Figures

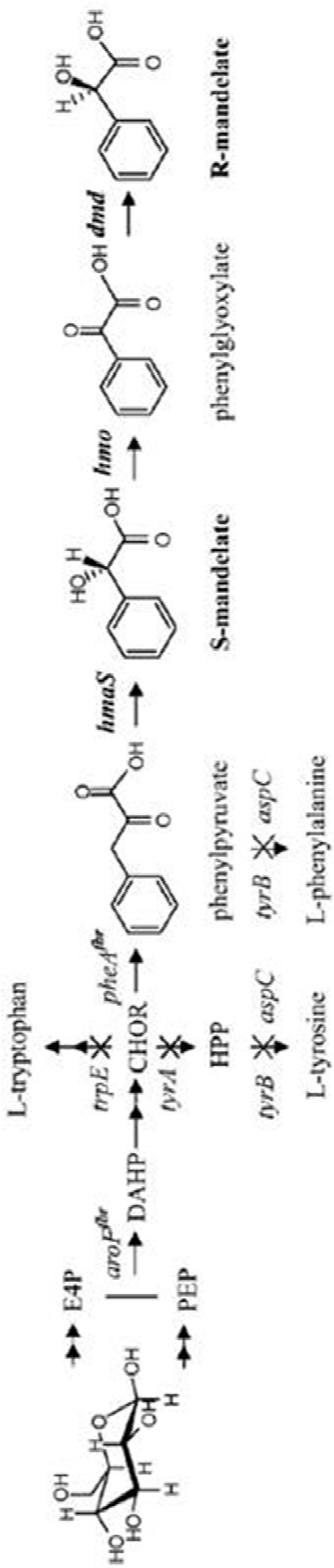

FIG. 1a

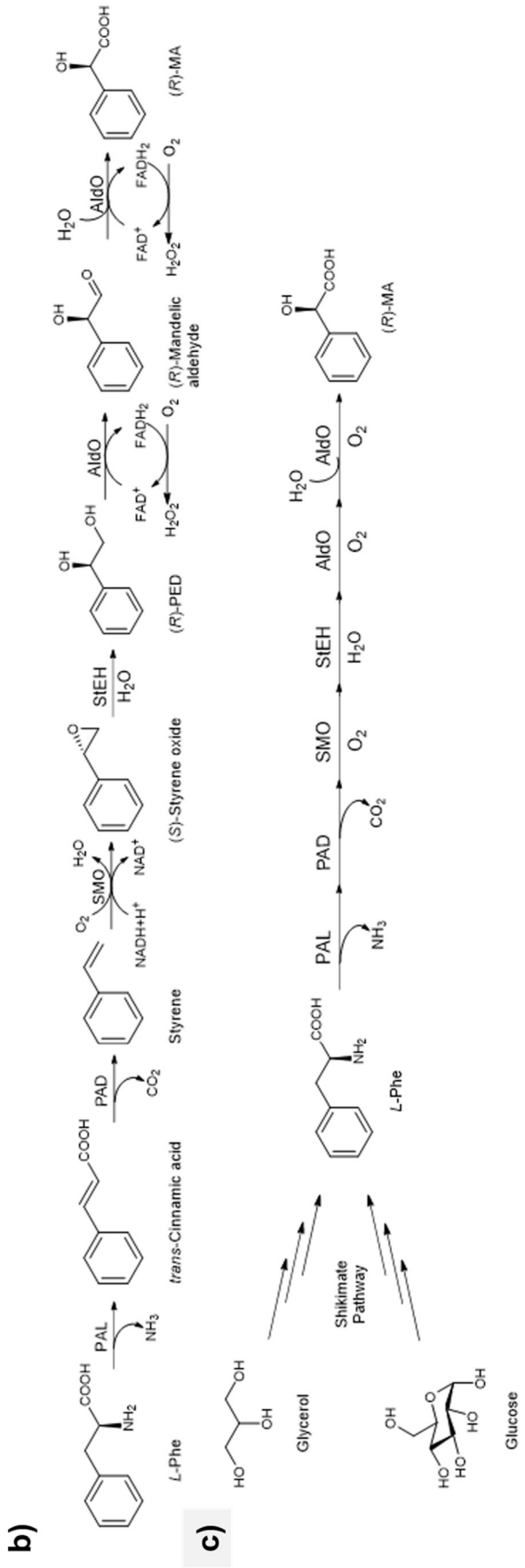
b)
L-Phe
PAL
NH3
trans-Cinnamic acid
PAD
CO2
Styrene
O2
SMO
H2O
NADH+H+
NAD+
(S)-Styrene oxide
StEH
H2O
(R)-PED
AldO
FADH2
O2
FAD+
H2O2
(R)-Mandelic aldehyde
H2O
AldO
FADH2
O2
FAD+
H2O2
(R)-MA
c)
Glycerol
Shikimate Pathway
Glucose
L-Phe
PAL
NH3
PAD
CO2
SMO
O2
StEH
H2O
AldO
O2
H2O
AldO
O2
(R)-MA

