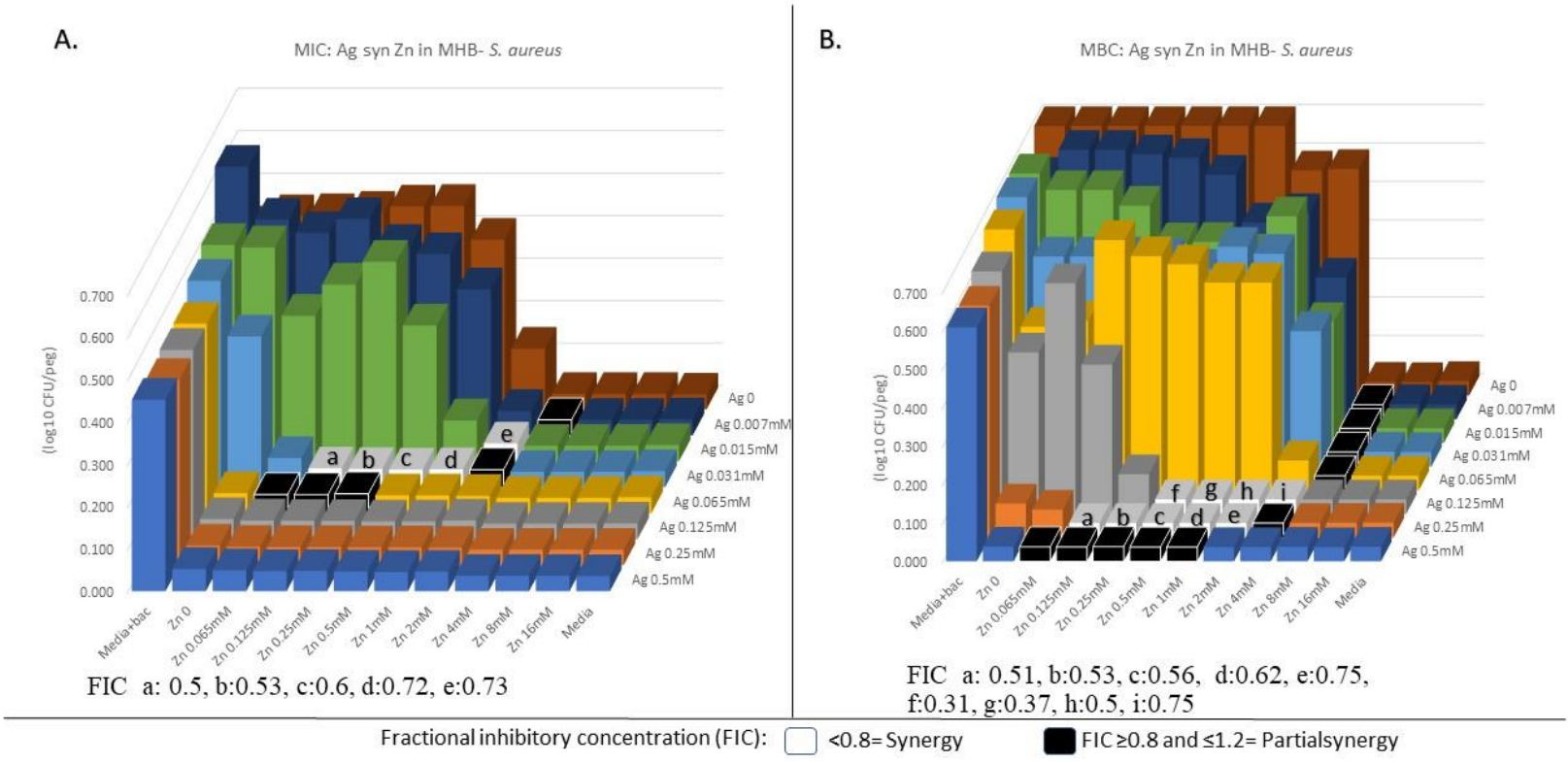


Figure S17. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) against *S. aureus* in MHB media.

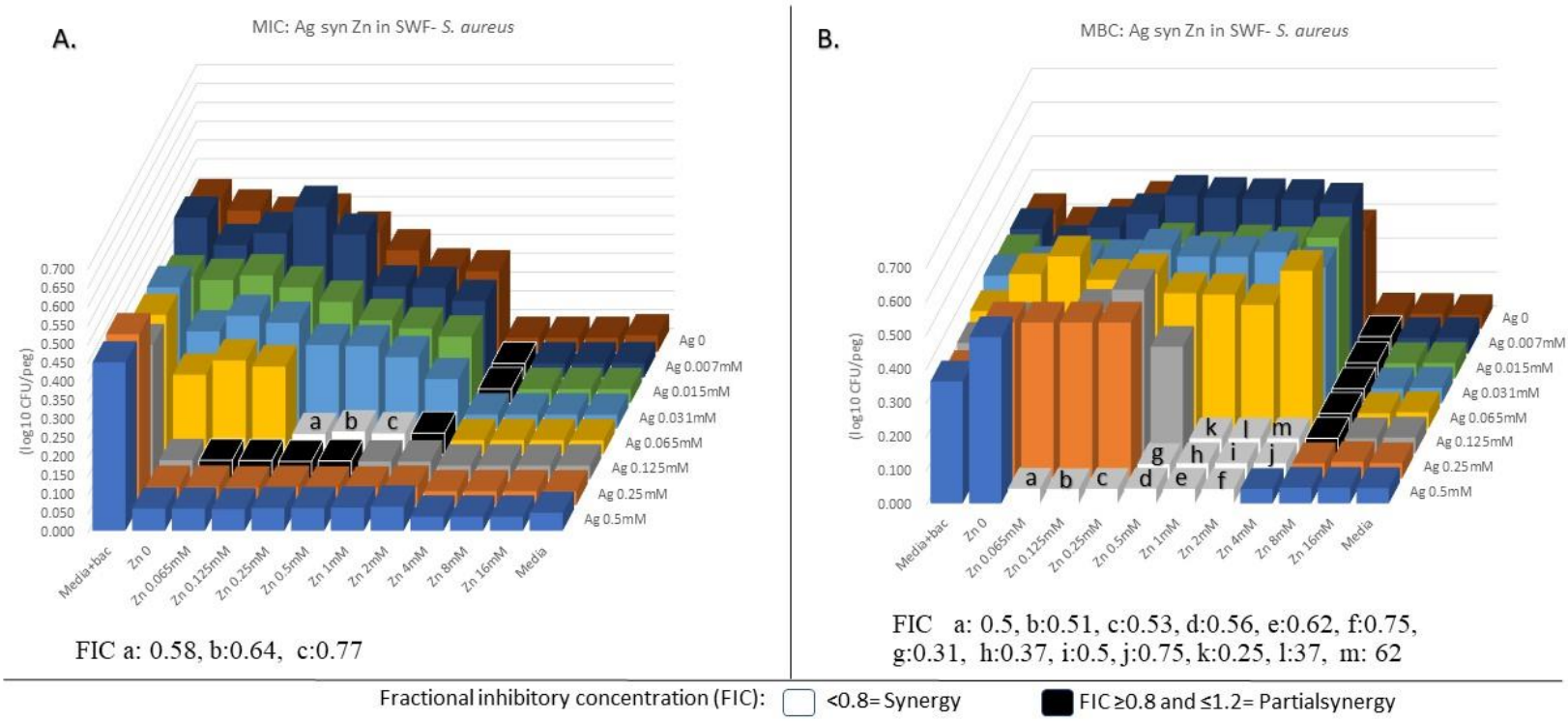
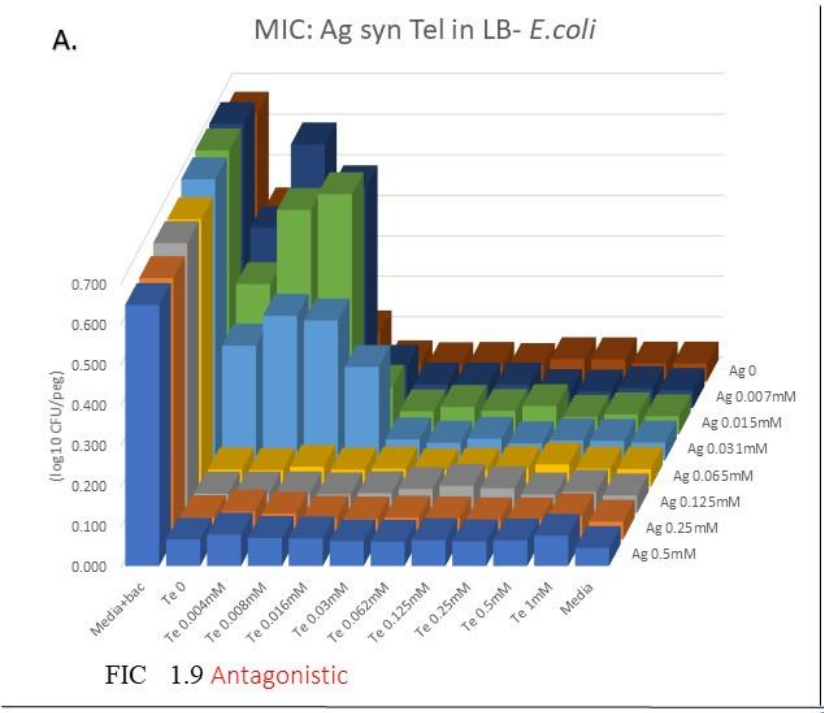
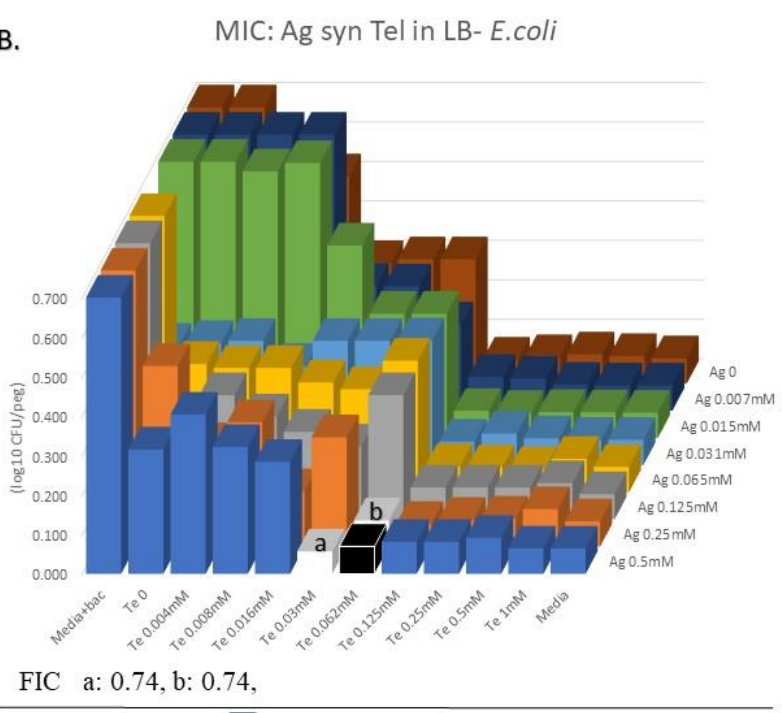


Figure S18. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4\bullet$) against *S. aureus* in SWF media.



FIC 1.9 Antagonistic



FIC a: 0.74, b: 0.74,

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S19. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with potassium tellurite (K_2TeO_3) against *E. coli* in LB media.

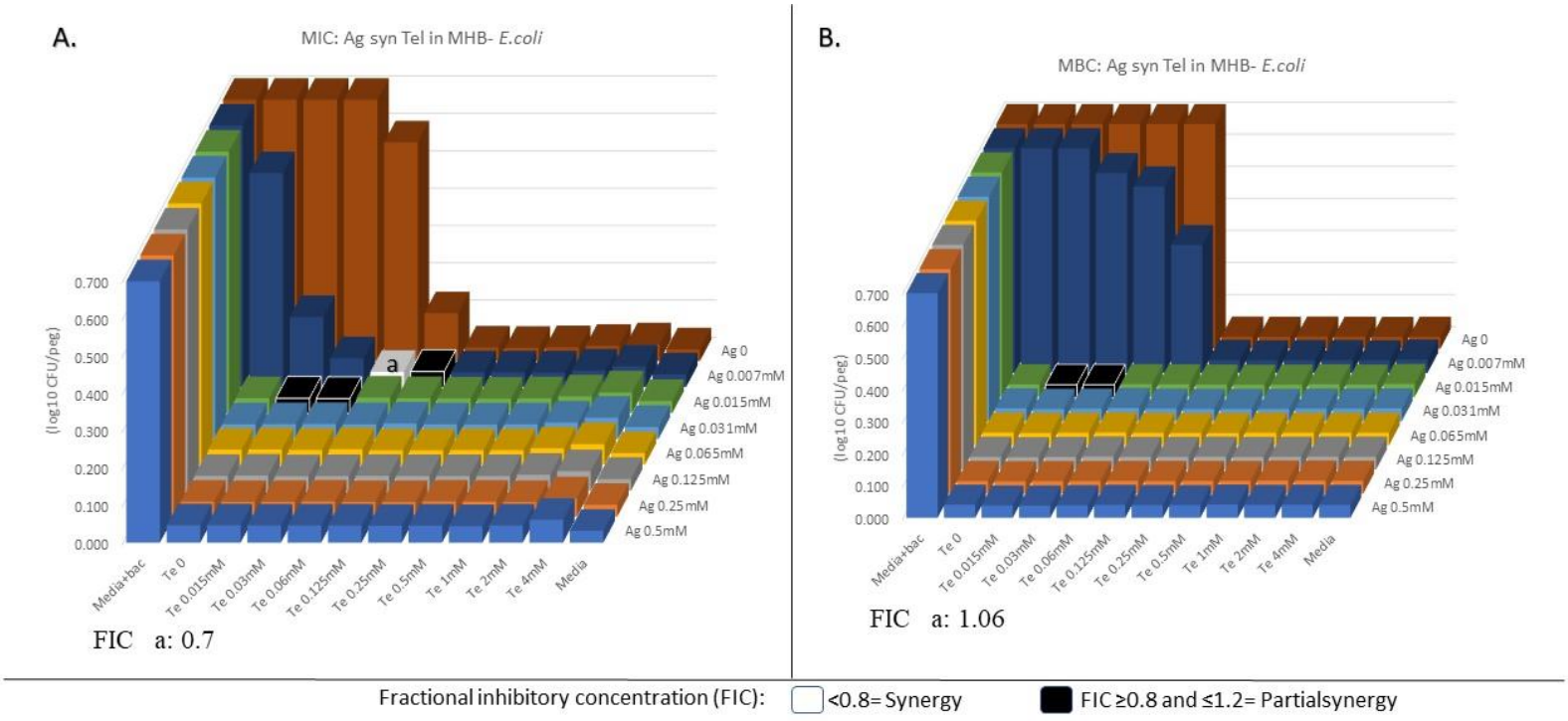
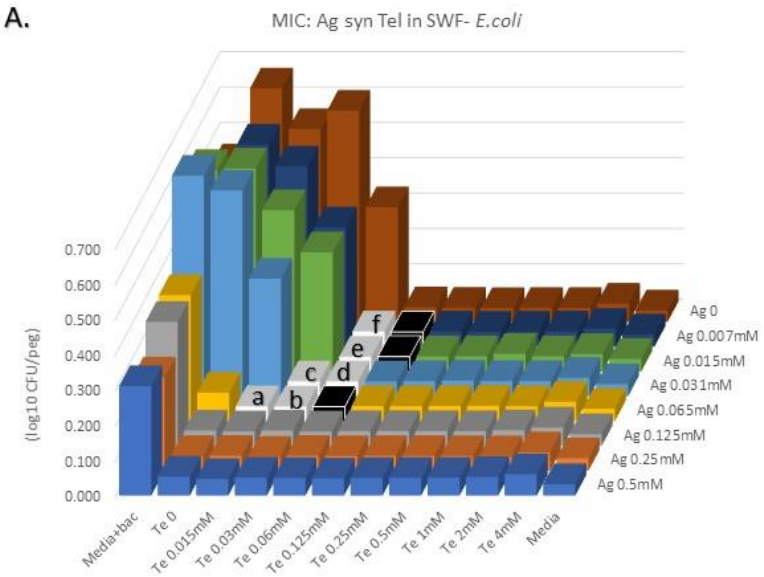
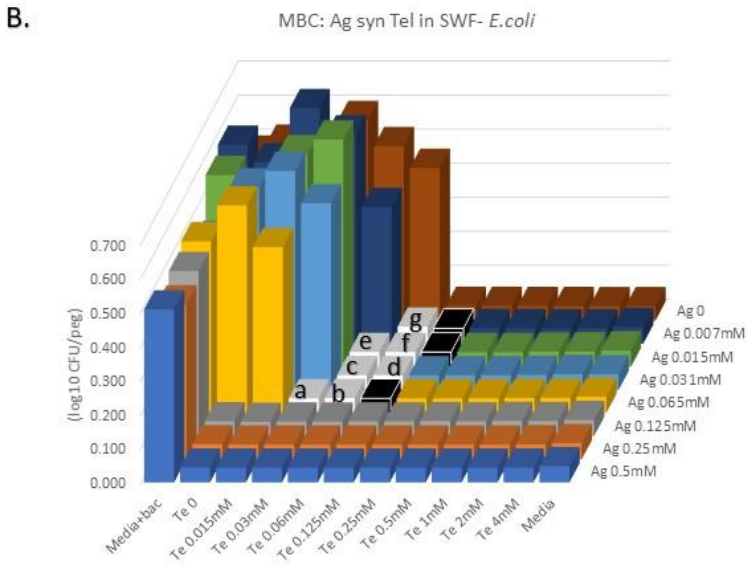


Figure S20. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with potassium tellurite (K_2TeO_3) against *E. coli* in MHB media.



FIC a: 0.65, b:0.76, c:0.48, d:0.72, e:0.62, f:0.53



FIC a: 0.64, b:0.48, c:0.75, d:0.36, e:0.62, f:0.75, g:0.55

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S21. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *E. coli* in simulated wound fluid (SWF) media.

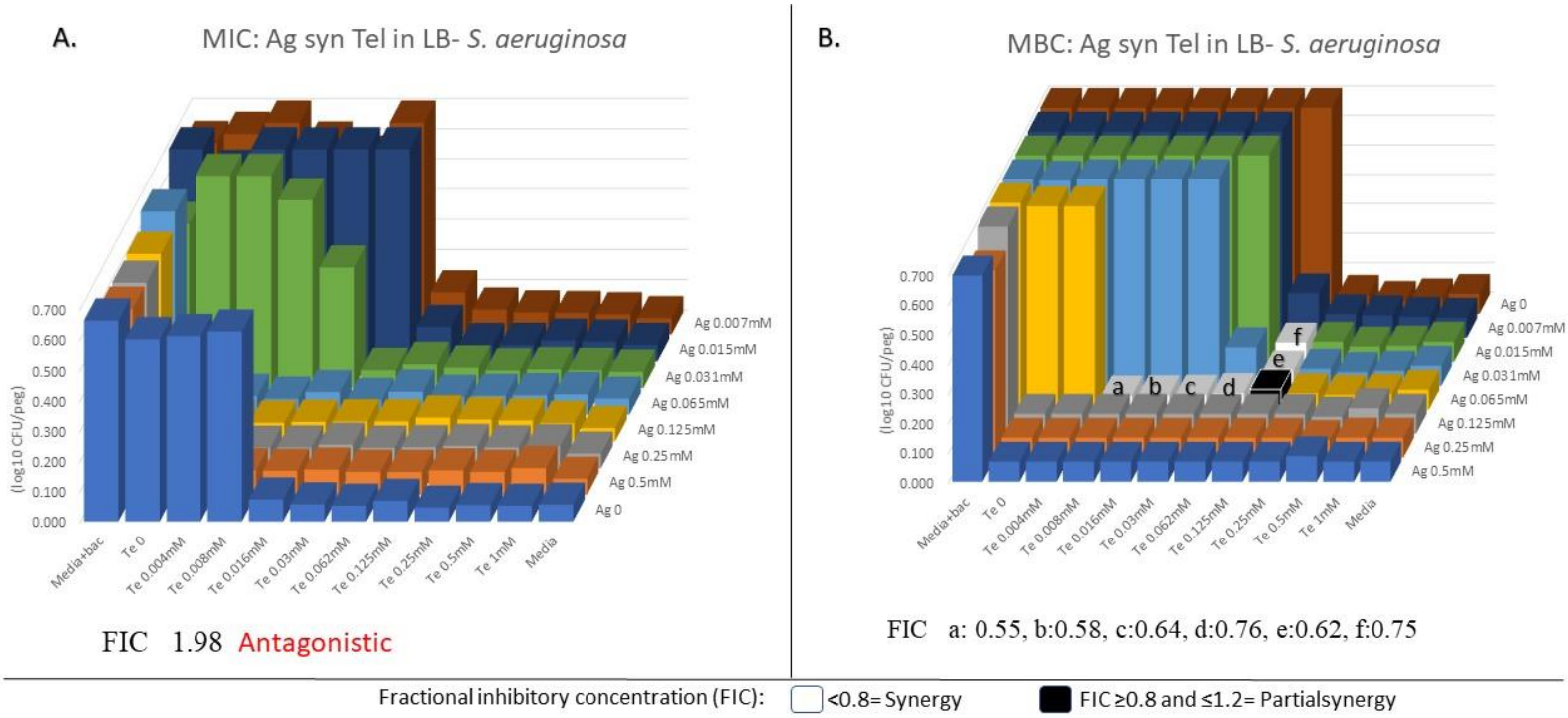


Figure S22. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *P. aeruginosa* in LB media.

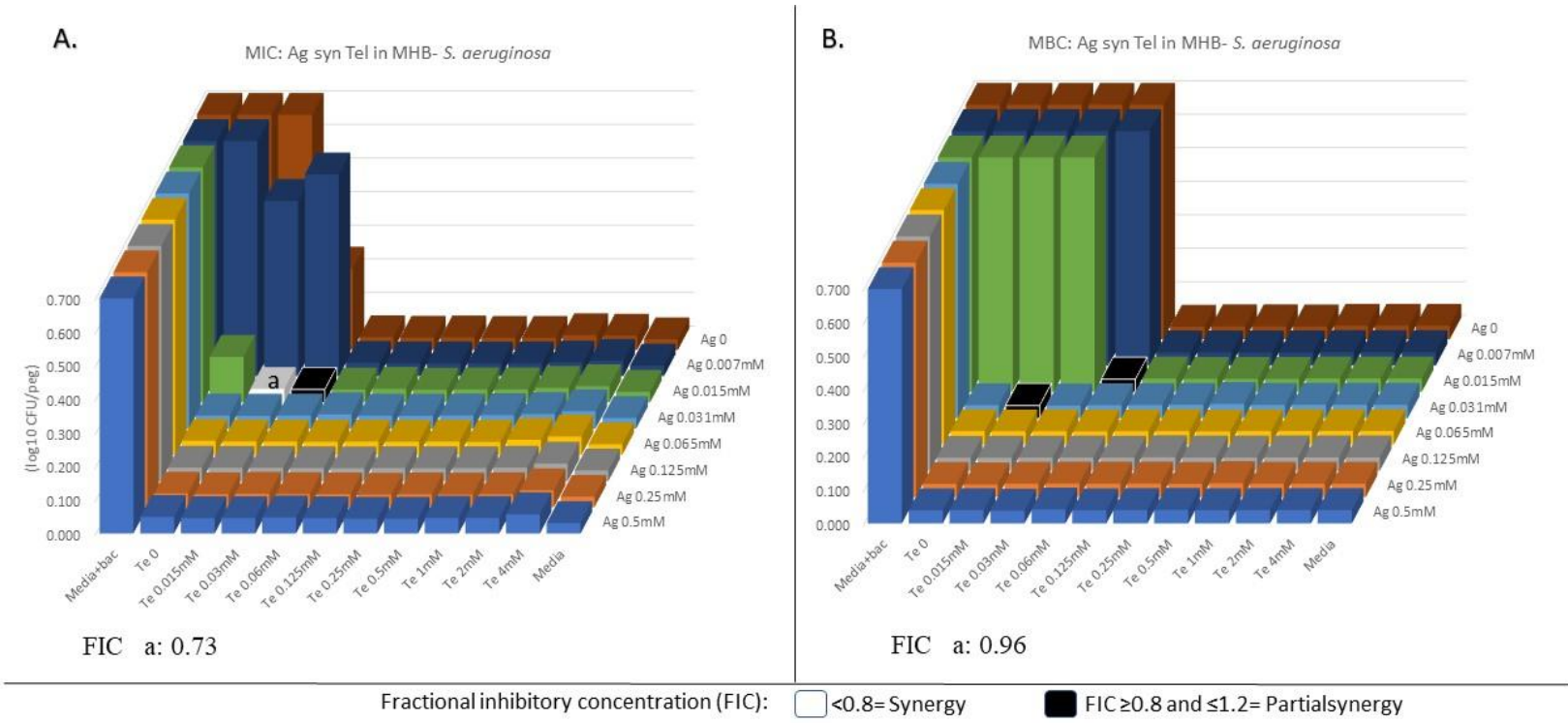


Figure S23. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *P. aeruginosa* in MHB media.

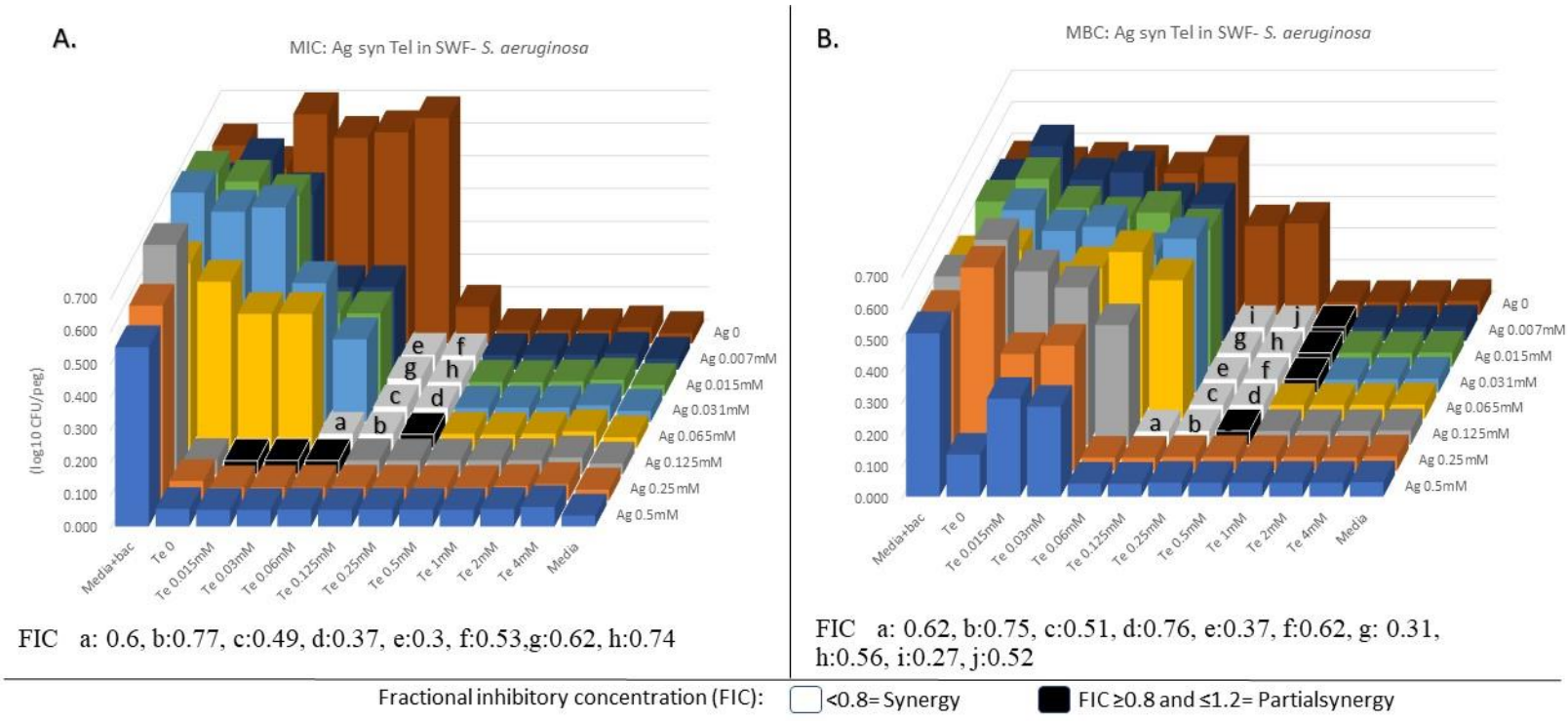


Figure S24. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *P. aeruginosa* in SWF media.

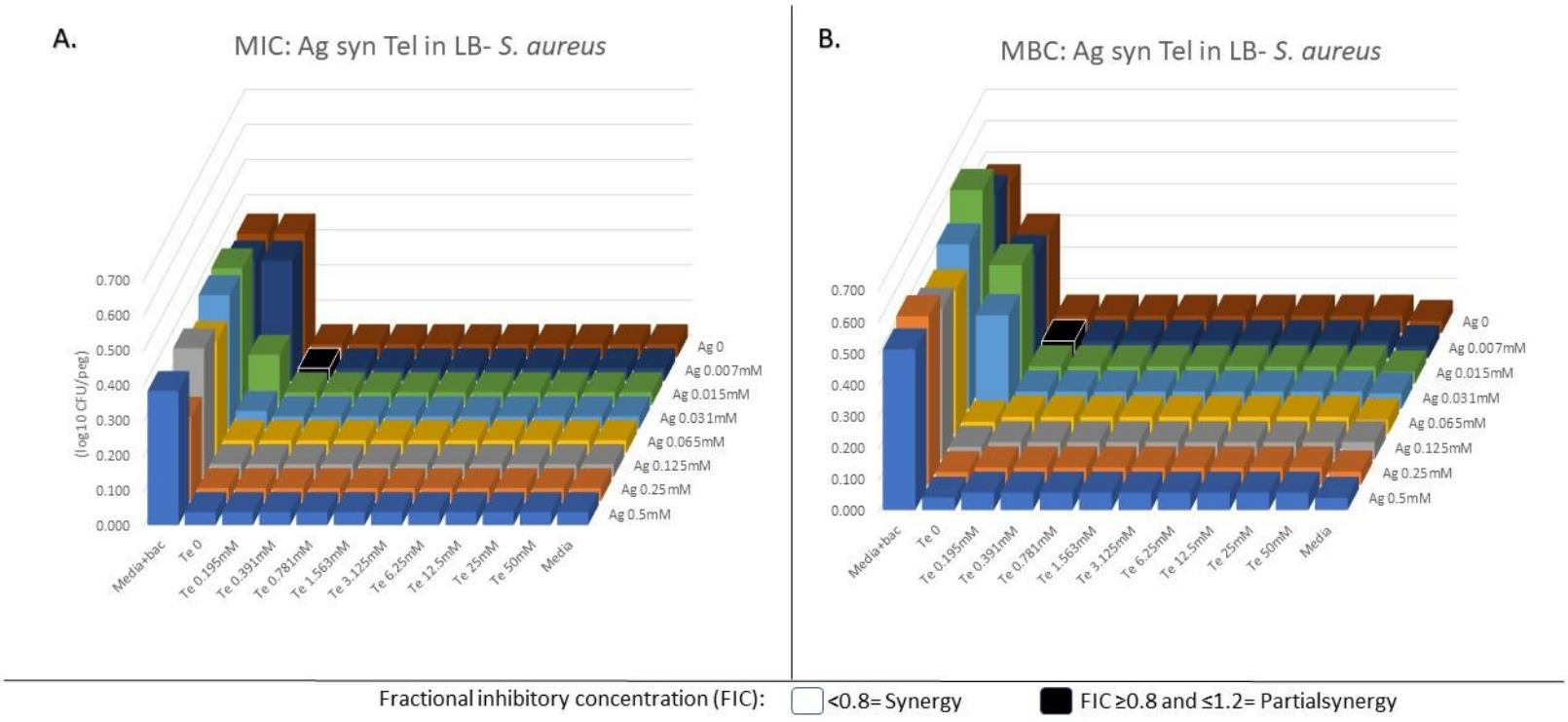


Figure S25. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *S. aureus* in LB media.

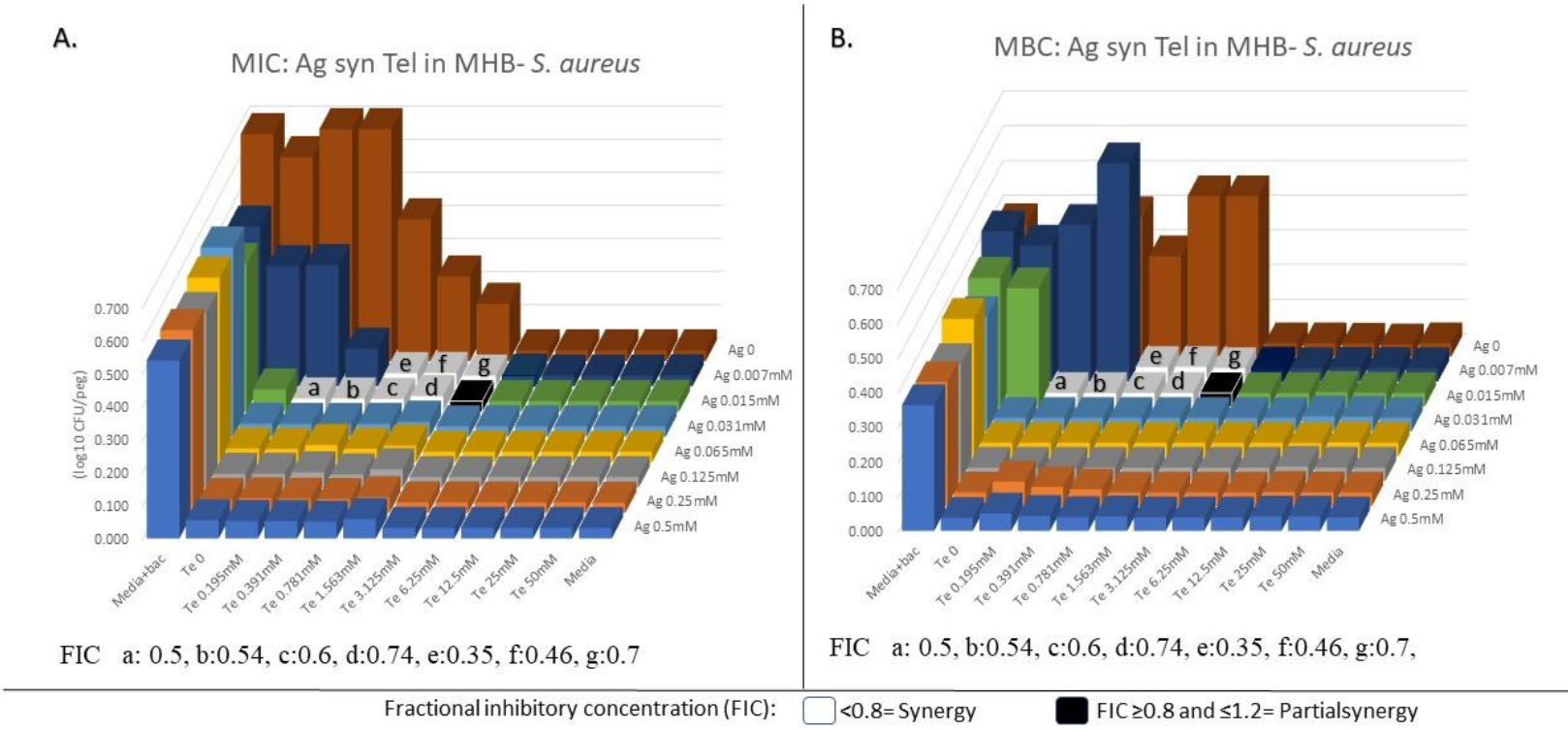
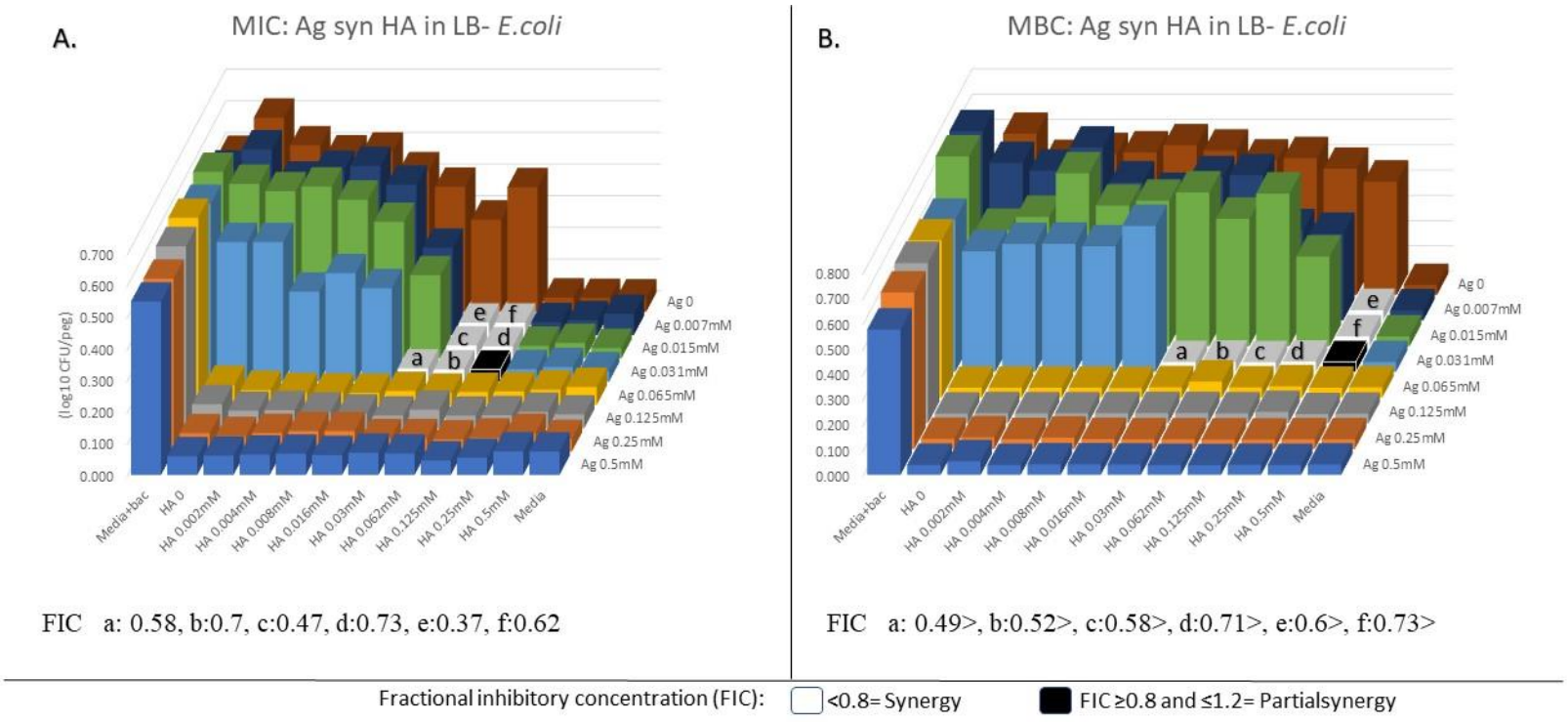


Figure S26. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) against *S. aureus* in MHB media.



FIC a: 0.58, b:0.7, c:0.47, d:0.73, e:0.37, f:0.62

FIC a: 0.49>, b:0.52>, c:0.58>, d:0.71>, e:0.6>, f:0.73>

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S27. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *E. coli* in LB media.

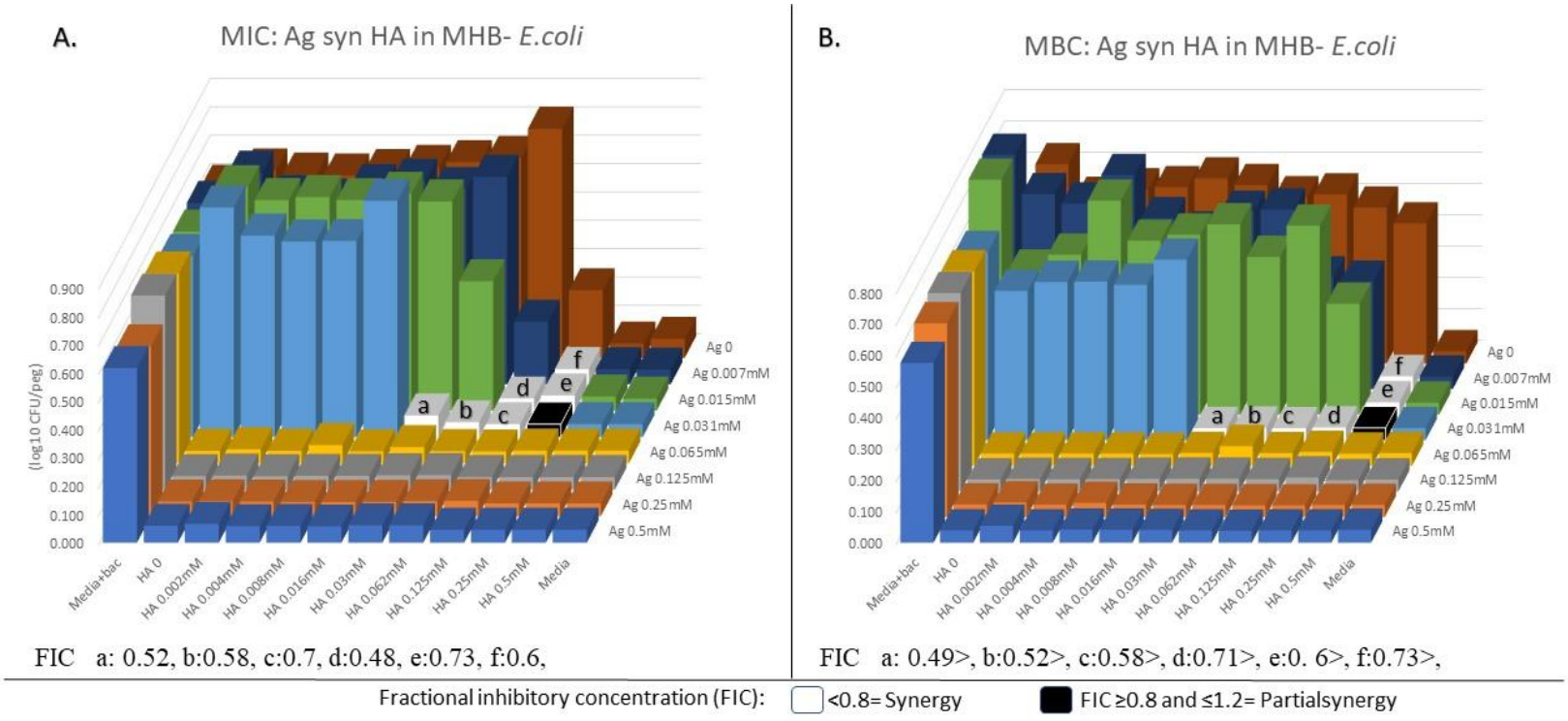
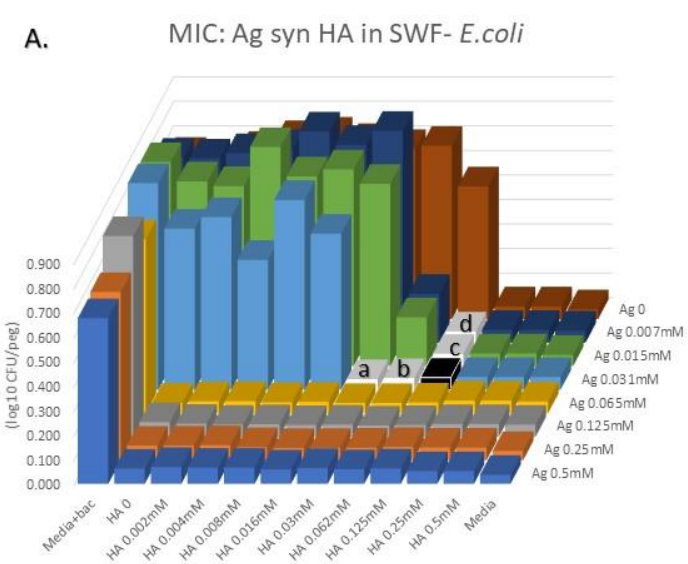
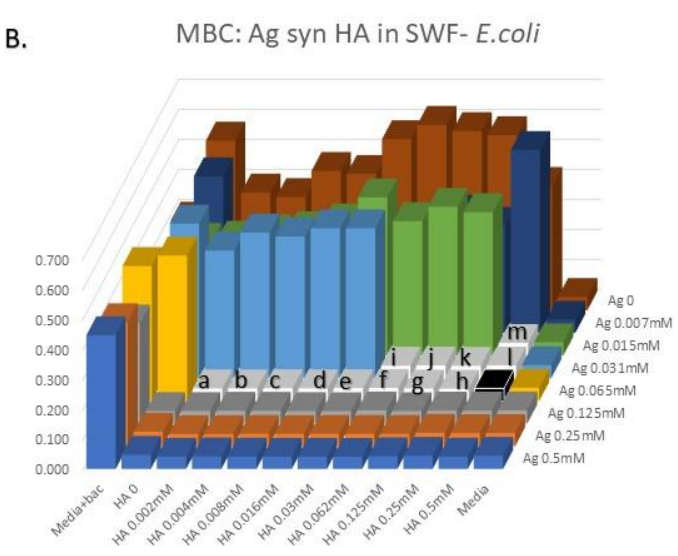


Figure S28. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *E. coli* in MHB media.



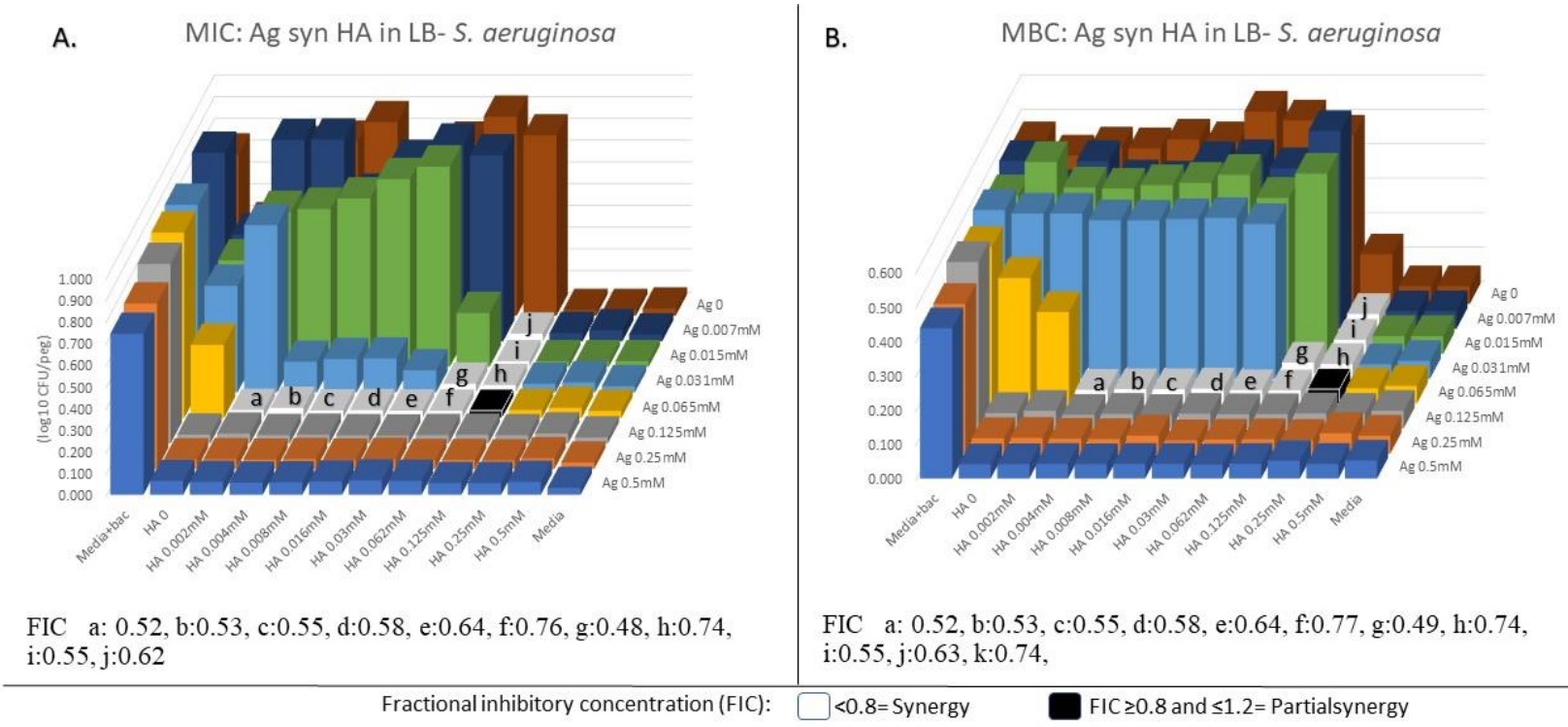
FIC a: 0.58, b:0.7, c:0.7, d:0.48, e:0.73,



FIC a: 0.522>, b:0.524>, c:0.528>, d:0.53>, e:0.55>, f:0.58>, g:0.64>, h:0.77>, i:0.3>, j:0.36>, k:0.49>, l:74>, m: 0.62>,

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S29. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *E. coli* in simulated wound fluid (SWF) media.



FIC a: 0.52, b:0.53, c:0.55, d:0.58, e:0.64, f:0.76, g:0.48, h:0.74, i:0.55, j:0.62

FIC a: 0.52, b:0.53, c:0.55, d:0.58, e:0.64, f:0.77, g:0.49, h:0.74, i:0.55, j:0.63, k:0.74,

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S30. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *P. aeruginosa* in LB media.

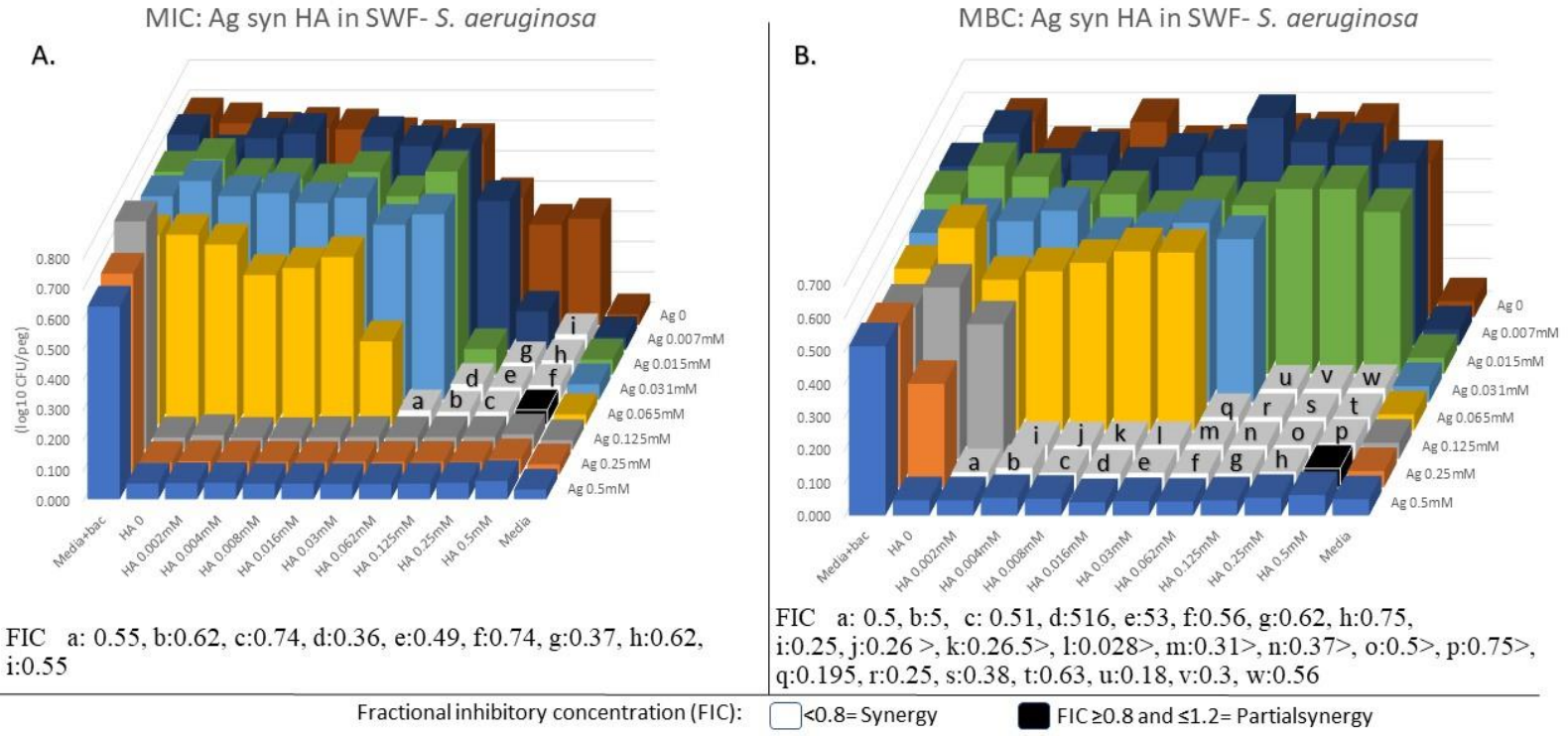


Figure S31. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *P. aeruginosa* in SWF media.

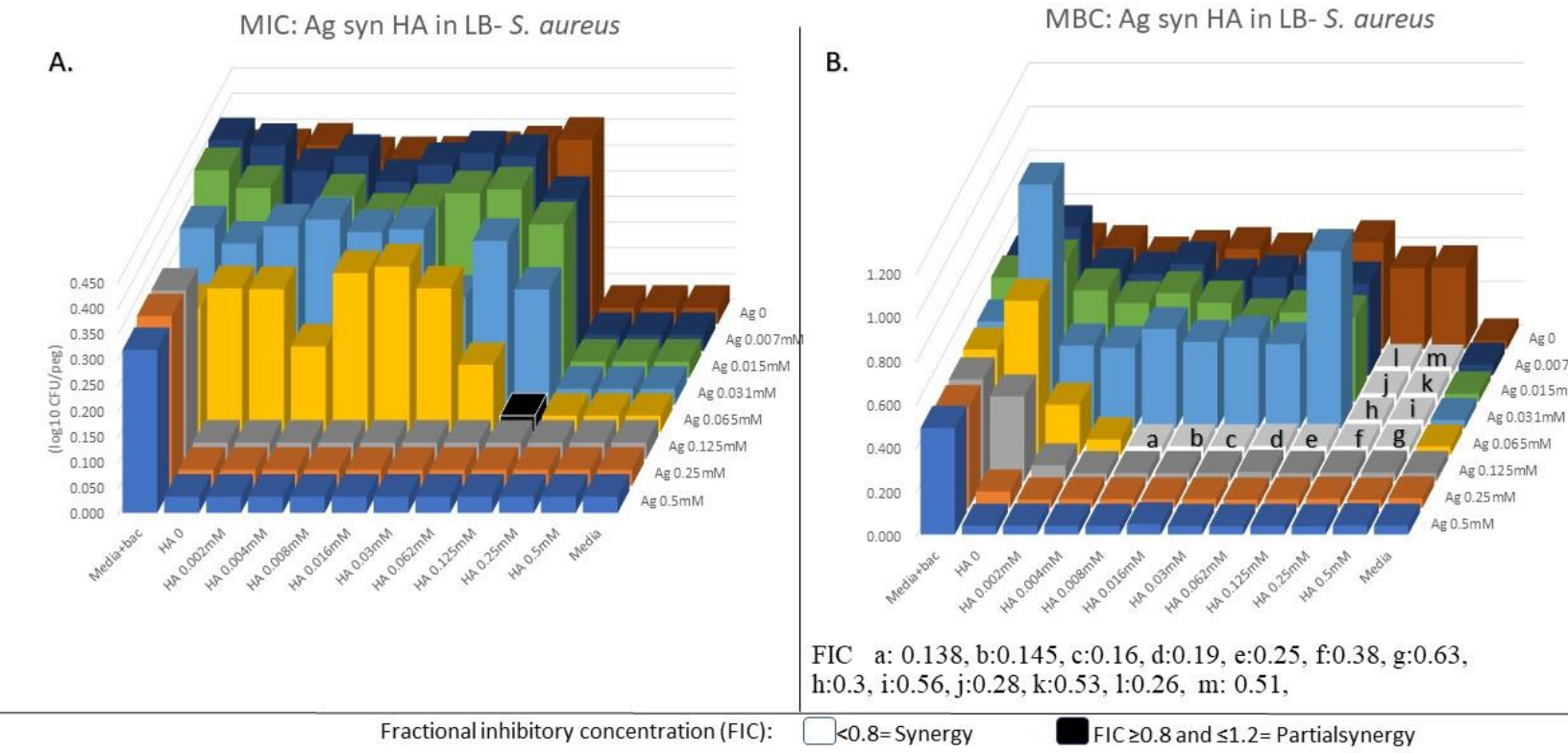


Figure S32. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *S. aureus* in LB media.

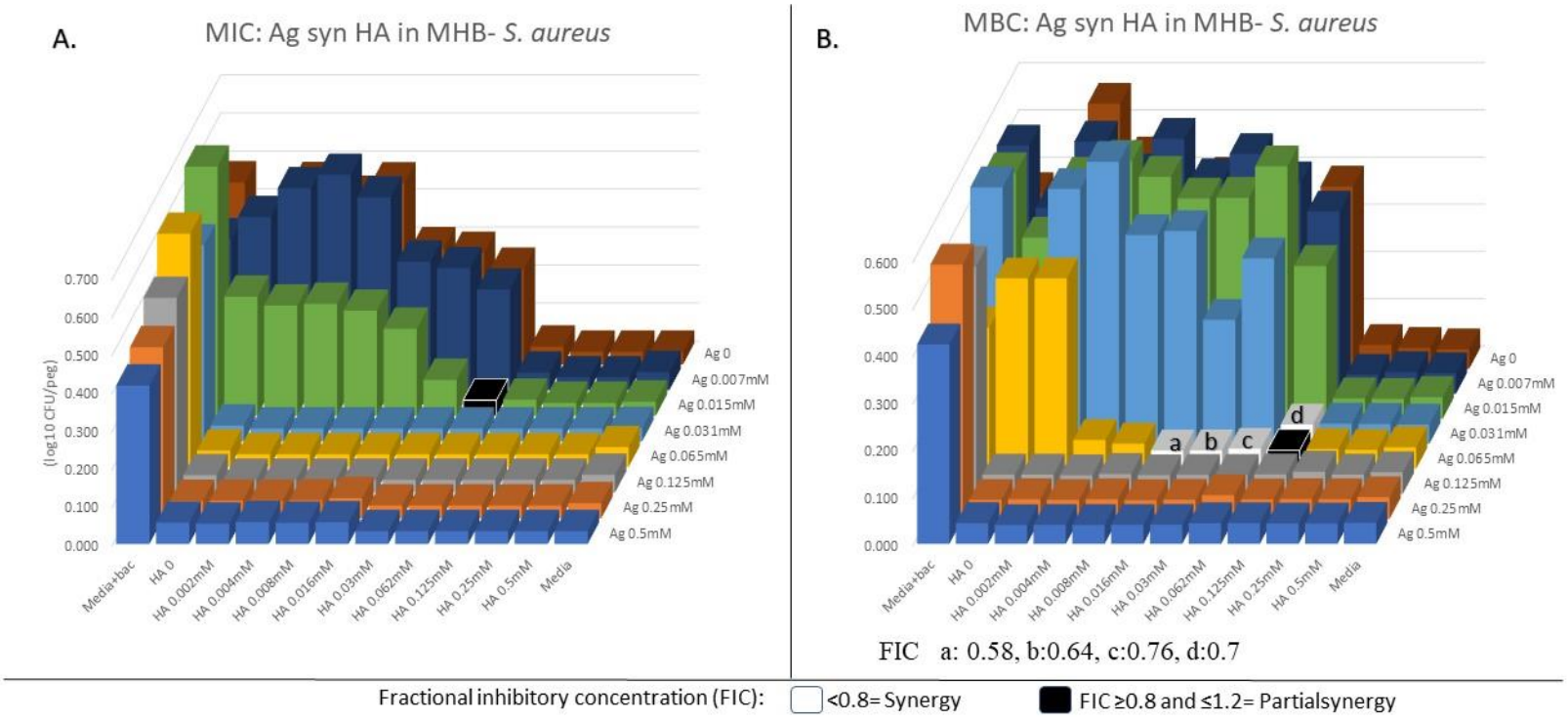


Figure S33. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *S. aureus* in MHB media.

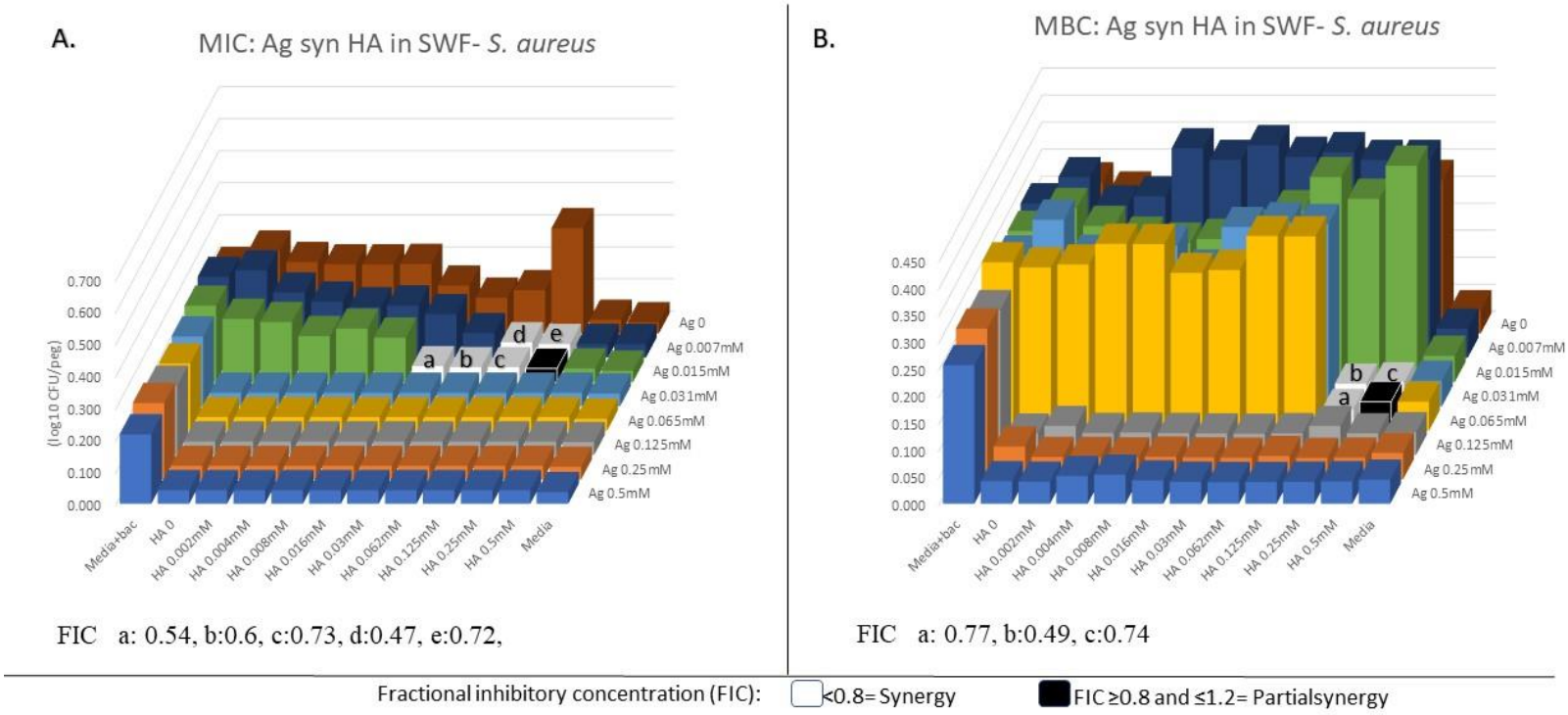


Figure S34. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) against *S. aureus* in SWF media.

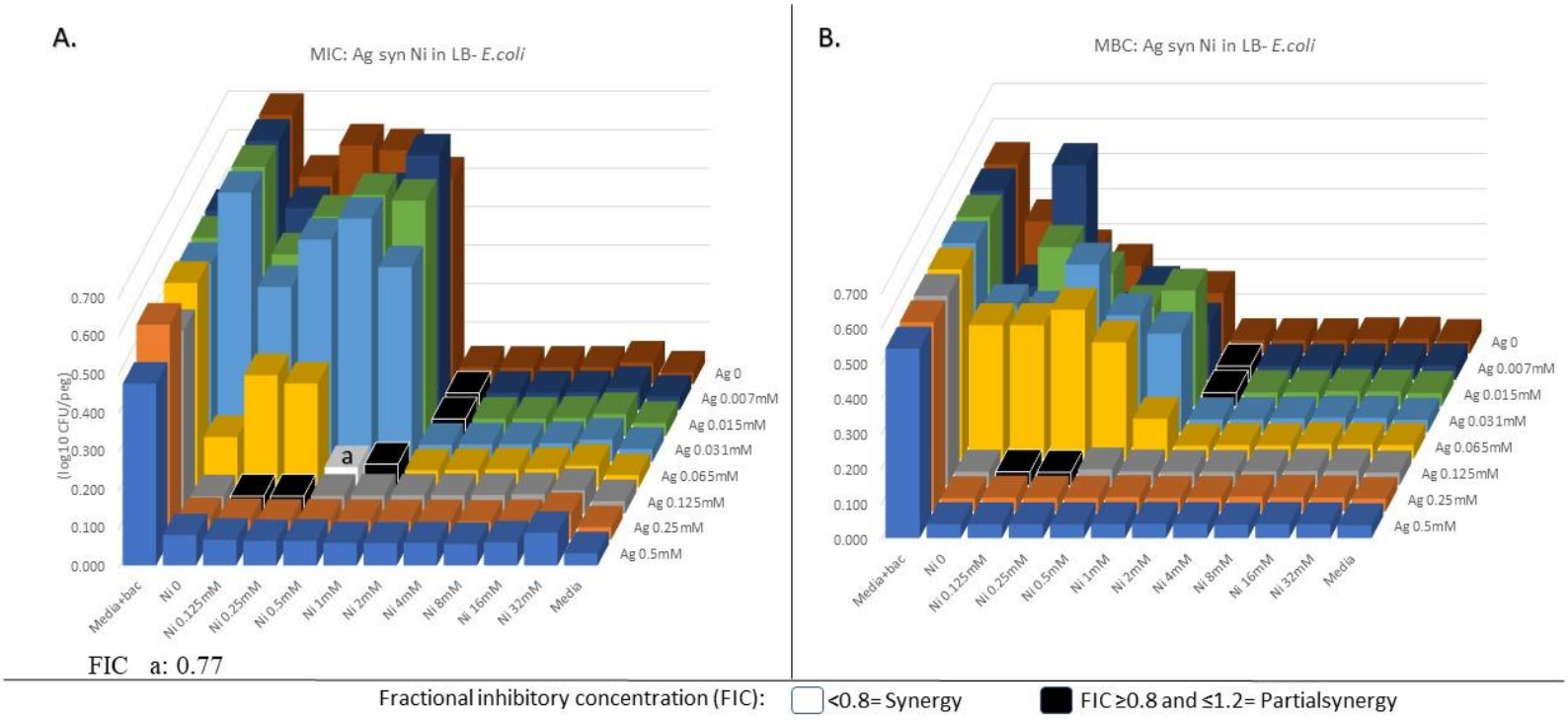


Figure S35. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *E. coli* in LB media.

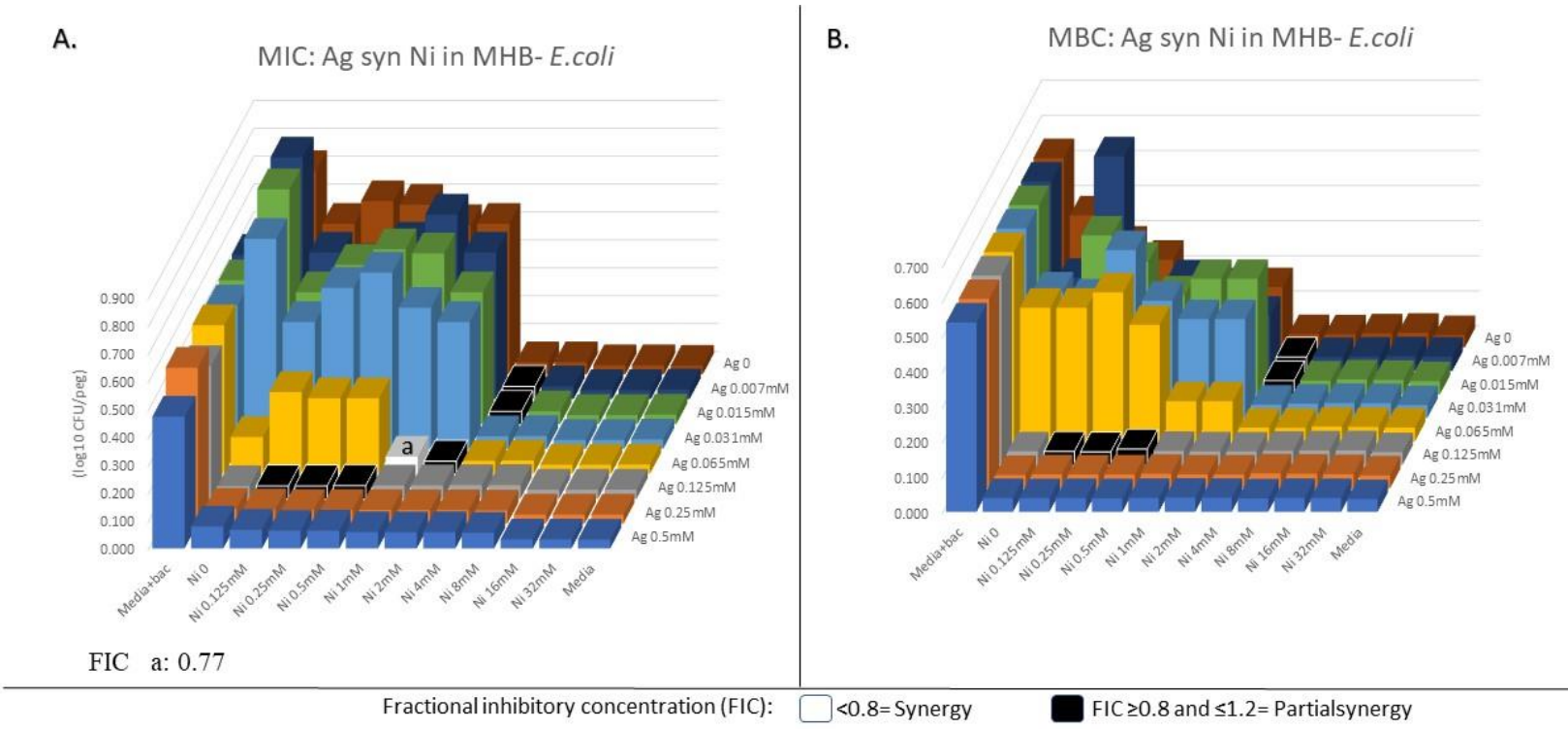


Figure S36. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *E. coli* in MHB media.

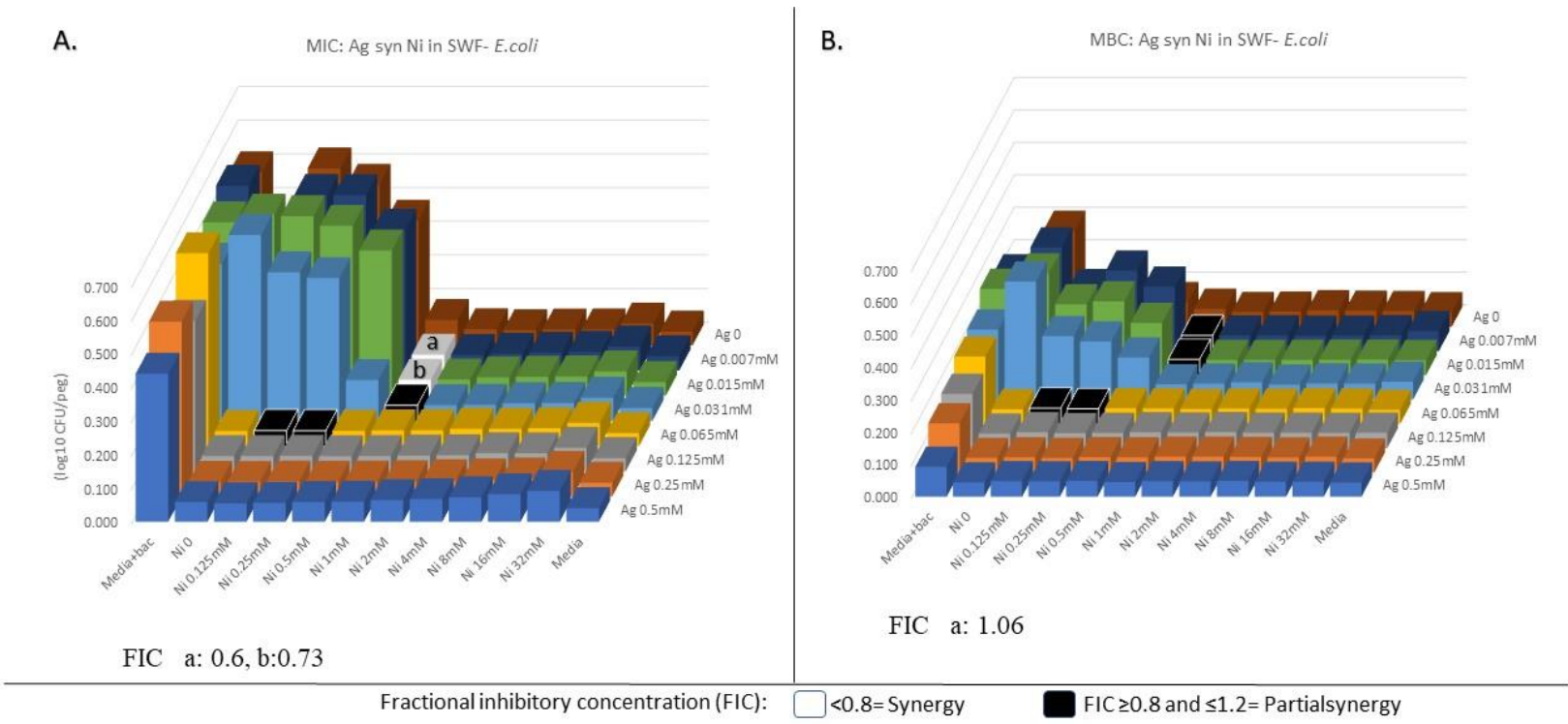


Figure S37. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *E. coli* in simulated wound fluid (SWF) media.

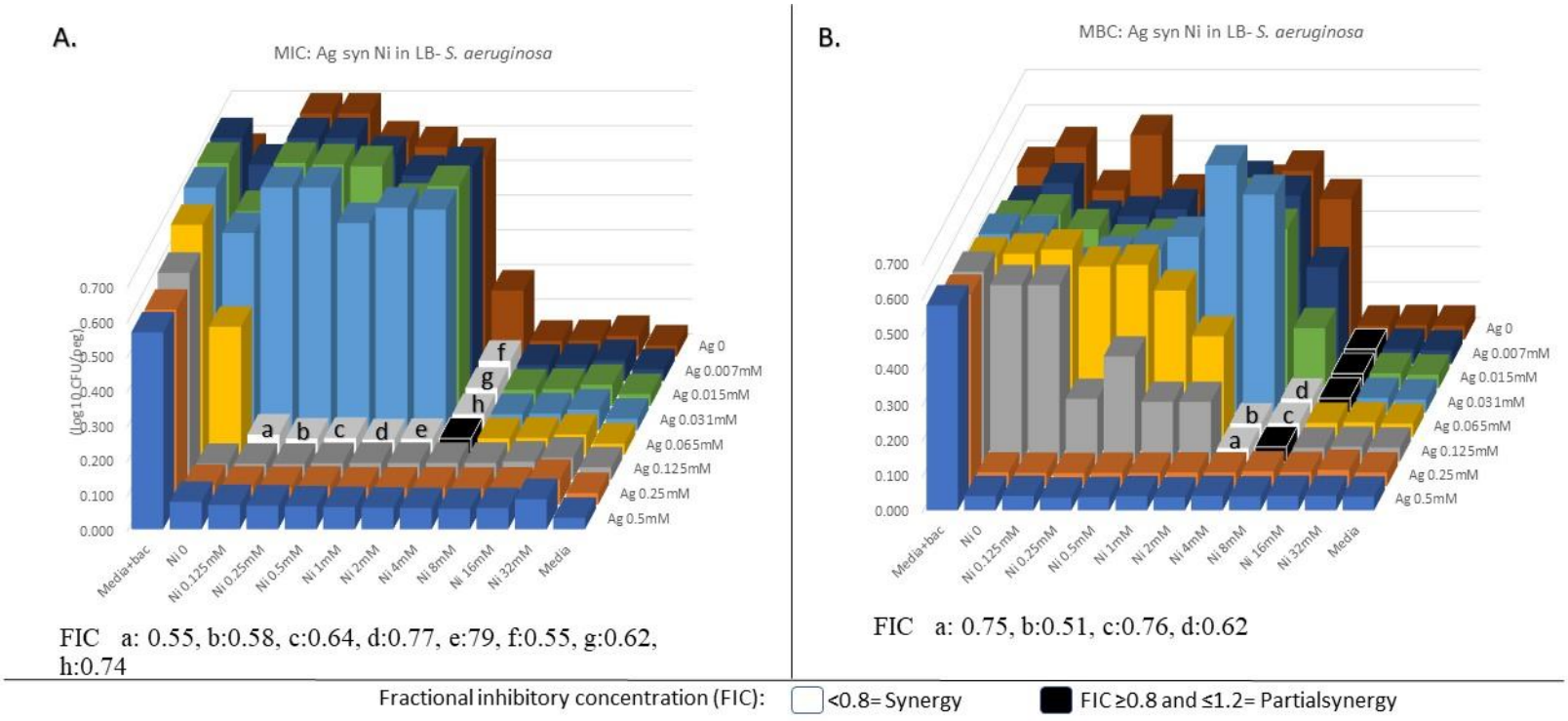
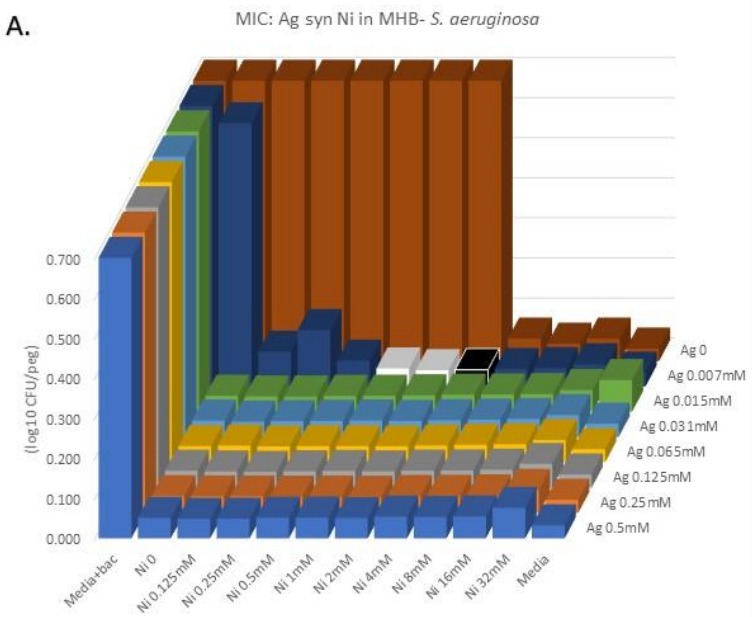
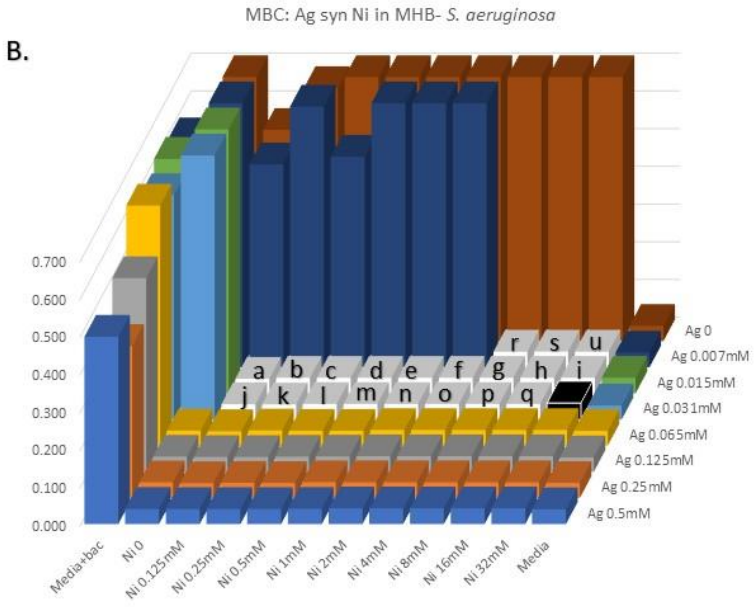


Figure S38. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *P. aeruginosa* in LB media.



FIC a: 0.50, b:0.71,



FIC a: 0.23, b:0.23, c:0.24, d:0.246, e:0.26, f:0.29, g:0.35, h:0.48, i:0.73, j:0.47, k:0.48, l:484, m: 0.49, n:50, o:54, p:0.6, q:0.72, r:0.23, s:0.35, u:0.6

Fractional inhibitory concentration (FIC): <0.8= Synergy FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S39. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *P. aeruginosa* in MHB media.

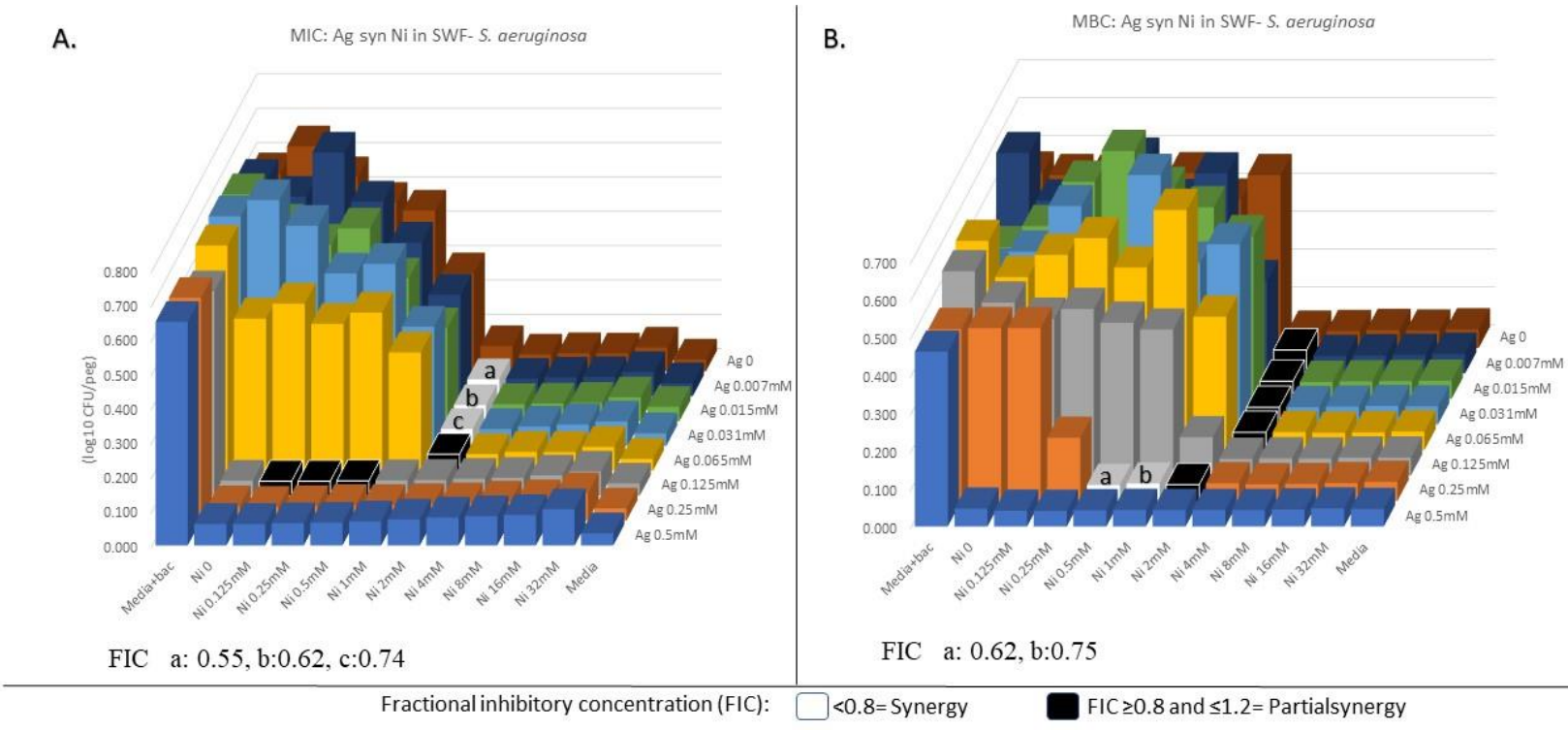


Figure S40. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *P. aeruginosa* in SWF media.

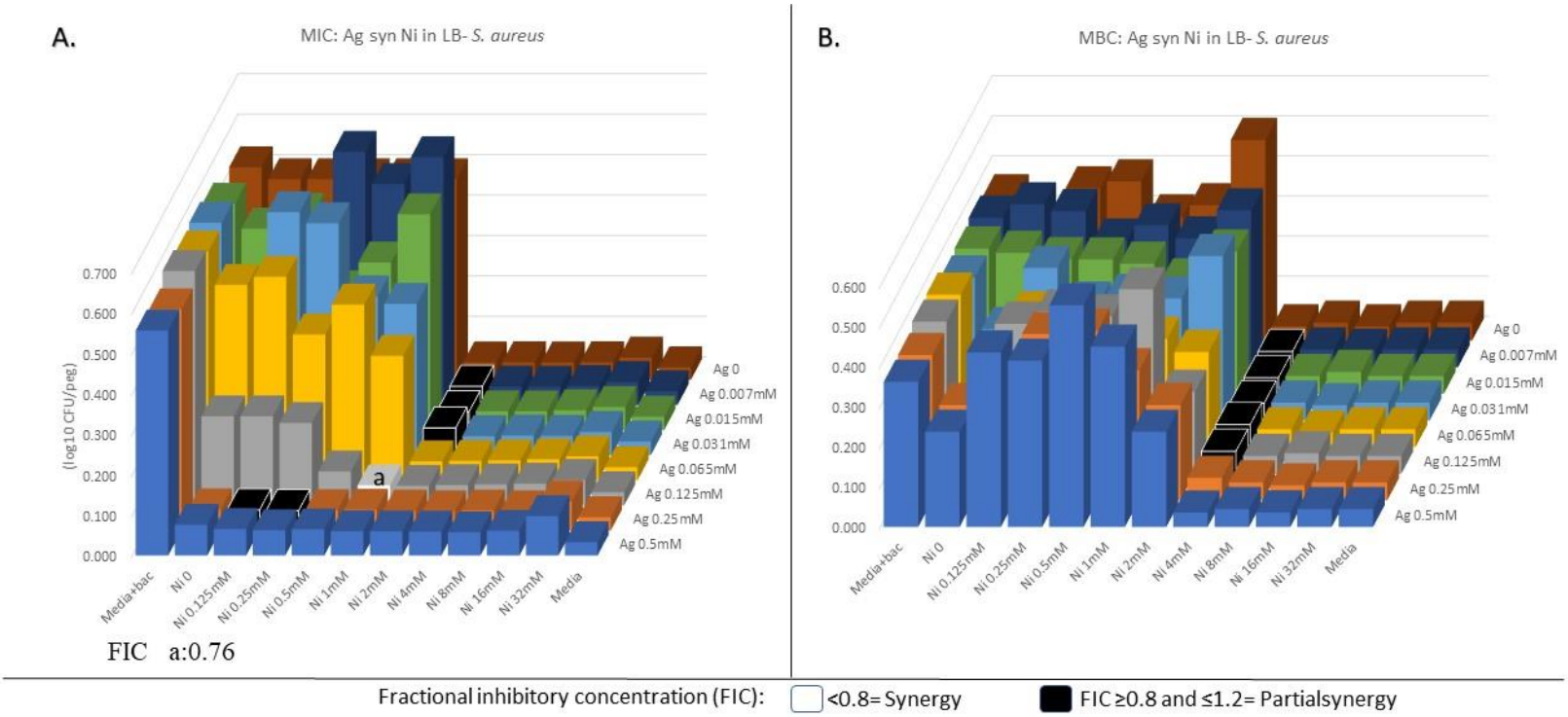


Figure S41. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *S. aureus* in LB media.

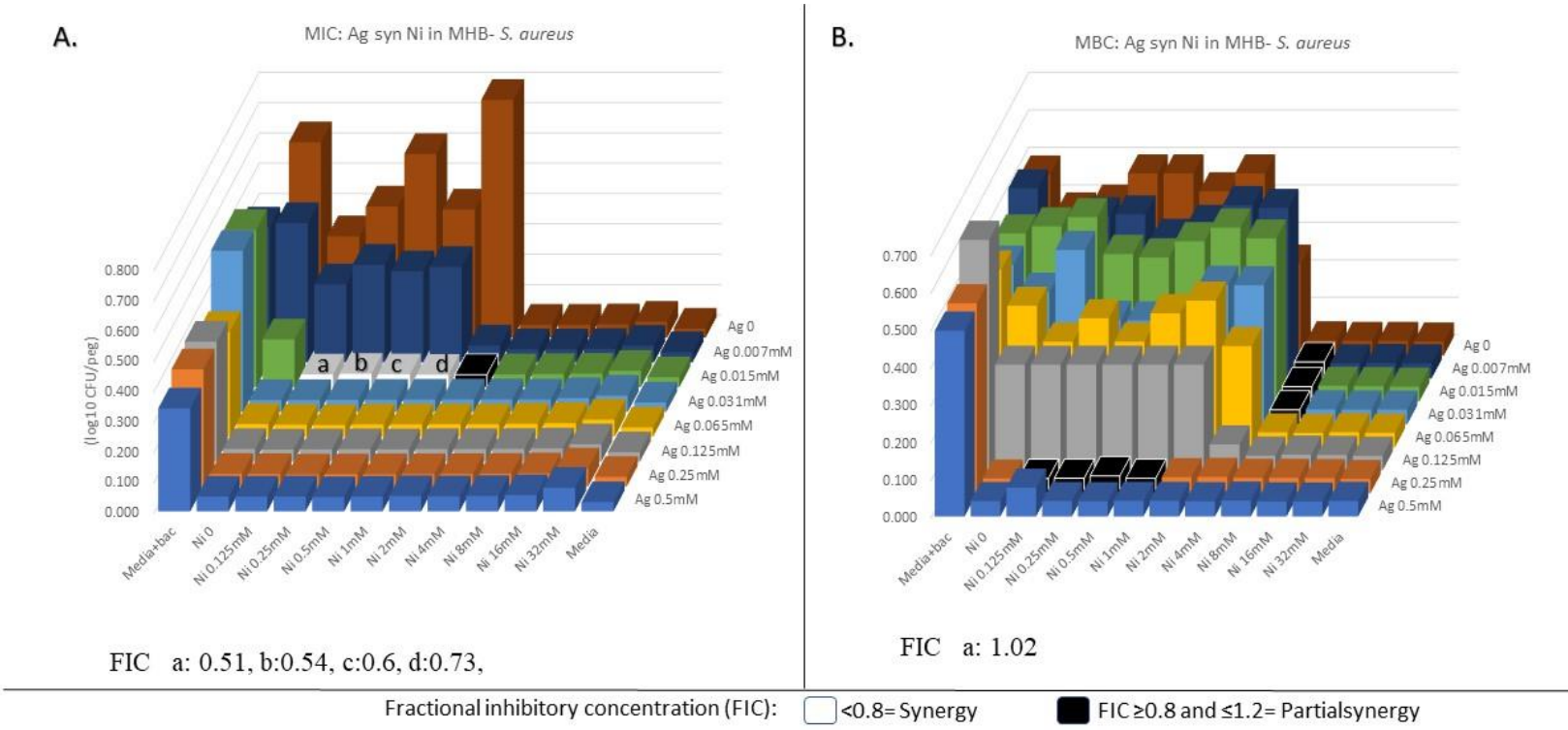


Figure S42. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *S. aureus* in MHB media.

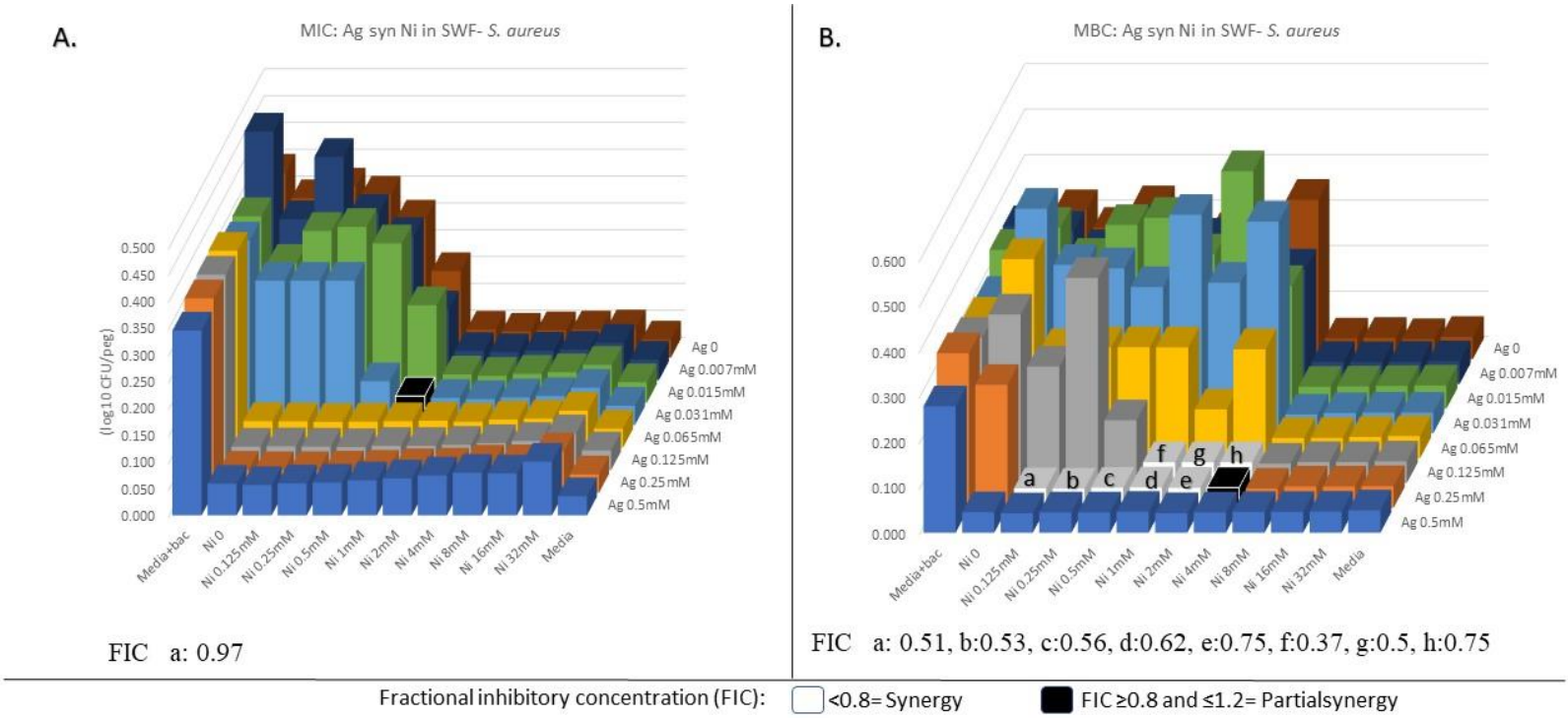


Figure S43. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) against *S. aureus* in SWF media.

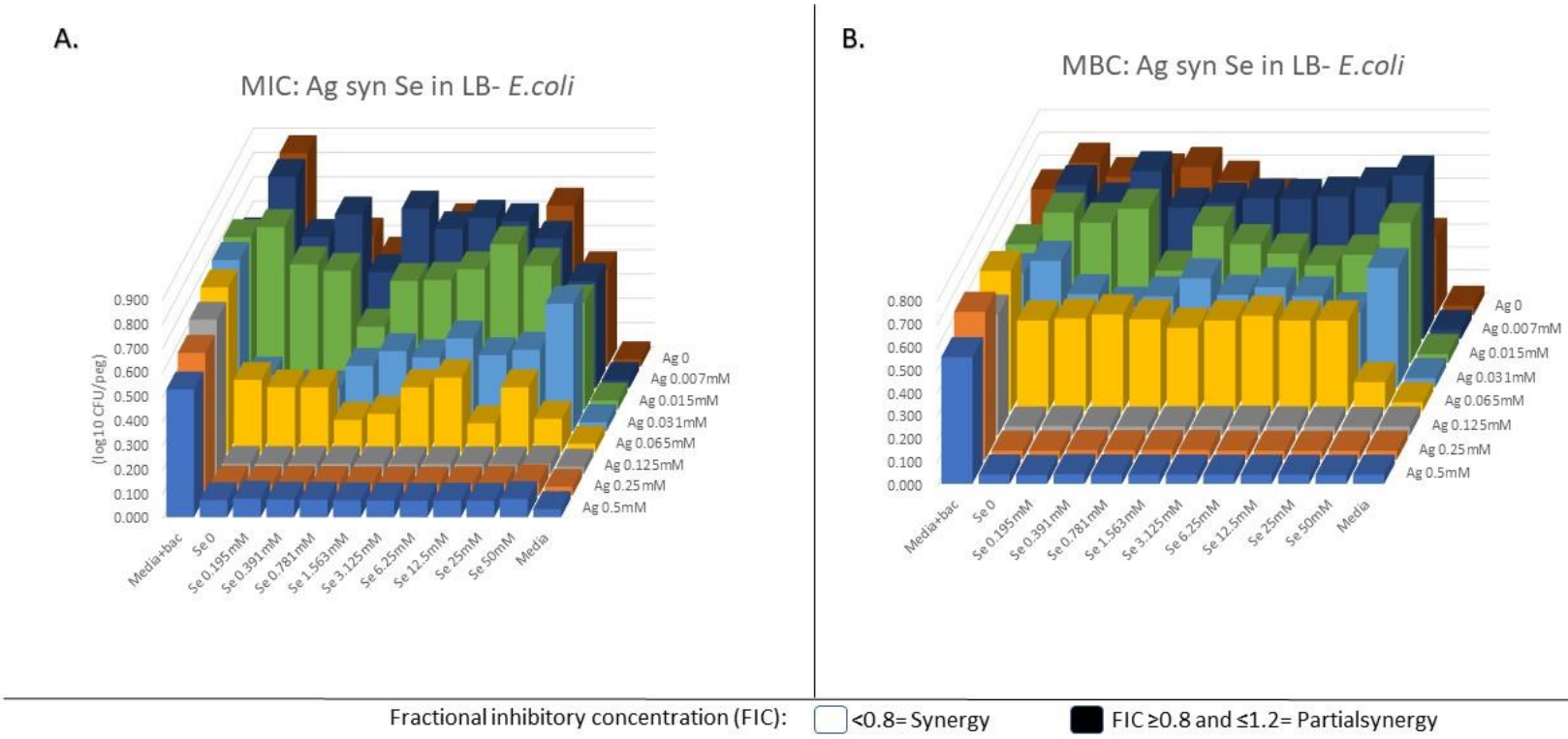


Figure S44. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *E. coli* in LB media.

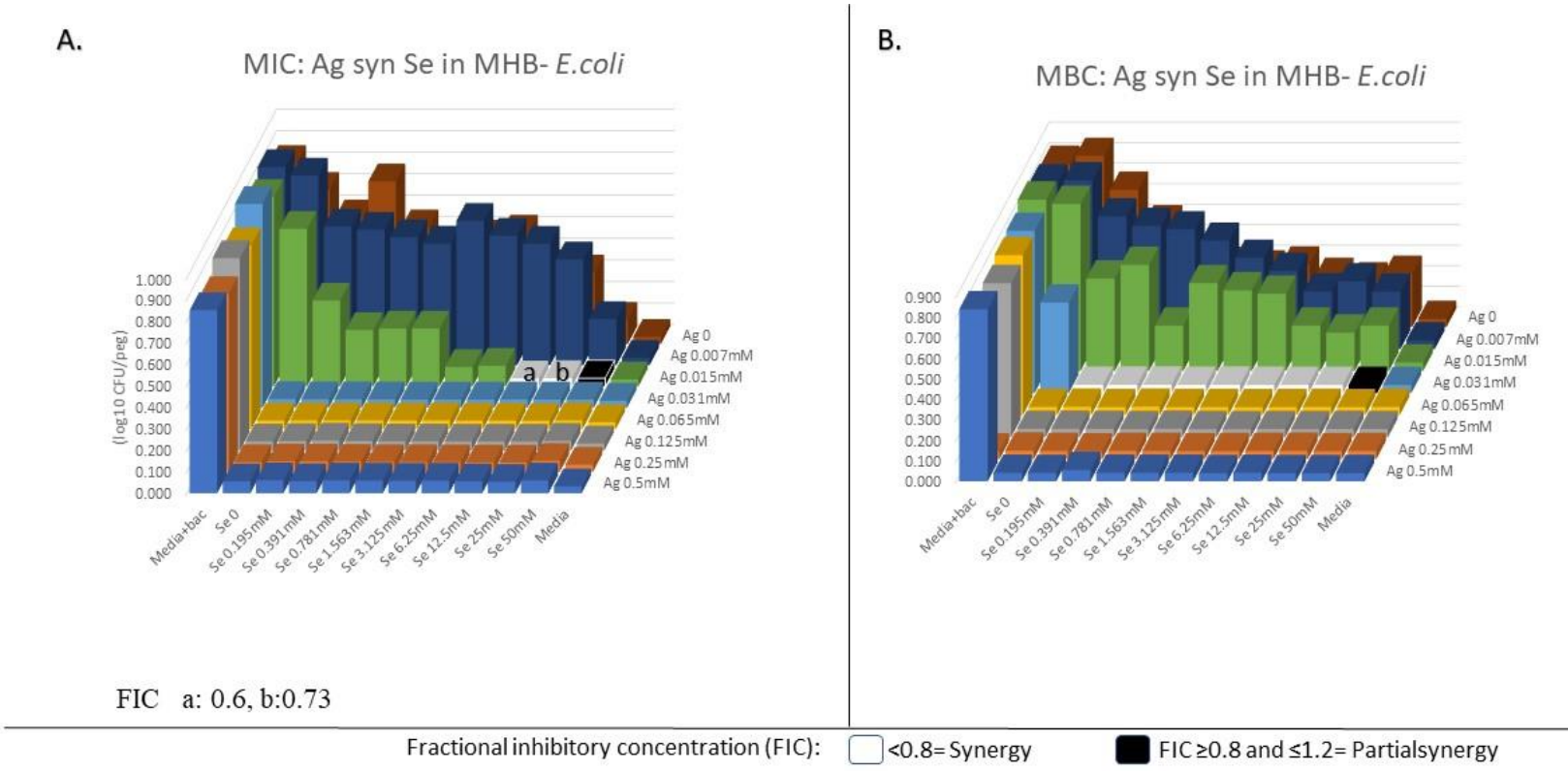


Figure S45. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *E. coli* in MHB media.

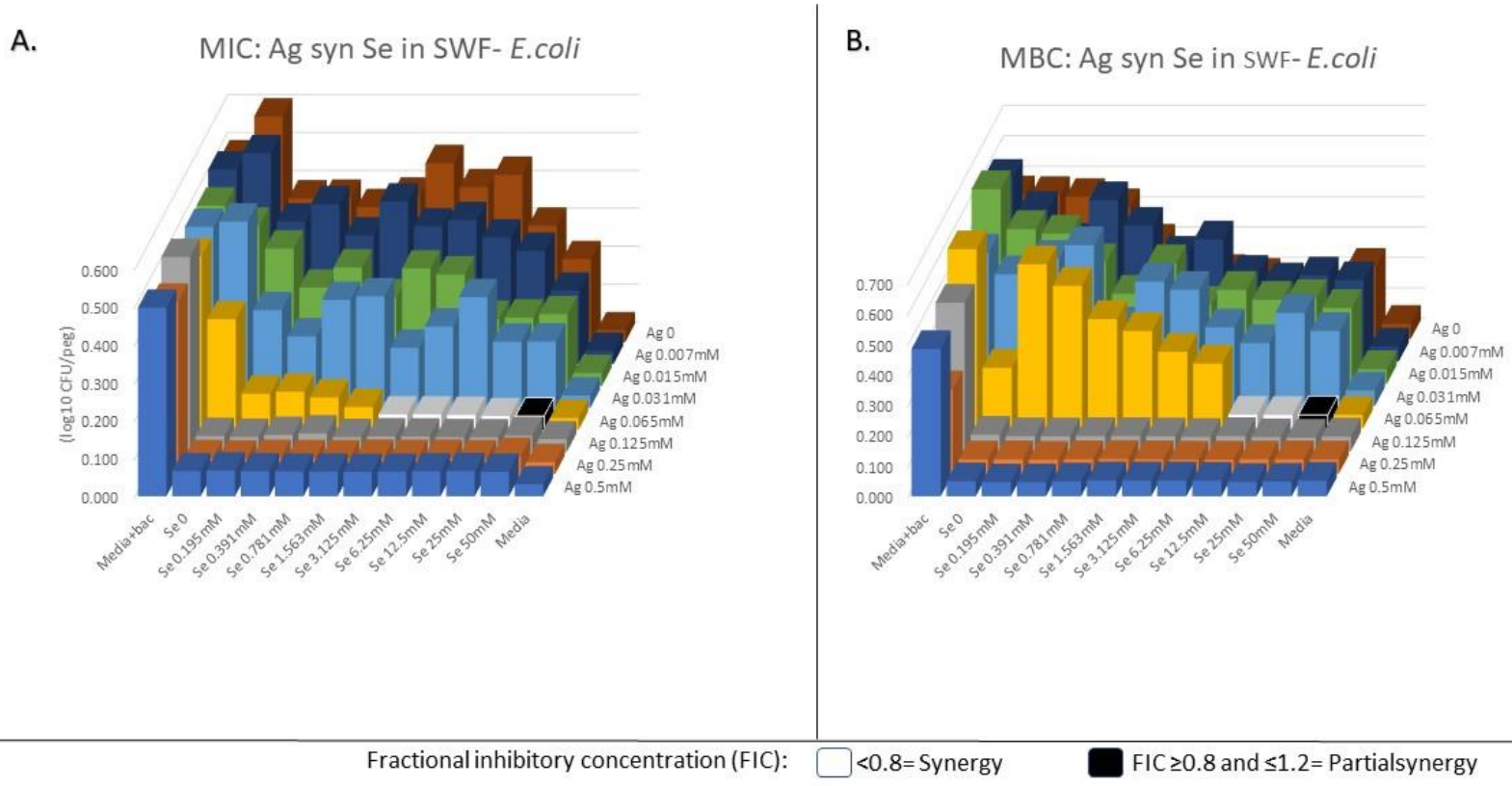

A.
MIC: Ag syn Se in SWF- E.coli
(log10 CFU/peg)
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Media+bac
Se 0
Se 0.195mM
Se 0.391mM
Se 0.781mM
Se 1.563mM
Se 3.125mM
Se 6.25mM
Se 12.5mM
Se 25mM
Se 50mM
Media
Ag 0
Ag 0.007mM
Ag 0.015mM
Ag 0.031mM
Ag 0.065mM
Ag 0.125mM
Ag 0.25mM
Ag 0.5mM
B.
MBC: Ag syn Se in SWF- E.coli
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Media+bac
Se 0
Se 0.195mM
Se 0.391mM
Se 0.781mM
Se 1.563mM
Se 3.125mM
Se 6.25mM
Se 12.5mM
Se 25mM
Se 50mM
Media
Ag 0
Ag 0.007mM
Ag 0.015mM
Ag 0.031mM
Ag 0.065mM
Ag 0.125mM
Ag 0.25mM
Ag 0.5mM
Fractional inhibitory concentration (FIC):
<0.8= Synergy
FIC ≥0.8 and ≤1.2= Partialsynergy

Figure S46. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *E. coli* in simulated wound fluid (SWF) media.

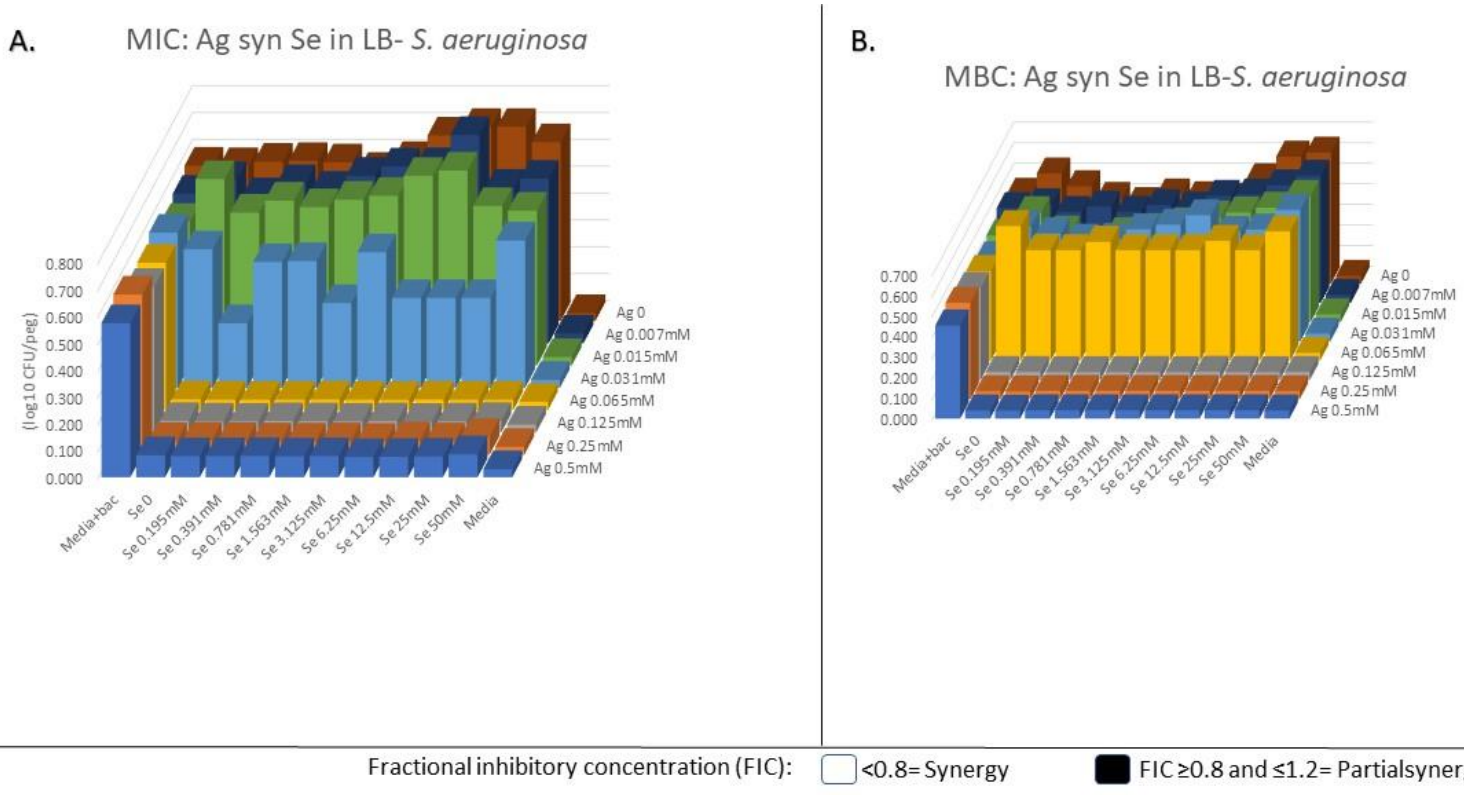


Figure S47. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *P. aeruginosa* in LB media.

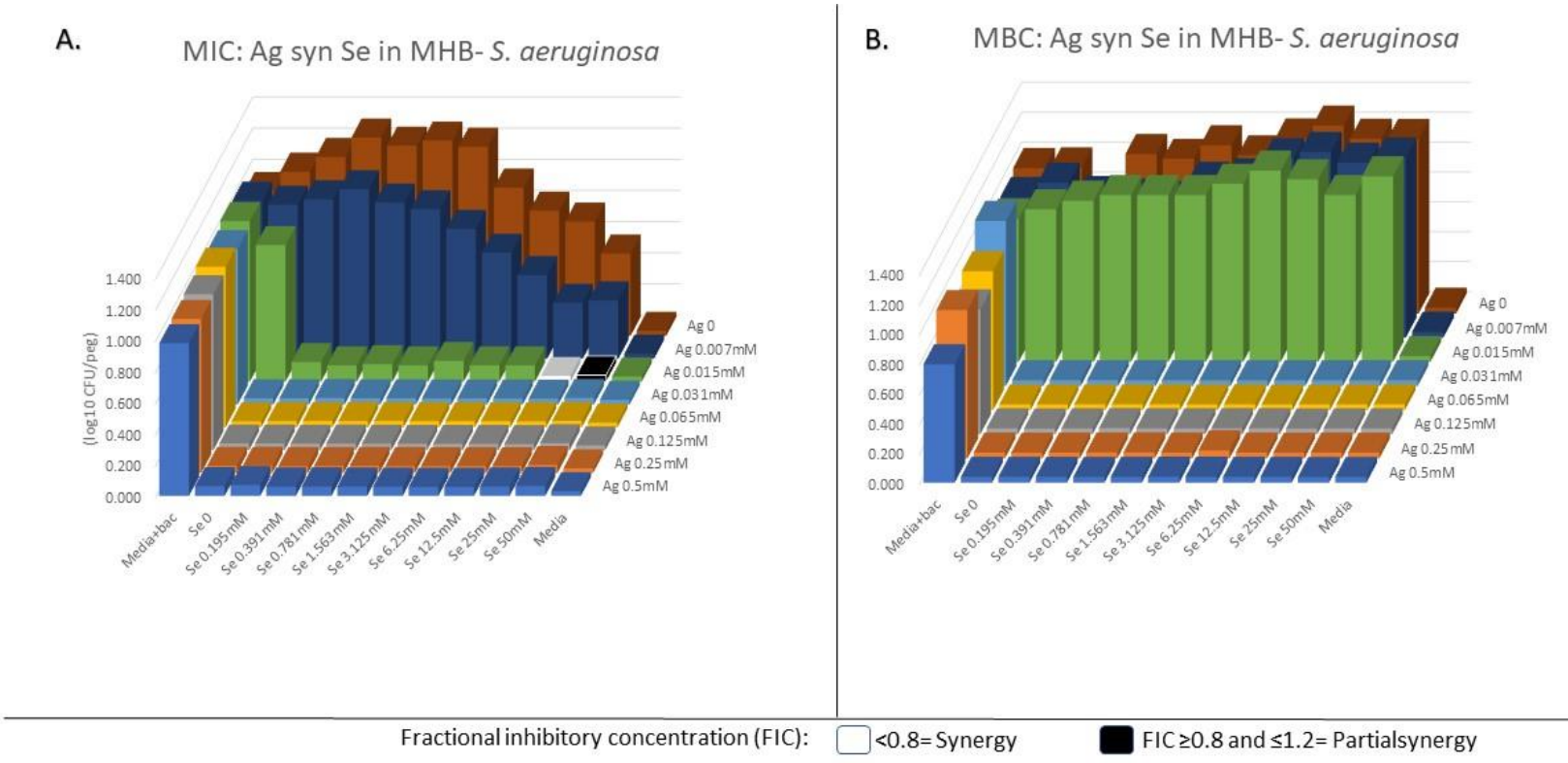


Figure S48. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *P. aeruginosa* in MHB media.

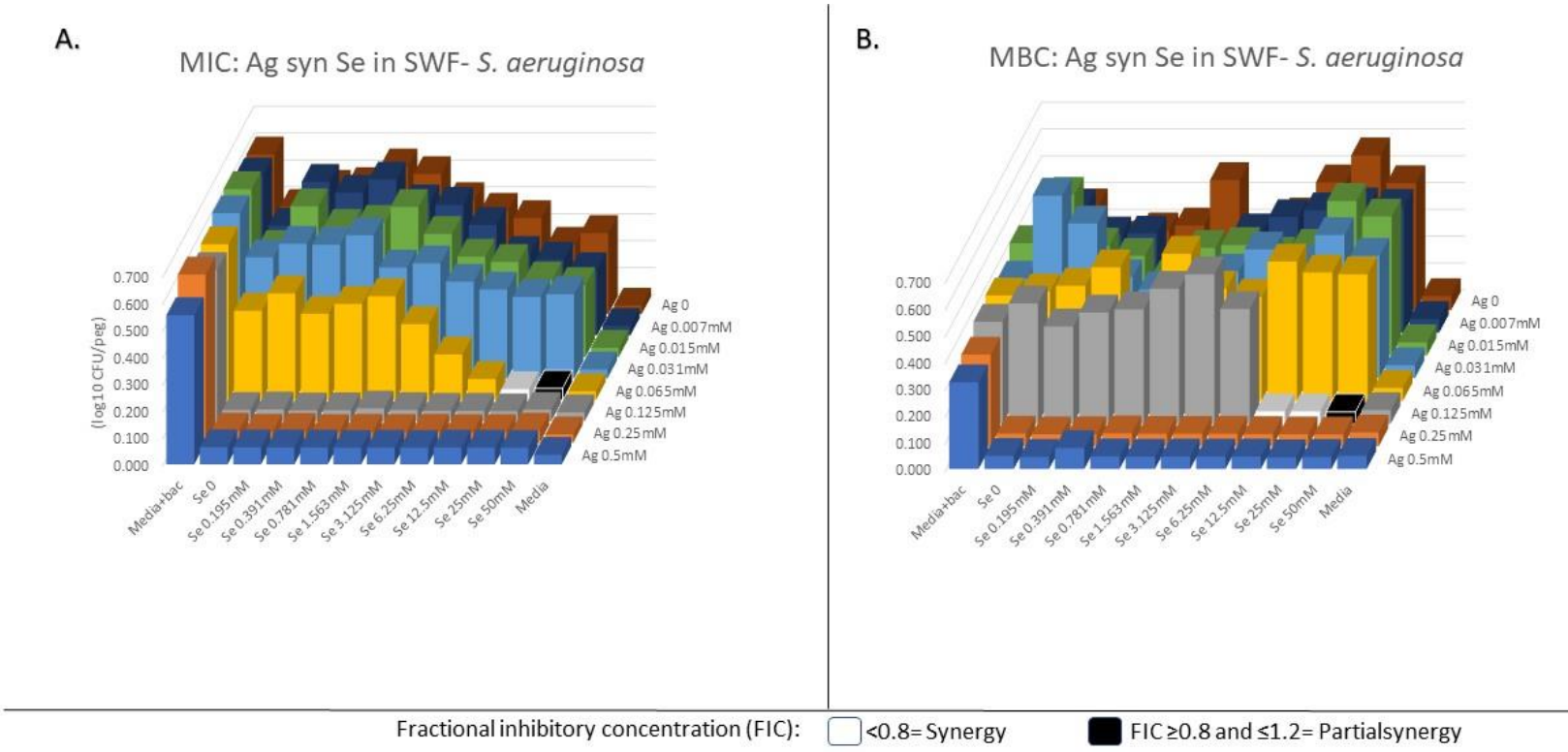


Figure S49. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *P. aeruginosa* in SWF media.

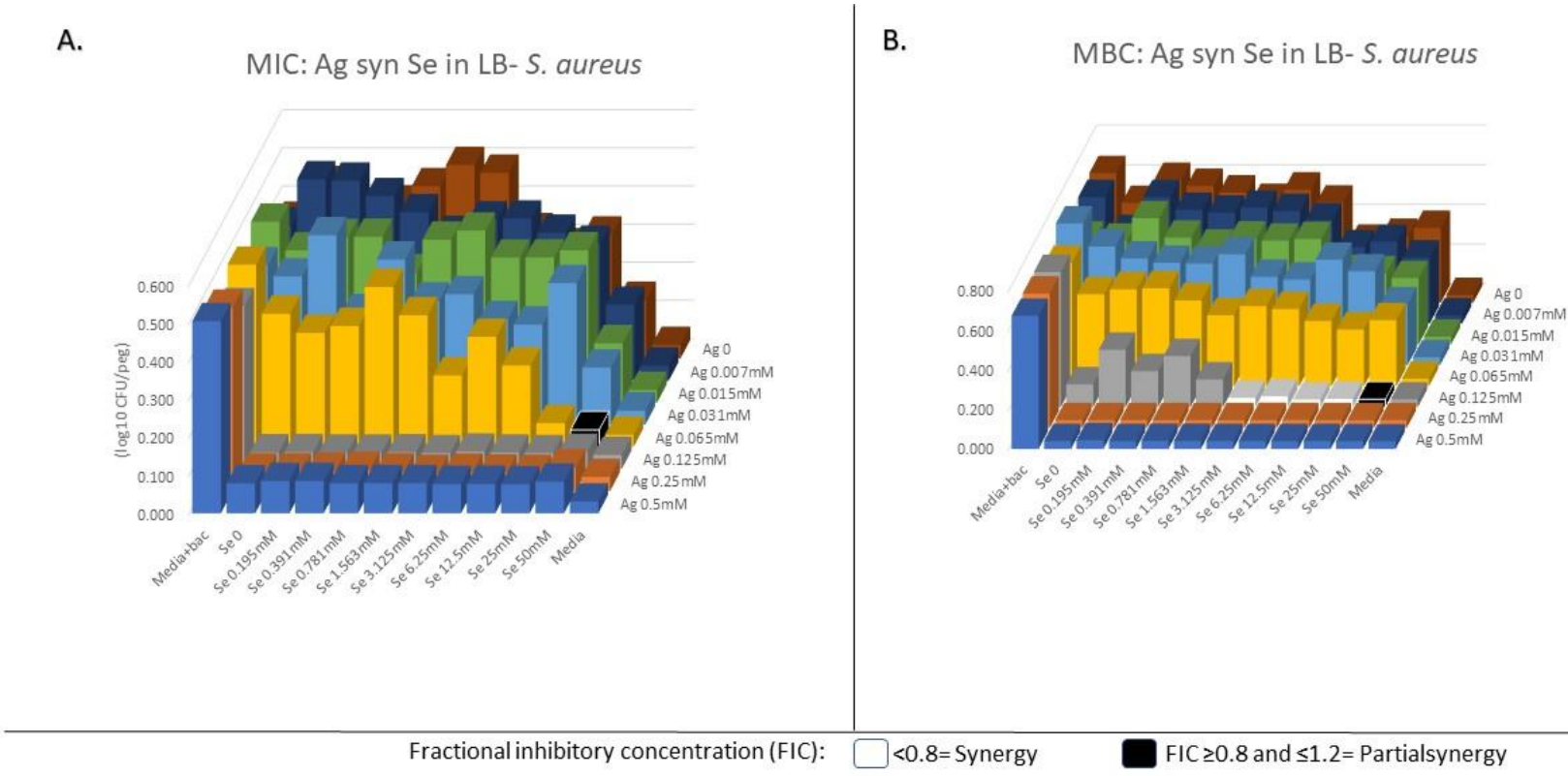


Figure S50. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *S. aureus* in LB media.

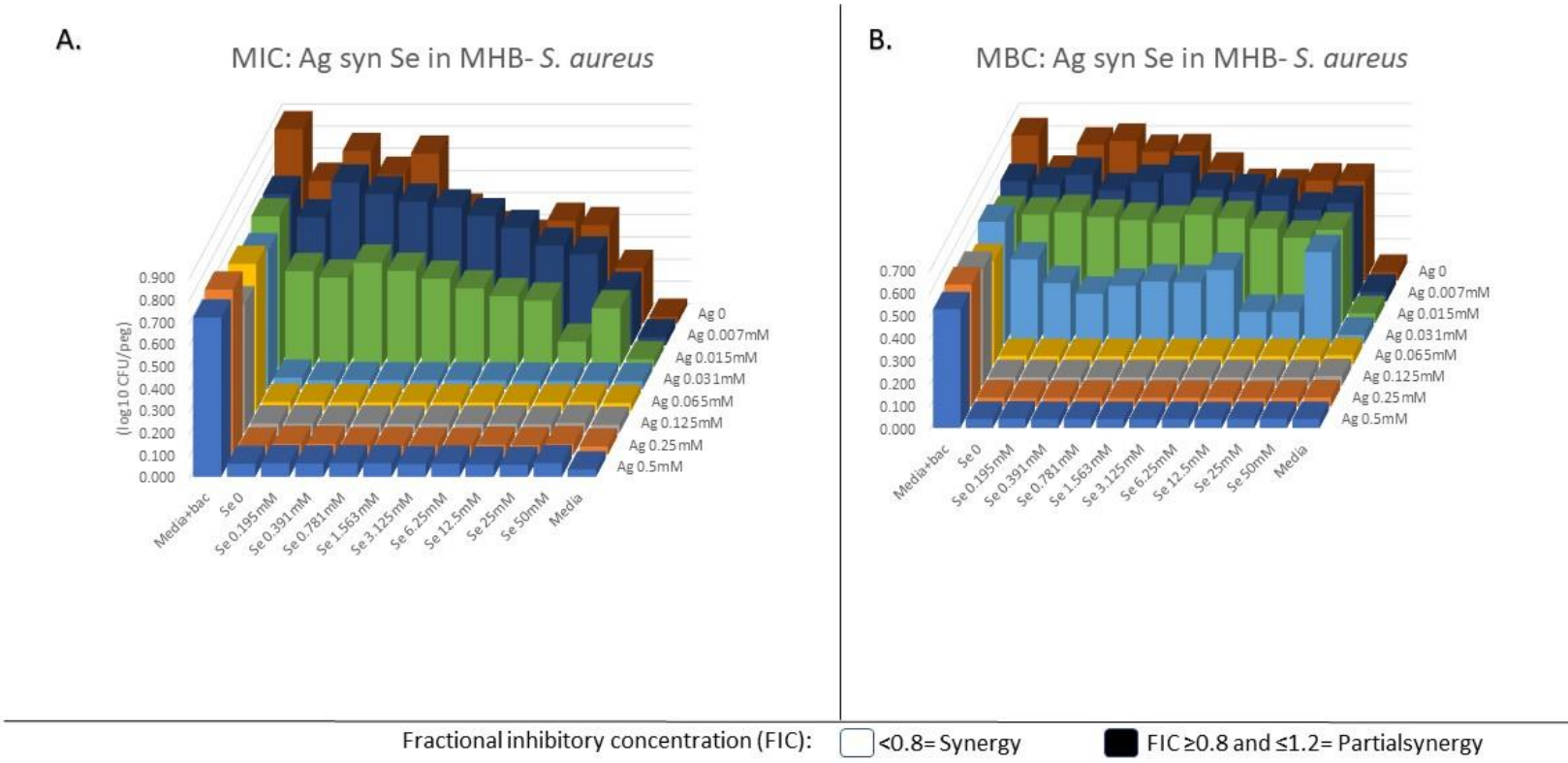


Figure S51. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *S. aureus* in MHB media.

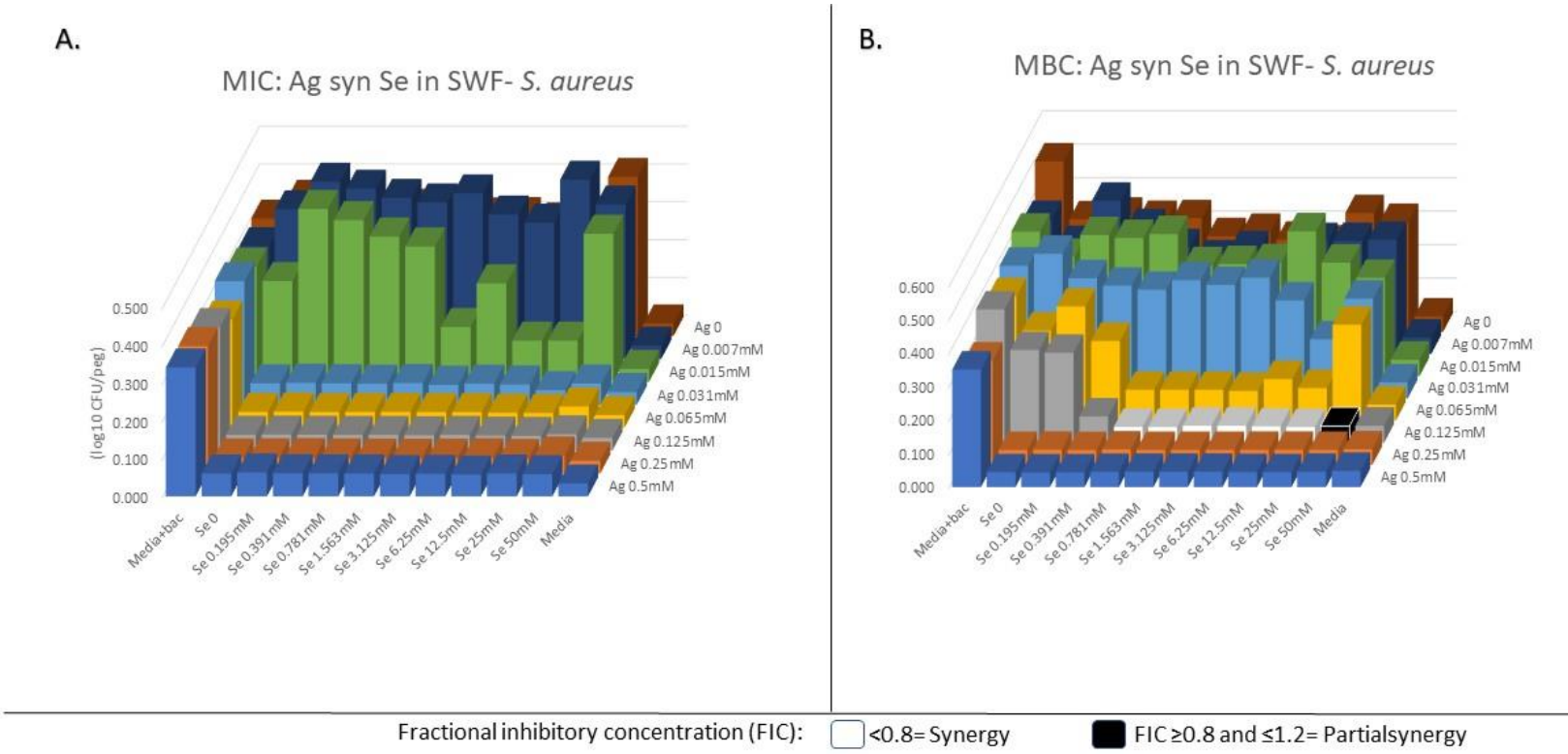


Figure S52. A. Minimum inhibitory concentration (MIC) and B. minimum bactericidal concentration (MBC) synergism (syn) effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) against *S. aureus* in SWF media.

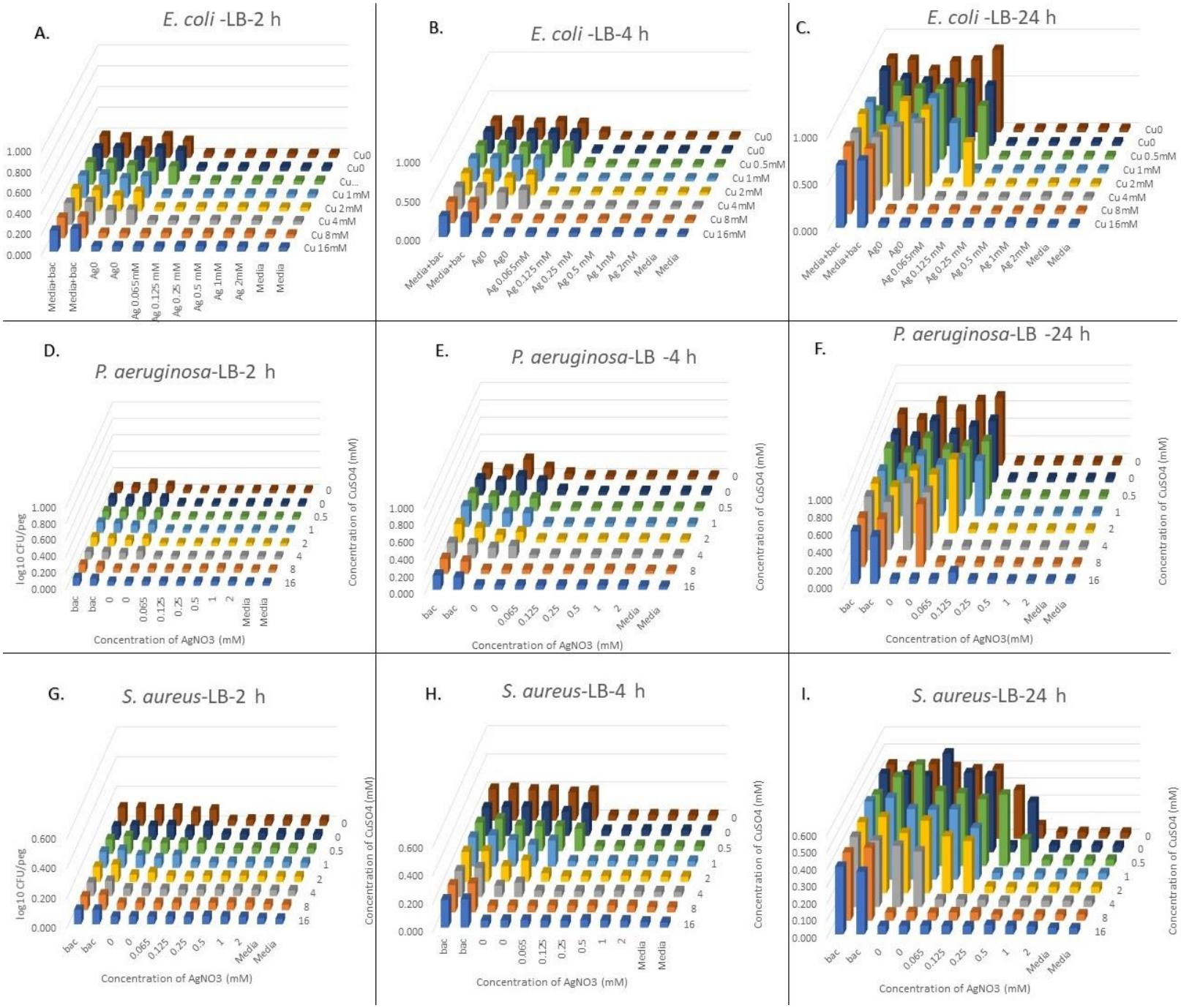

A.
E. coli -LB-2 h
B.
E. coli -LB-4 h
C.
E. coli -LB-24 h
D.
P. aeruginosa-LB-2 h
E.
P. aeruginosa-LB -4 h
F.
P. aeruginosa-LB -24 h
G.
S. aureus-LB-2 h
H.
S. aureus-LB-4 h
I.
S. aureus-LB-24 h
log10 CFU/peg
Concentration of AgNO3 (mM)
Concentration of AgNO3(mM)
Concentration of CuSO4 (mM)
Media+bac
Media
Cu0
Cu 0.5mM
Cu 1mM
Cu 2mM
Cu 4mM
Cu 8mM
Cu 16mM

Figure S53. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB..

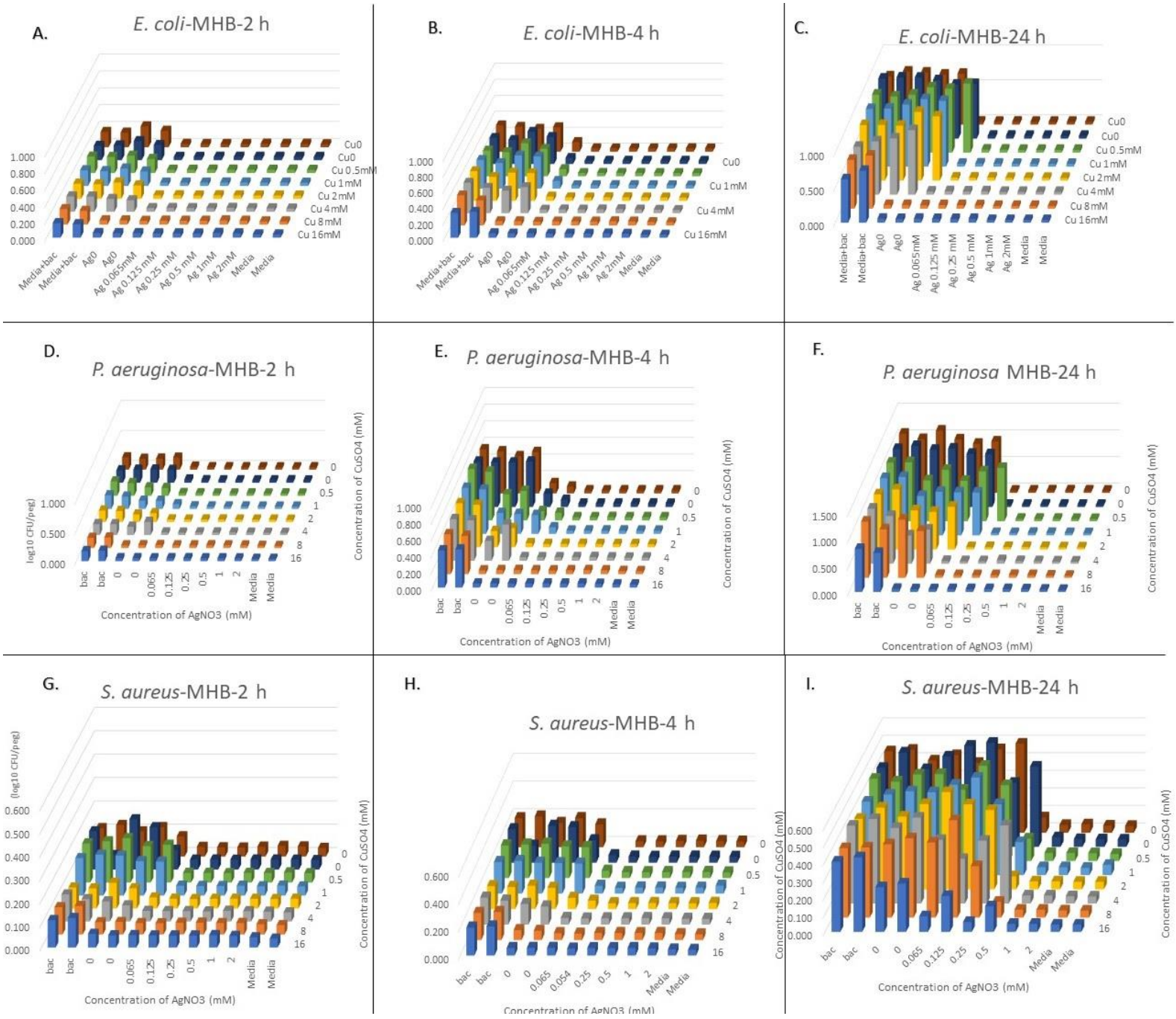


Figure S54. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h

(D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in Mueller–Hinton broth (MHB).

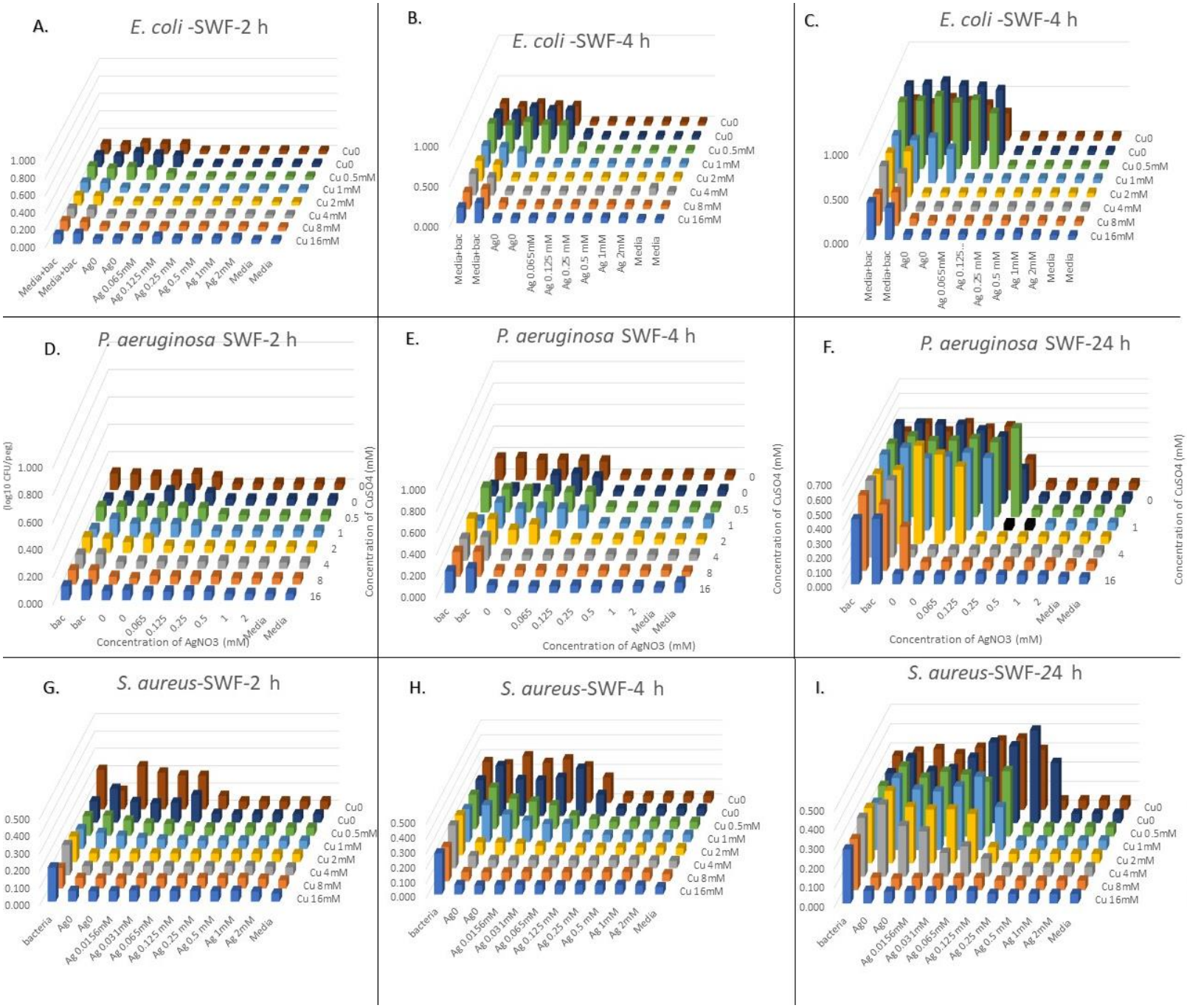


Figure S55. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with copper (II) sulfate ($CuSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h

(D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in simulated wound fluid (SWF).

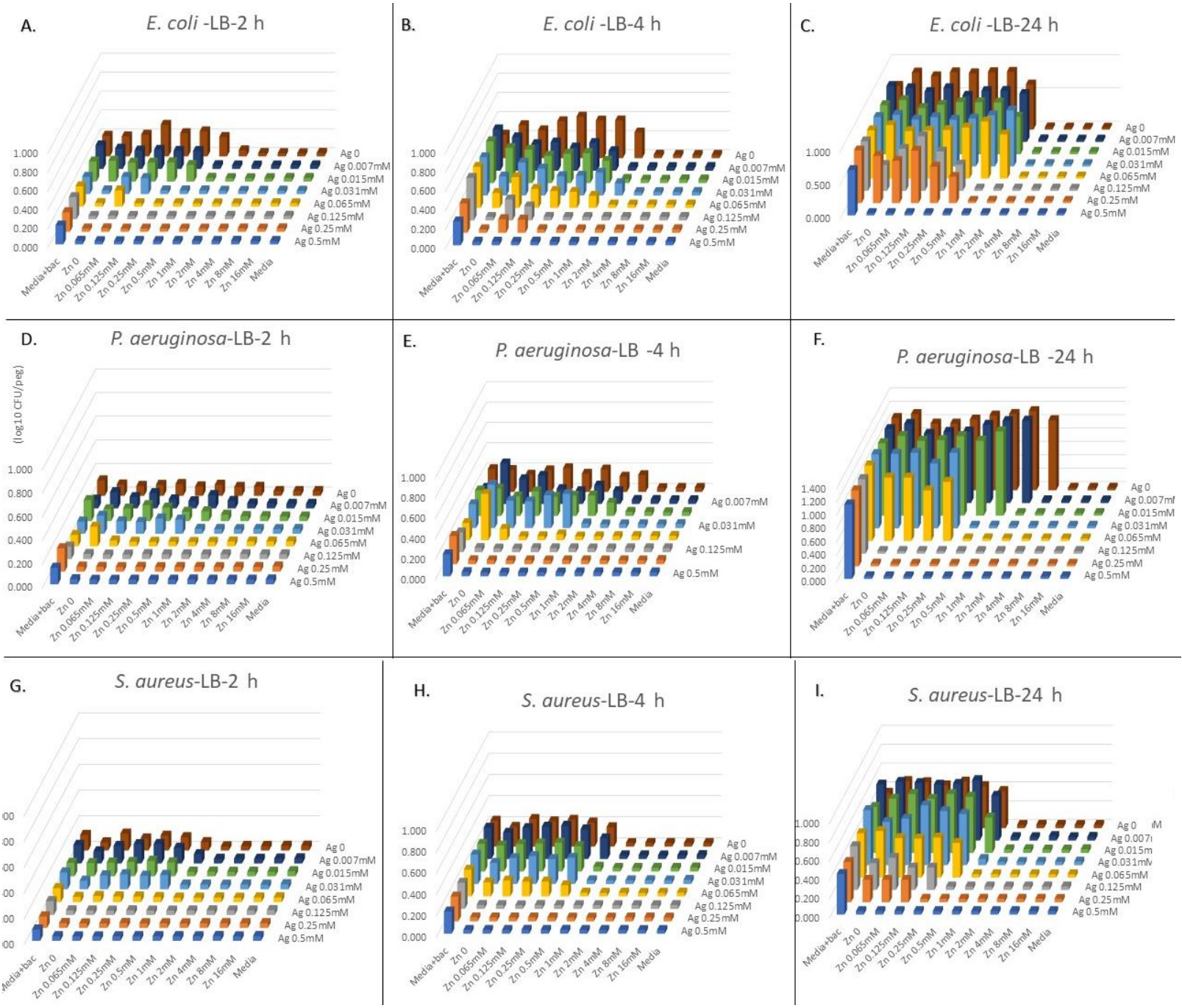


Figure S56. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB..

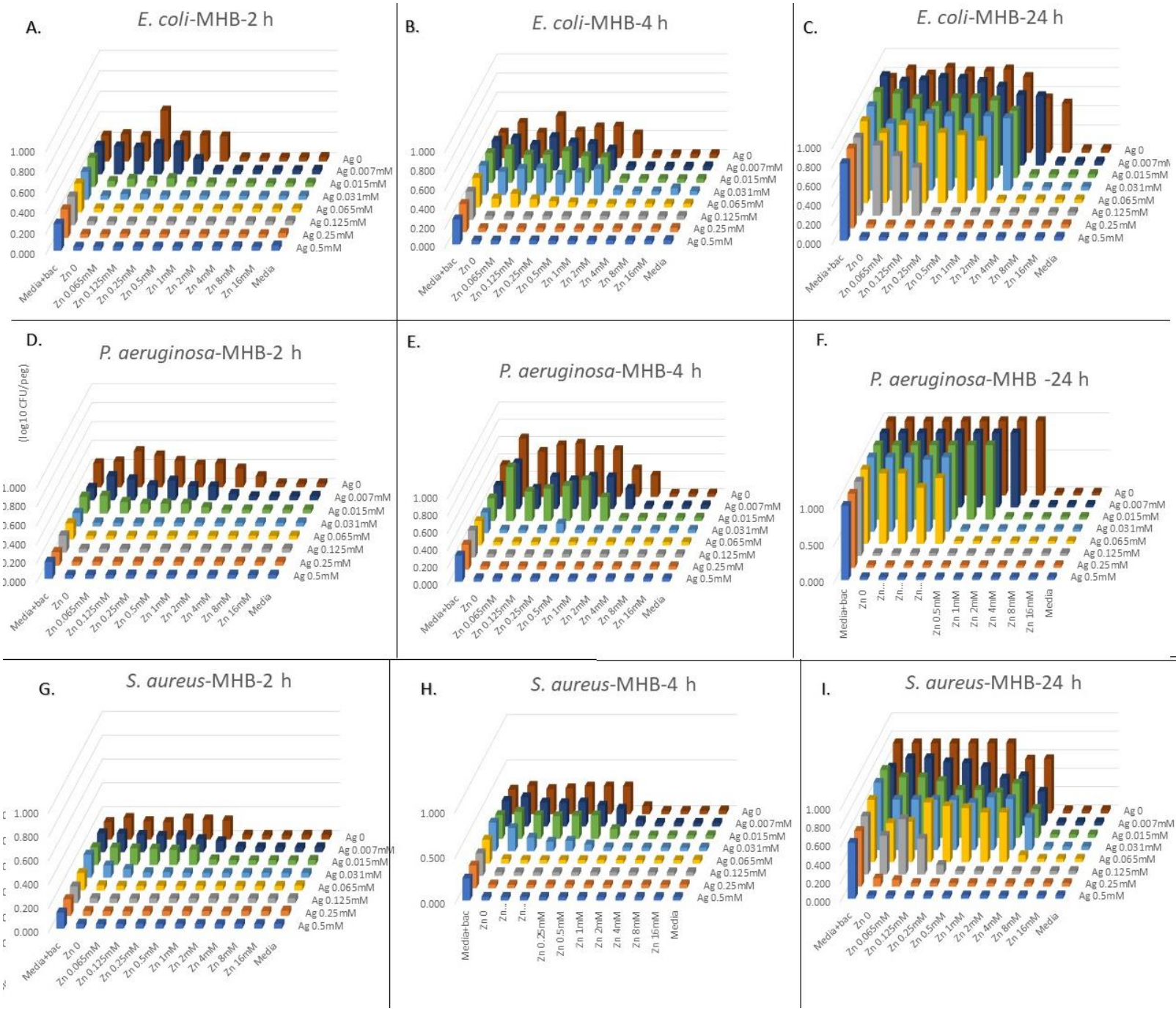


Figure S57. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in MHB.

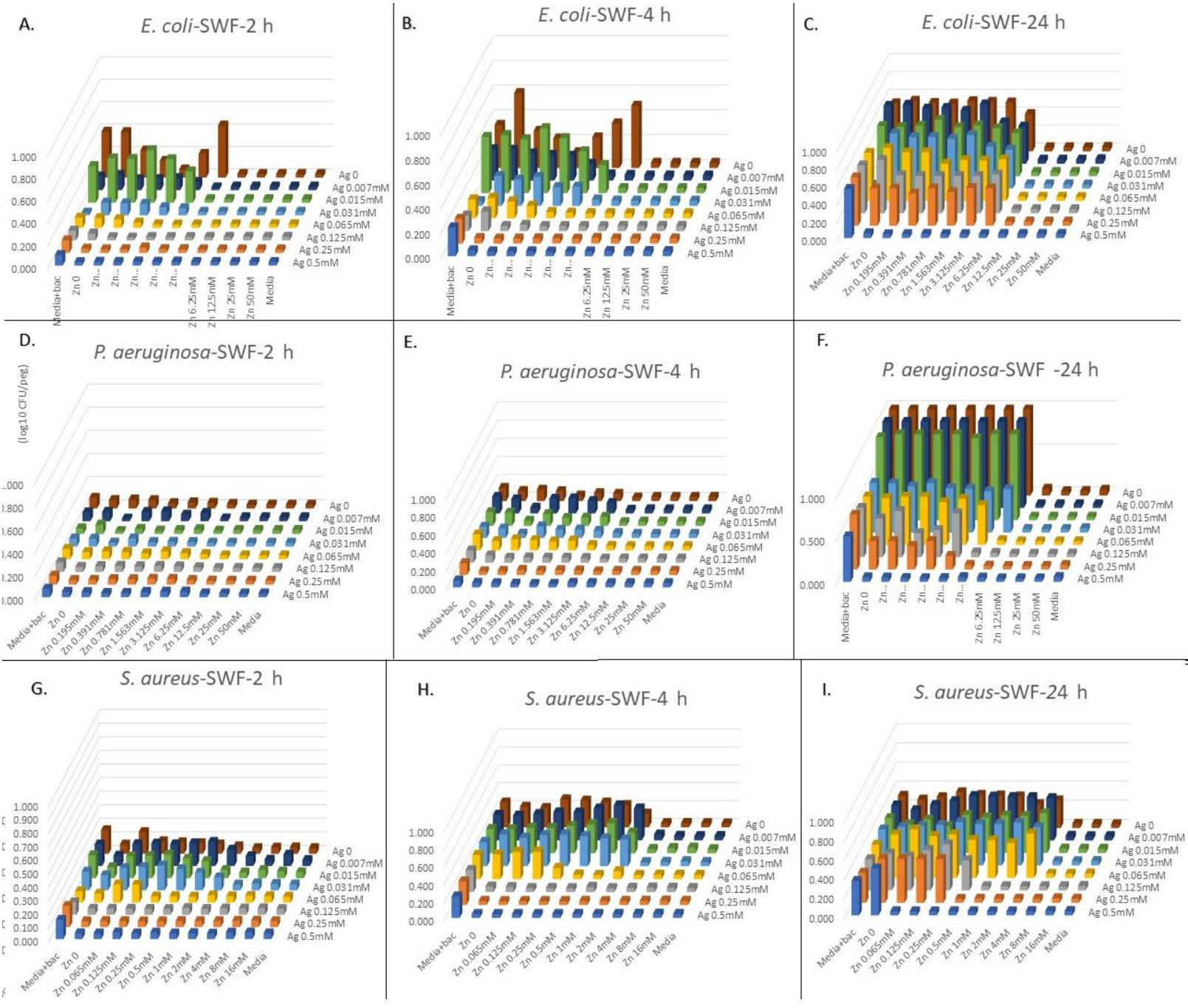


Figure S58. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with zinc sulfate ($ZnSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in SWF.

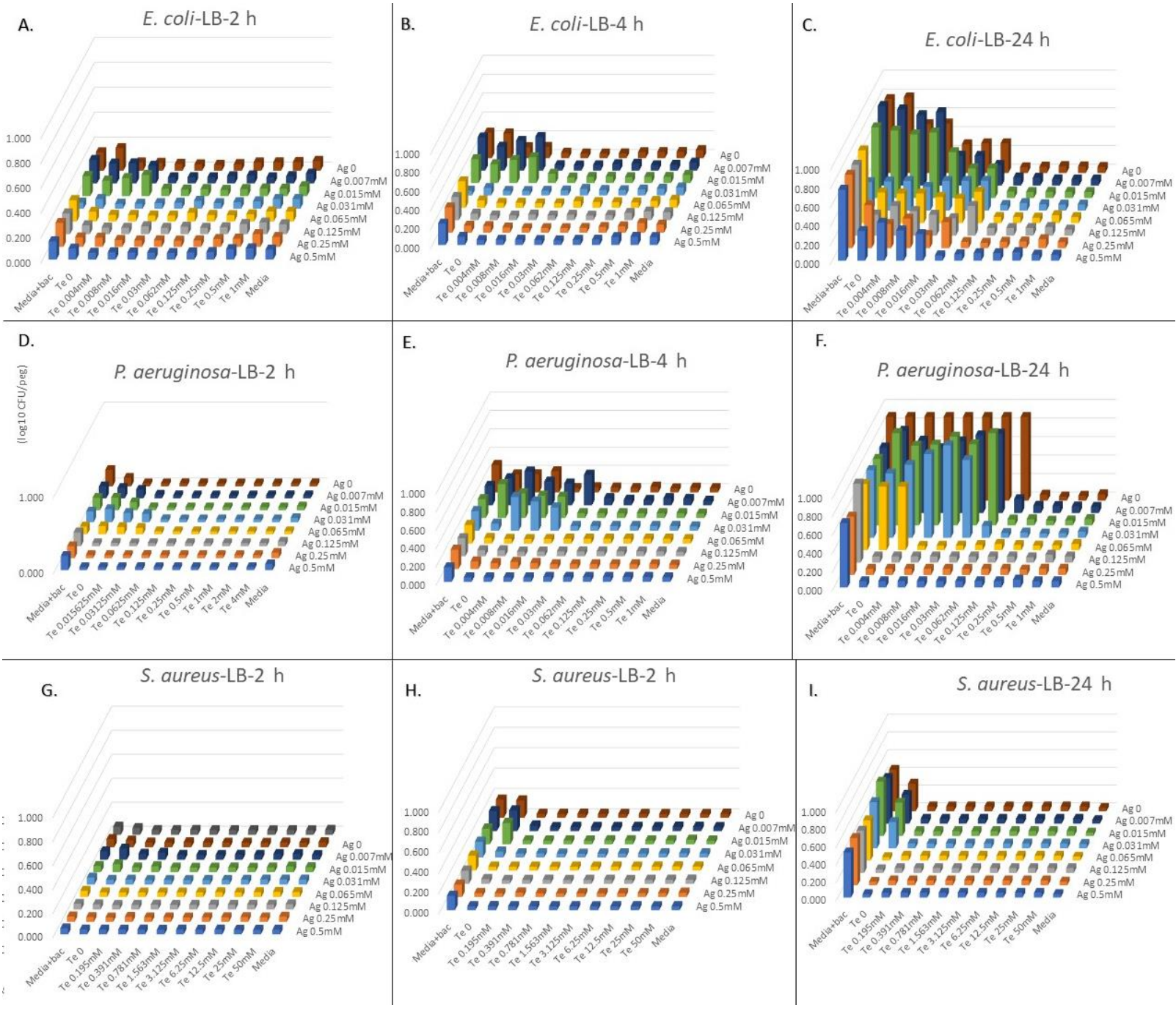


Figure S59. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB.

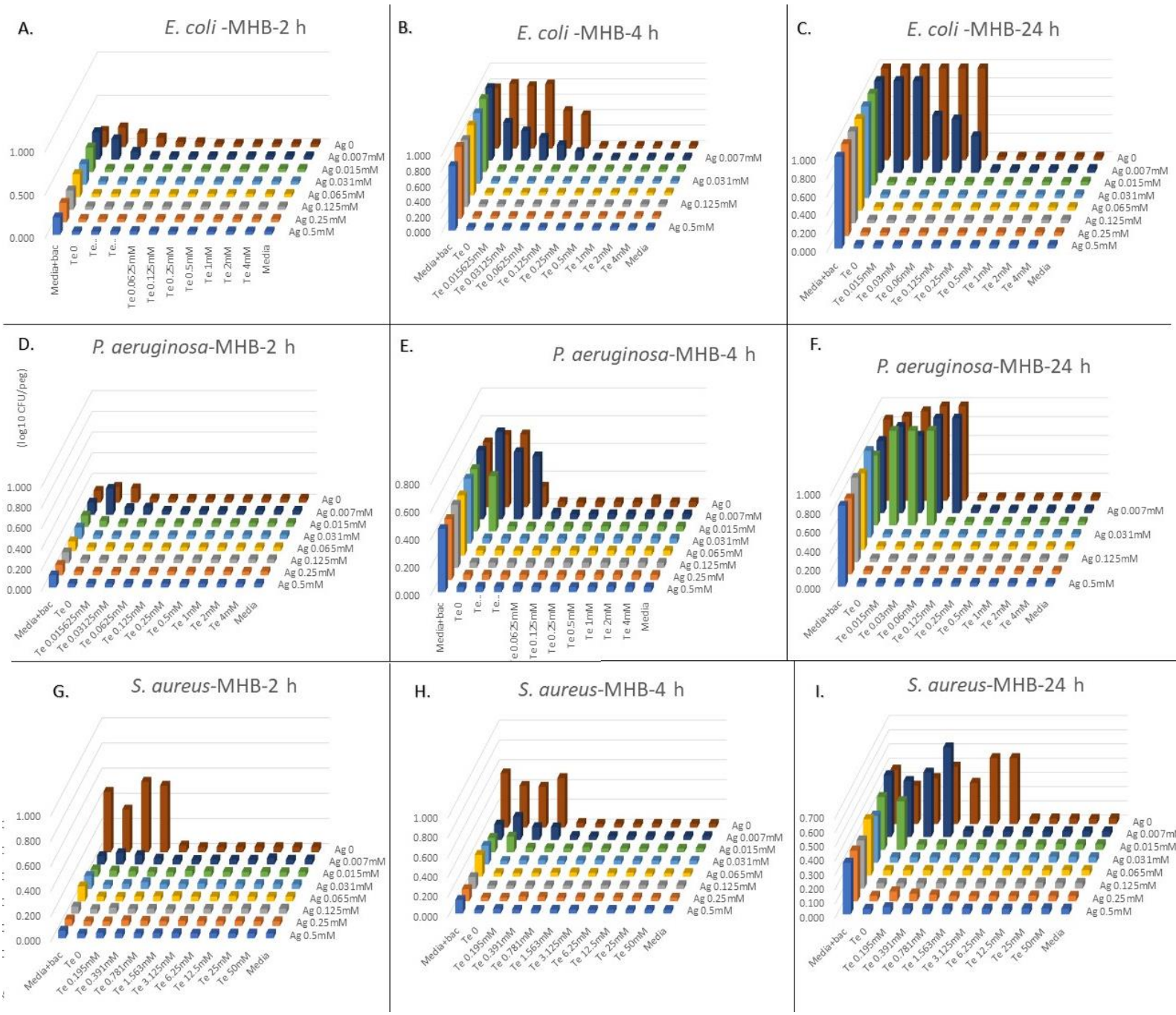


Figure S60. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in MHB.

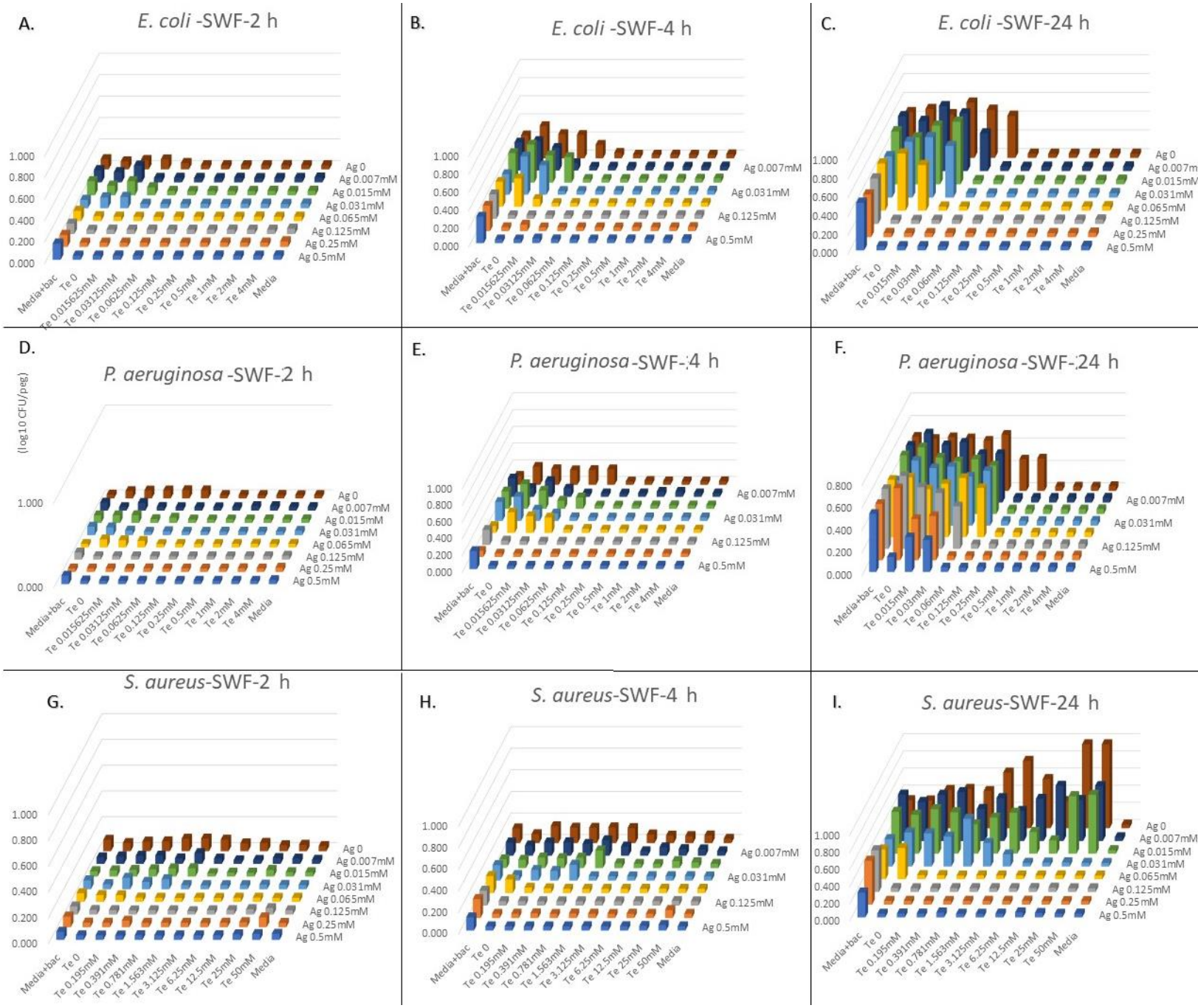


Figure S61. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with tellurite (K_2TeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in SWF.

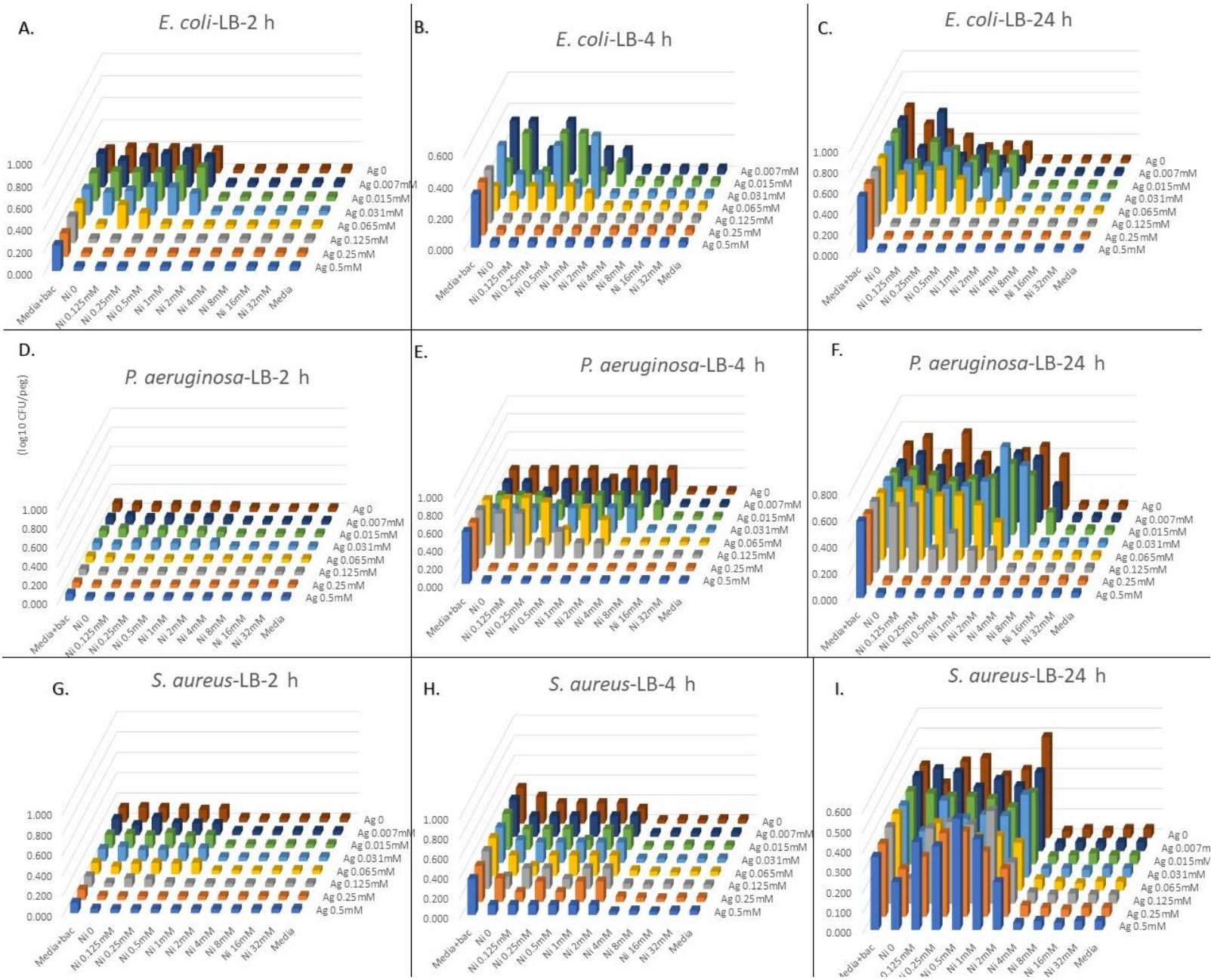


Figure S62. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB.

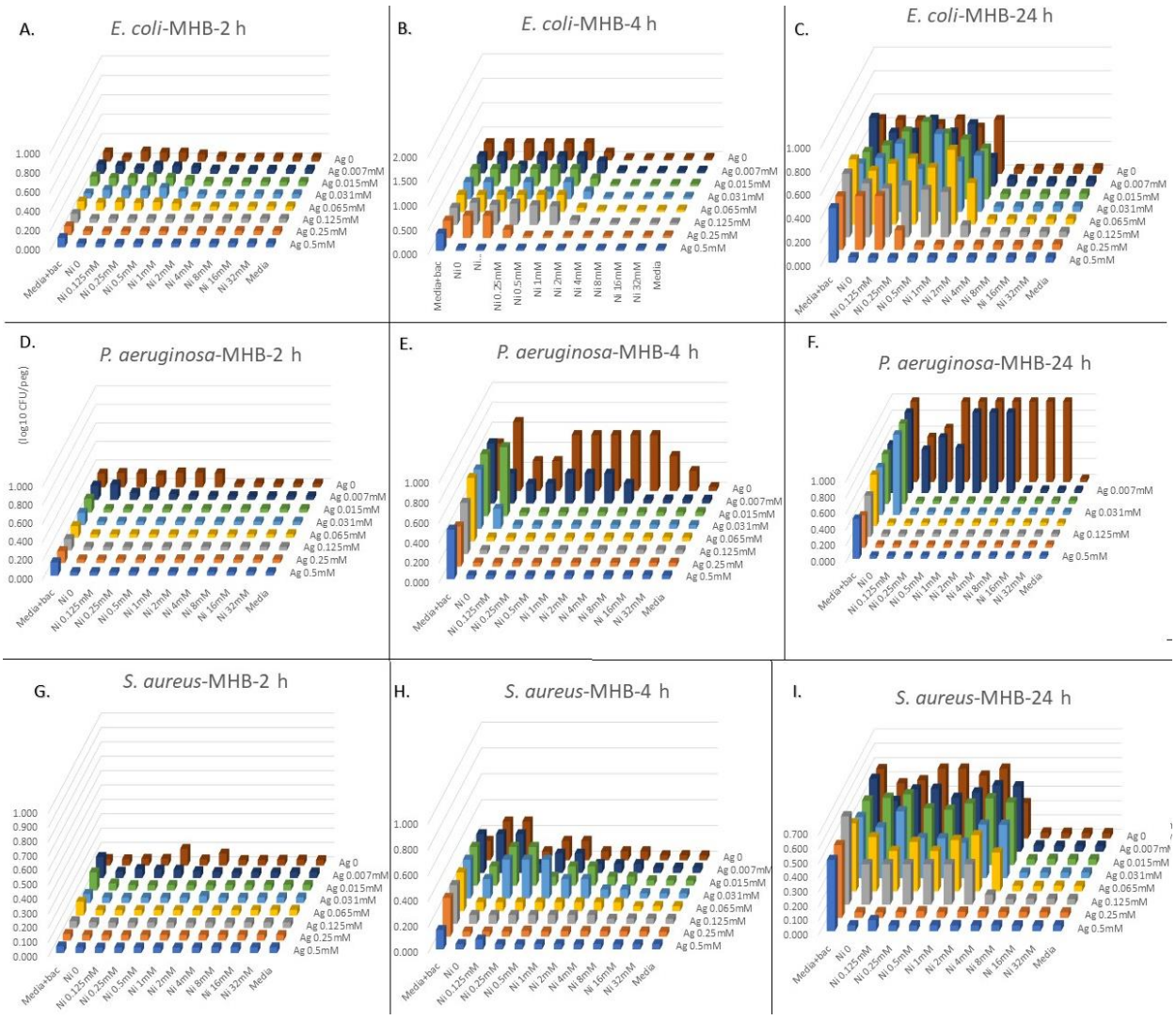


Figure S63. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with nickel sulfate ($NiSO_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in MHB.

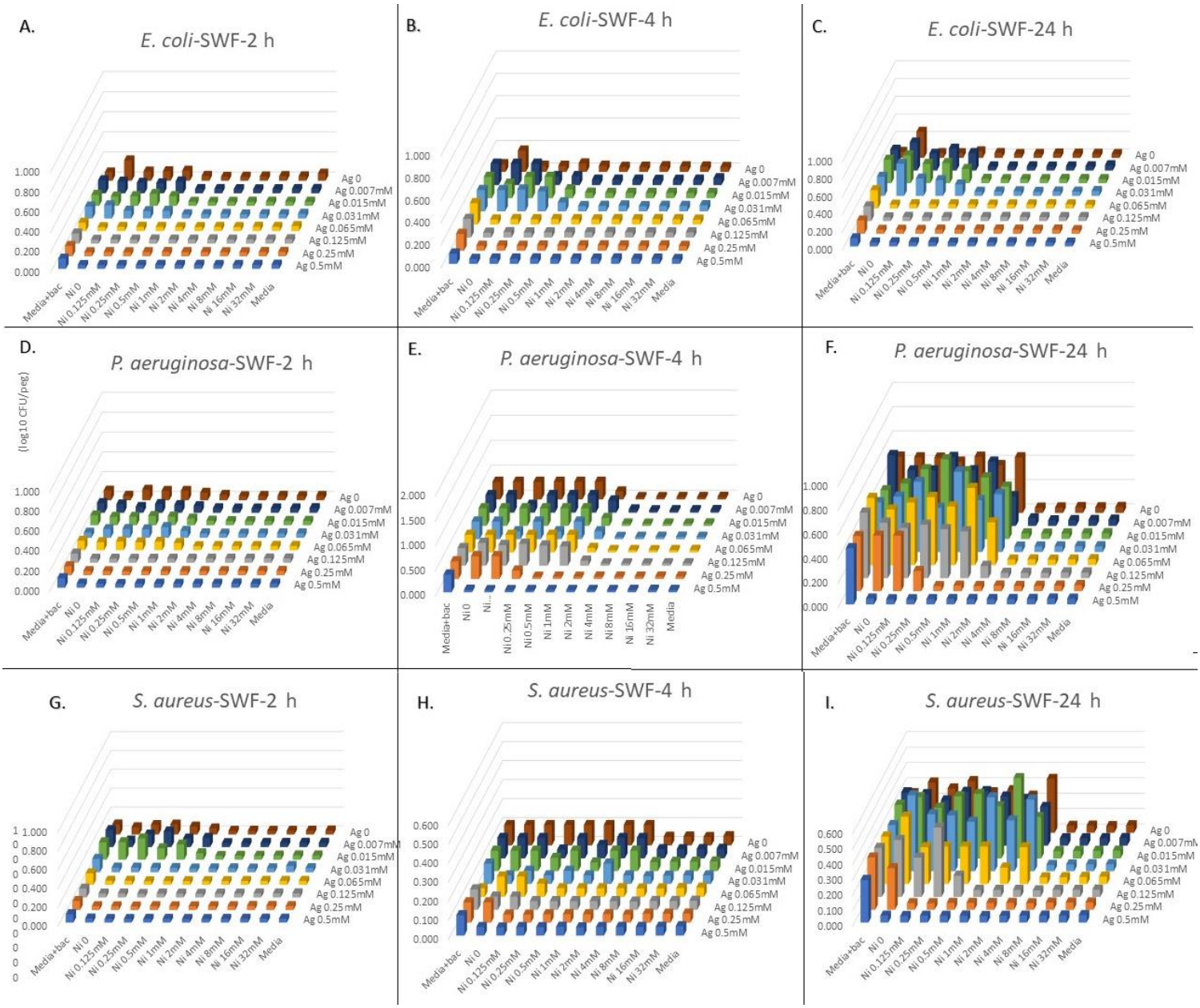

A.
E. coli-SWF-2 h
B.
E. coli-SWF-4 h
C.
E. coli-SWF-24 h
D.
P. aeruginosa-SWF-2 h
(log10 CFU/peg)
E.
P. aeruginosa-SWF-4 h
F.
P. aeruginosa-SWF-24 h
G.
S. aureus-SWF-2 h
H.
S. aureus-SWF-4 h
I.
S. aureus-SWF-24 h
Ag 0
Ag 0.007mM
Ag 0.015mM
Ag 0.031mM
Ag 0.065mM
Ag 0.125mM
Ag 0.25mM
Ag 0.5mM
Media+bac
Ni 0
Ni 0.125mM
Ni 0.25mM
Ni 0.5mM
Ni 1mM
Ni 2mM
Ni 4mM
Ni 8mM
Ni 16mM
Ni 32mM
Media

Figure S64. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in SWF.

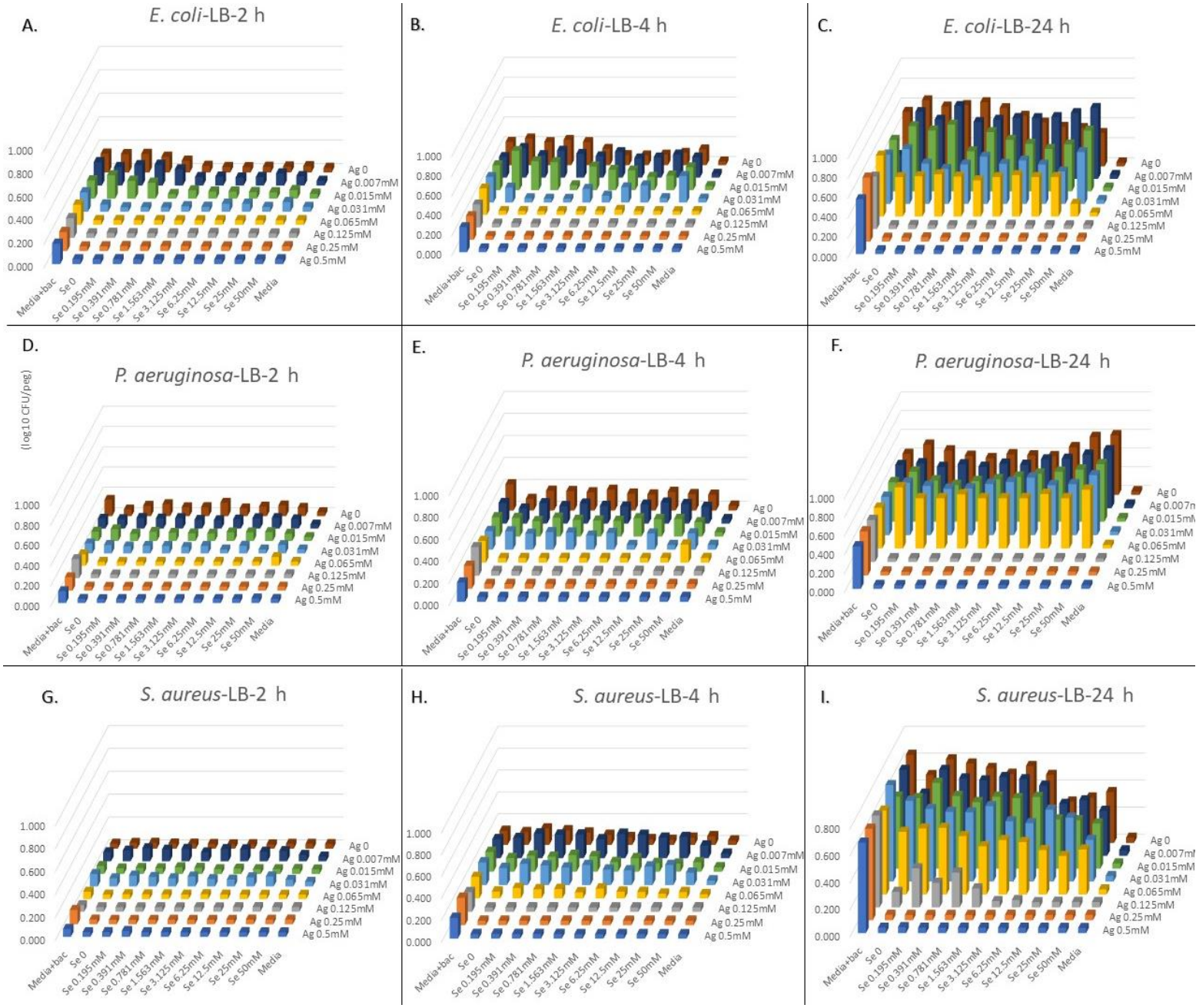


Figure S65. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB.

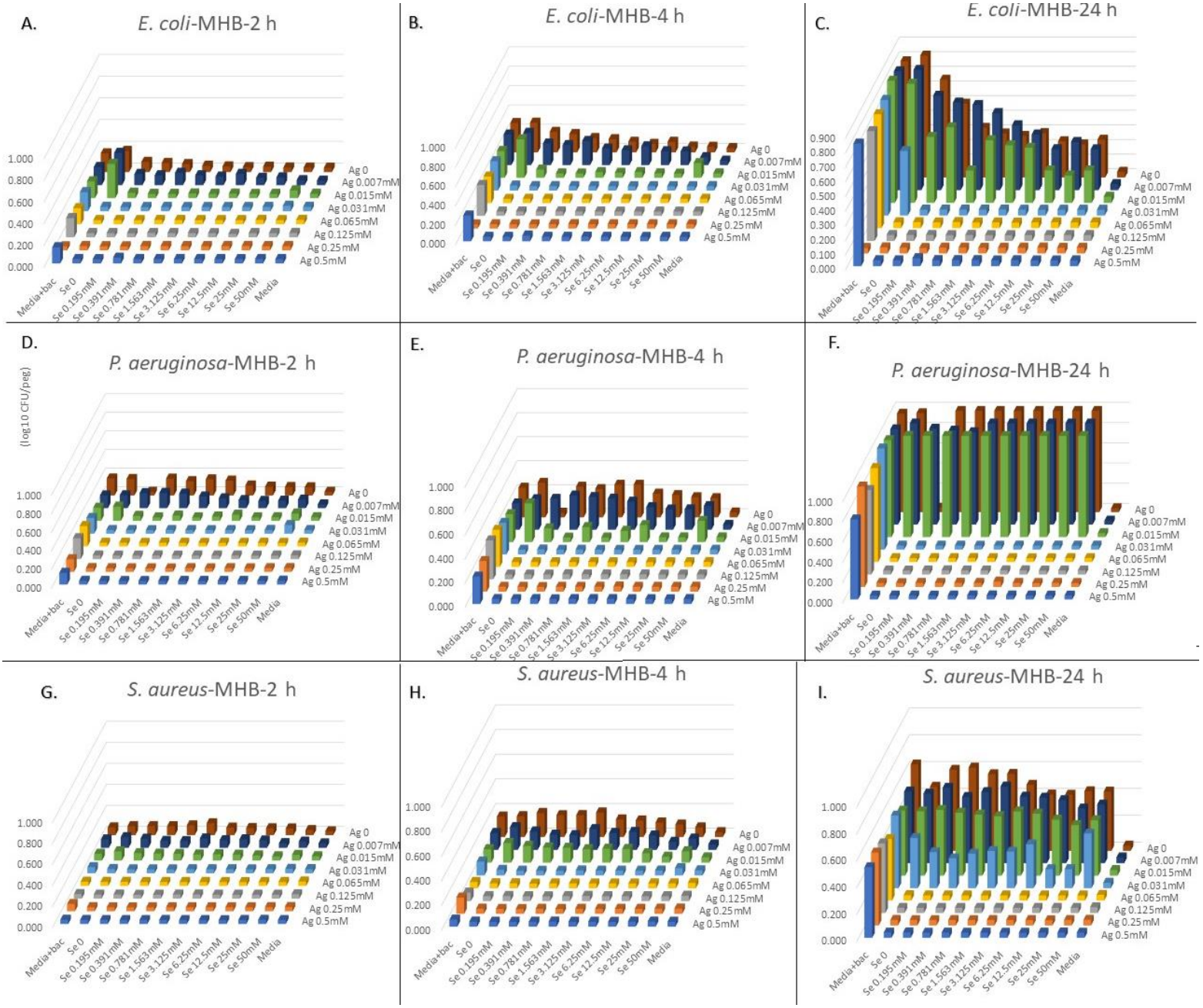


Figure S66. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in MHB.

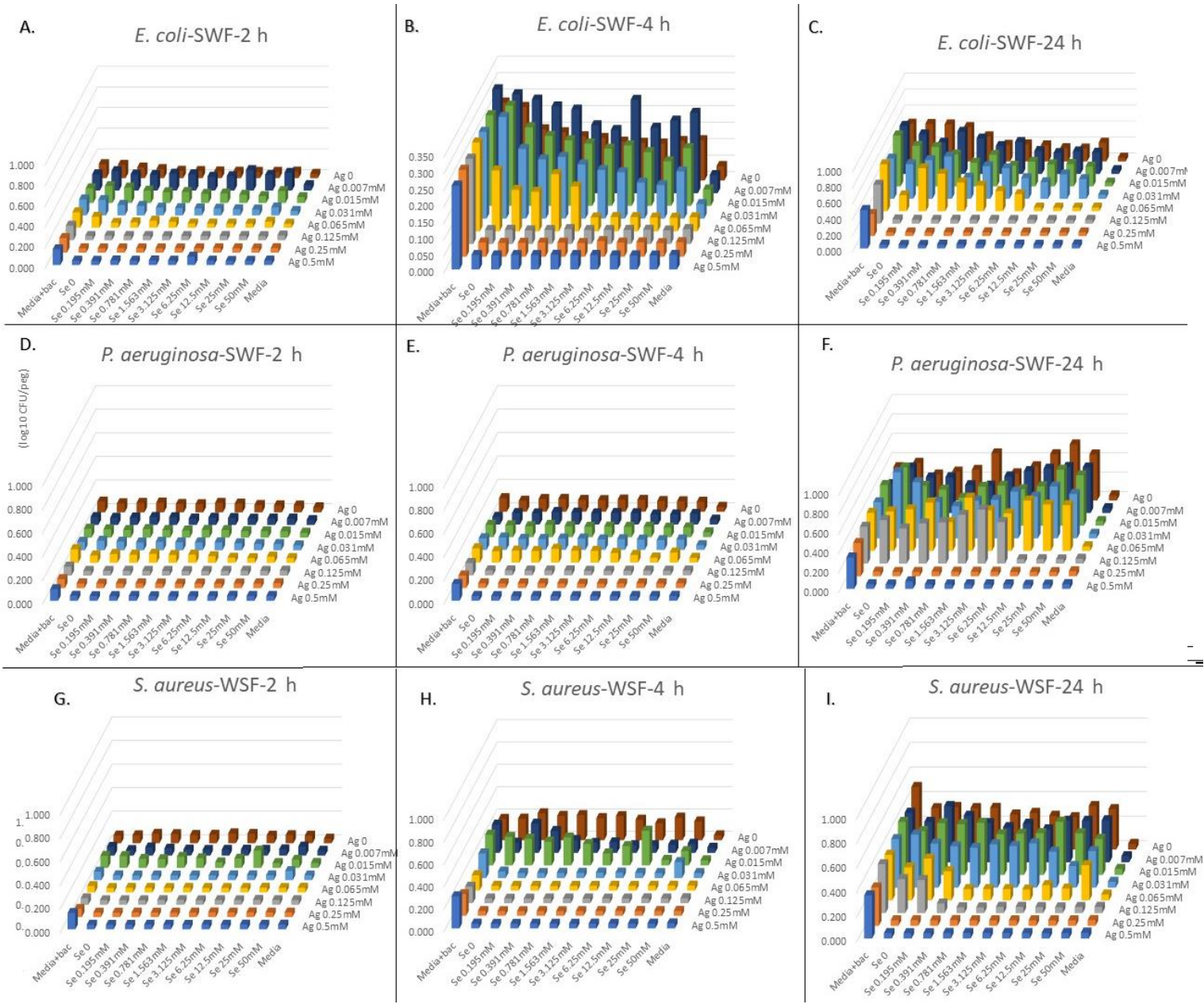


Figure S67. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with sodium selenite (Na_2SeO_3) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in SWF.

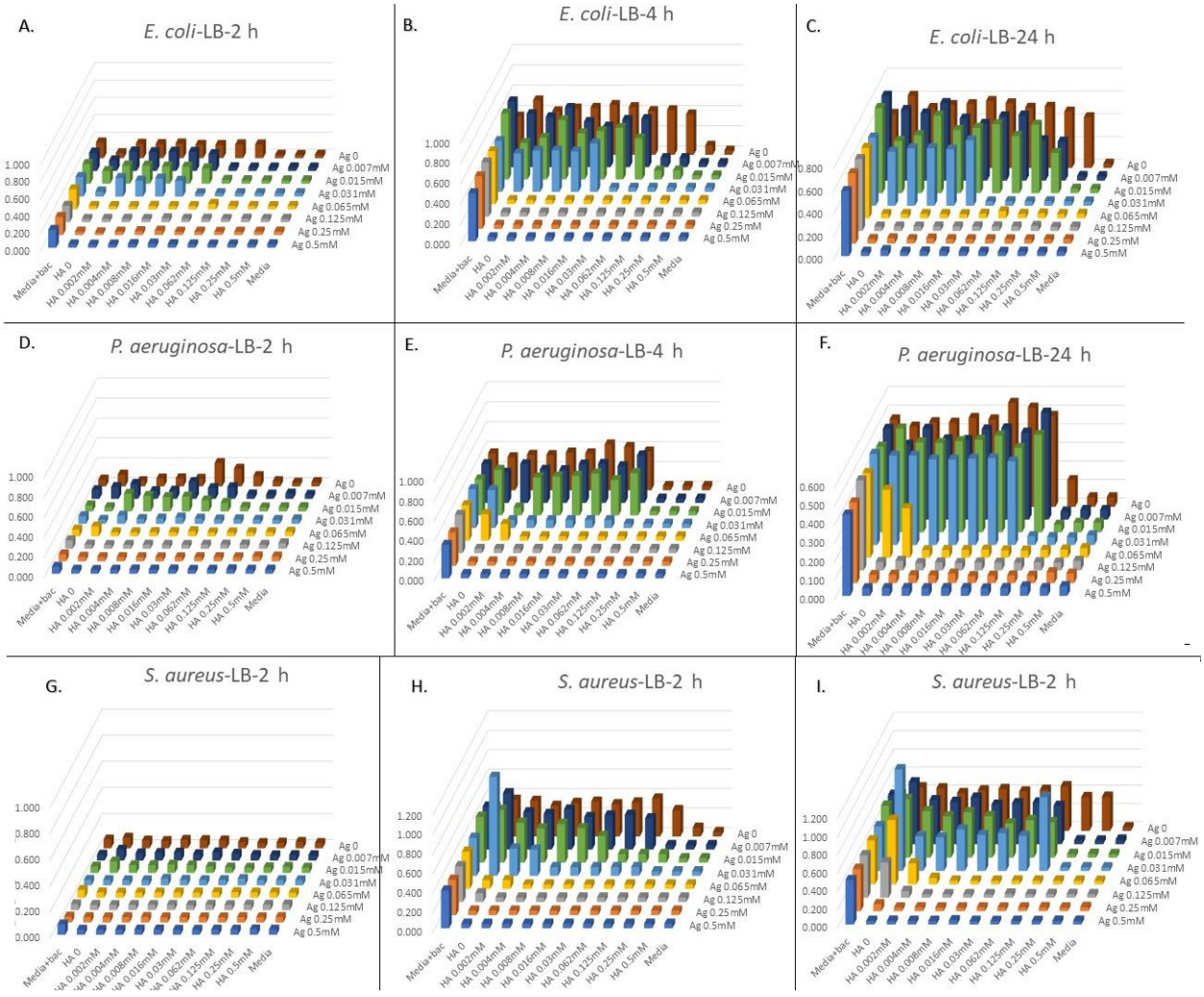


Figure S68. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in LB.

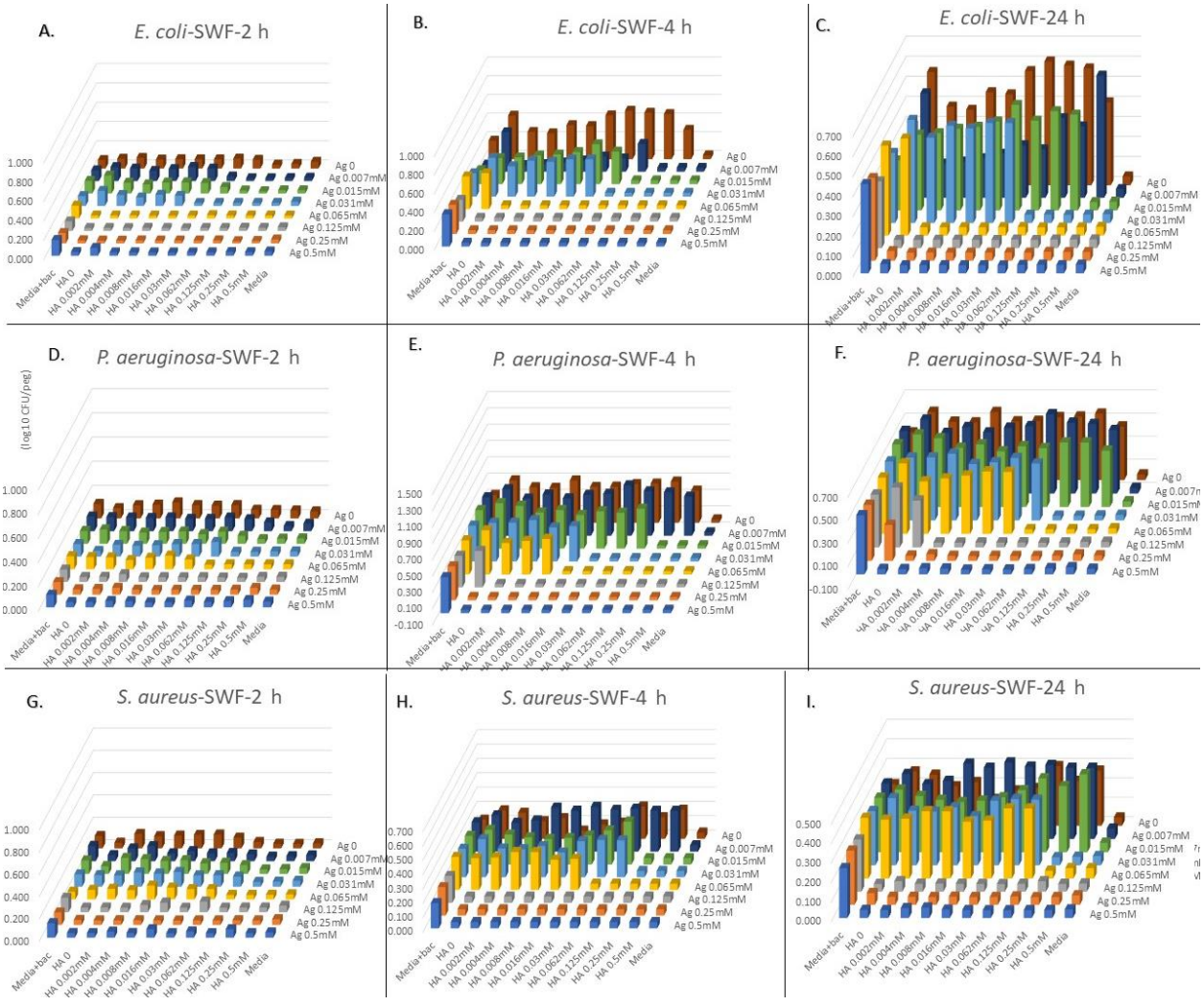

A.
E. coli-SWF-2 h
B.
E. coli-SWF-4 h
C.
E. coli-SWF-24 h
D.
P. aeruginosa-SWF-2 h
(log10 CFU/peg)
E.
P. aeruginosa-SWF-4 h
F.
P. aeruginosa-SWF-24 h
G.
S. aureus-SWF-2 h
H.
S. aureus-SWF-4 h
I.
S. aureus-SWF-24 h
Ag 0
Ag 0.007mM
Ag 0.015mM
Ag 0.031mM
Ag 0.065mM
Ag 0.125mM
Ag 0.25mM
Ag 0.5mM
Media+bac
HA 0
HA 0.002mM
HA 0.004mM
HA 0.008mM
HA 0.016mM
HA 0.03mM
HA 0.062mM
HA 0.125mM
HA 0.25mM
HA 0.5mM
Media

Figure S69. Recovery potency of *E. coli* ATCC 259 against synergism effects of silver nitrate ($AgNO_3$) combined with tetrachloroaurate (iii) (HA, $AuCl_4$) after 2 h (A), 4 h (B), and 24 h (C); *P. aeruginosa* after 2 h (D), 4 h (E), and 24 h (F); and *S. aureus* after 2 h (G), 4 h (H), and 24 h (I) in SWF.