FIG. 1b-c

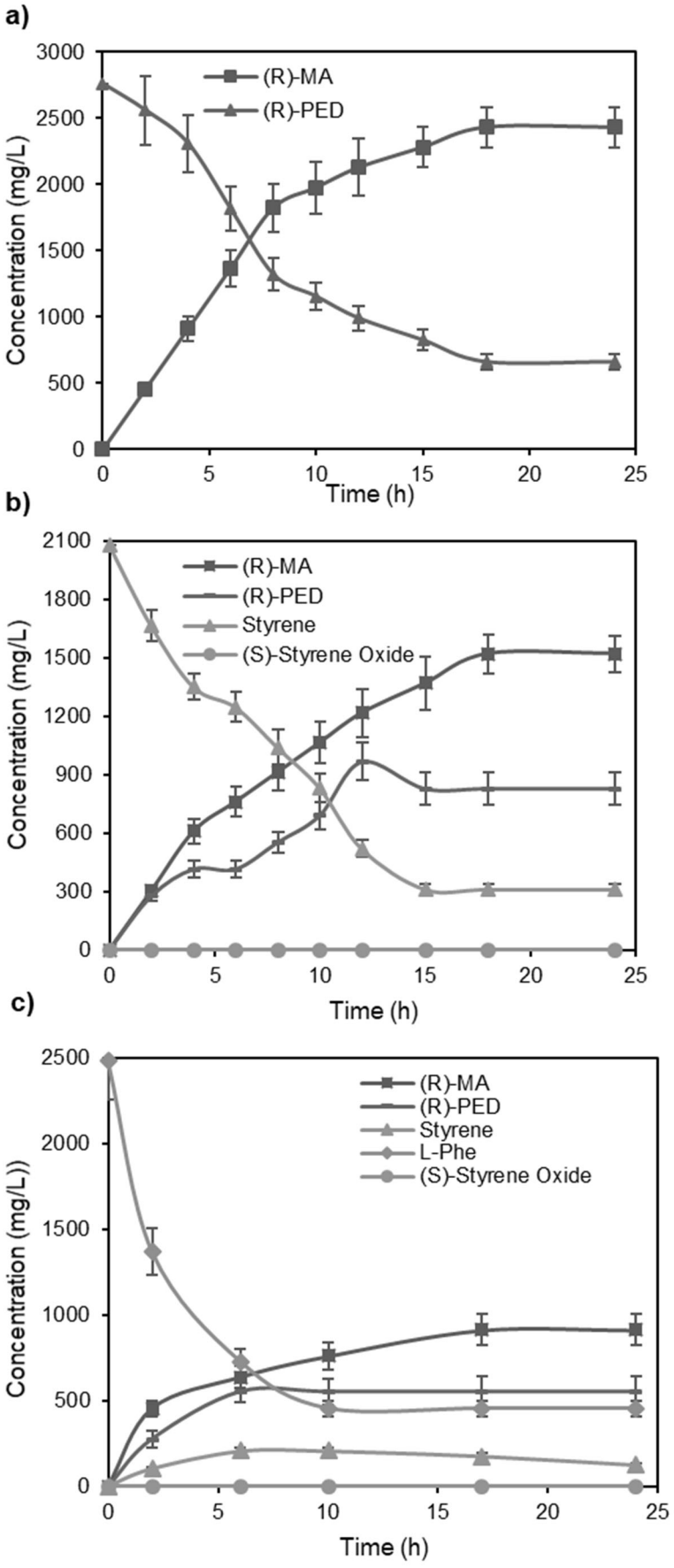
a)
3000
2500
2000
1500
1000
500
0
Concentration (mg/L)
(R)-MA
(R)-PED
0
5
10
15
20
25
Time (h)
b)
2100
1800
1500
1200
900
600
300
0
Concentration (mg/L)
(R)-MA
(R)-PED
Styrene
(S)-Styrene Oxide
0
5
10
15
20
25
Time (h)
c)
2500
2000
1500
1000
500
0
Concentration (mg/L))
(R)-MA
(R)-PED
Styrene
L-Phe
(S)-Styrene Oxide
0
5
10
15
20
25
Time (h)

FIG. 2

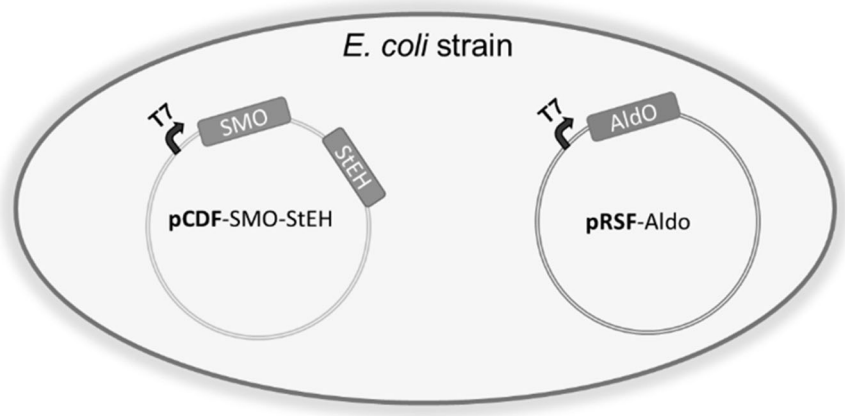
E. coli strain
T7
SMO
StEH
pCDF-SMO-StEH
T7
AldO
pRSF-Aldo

FIG. 3

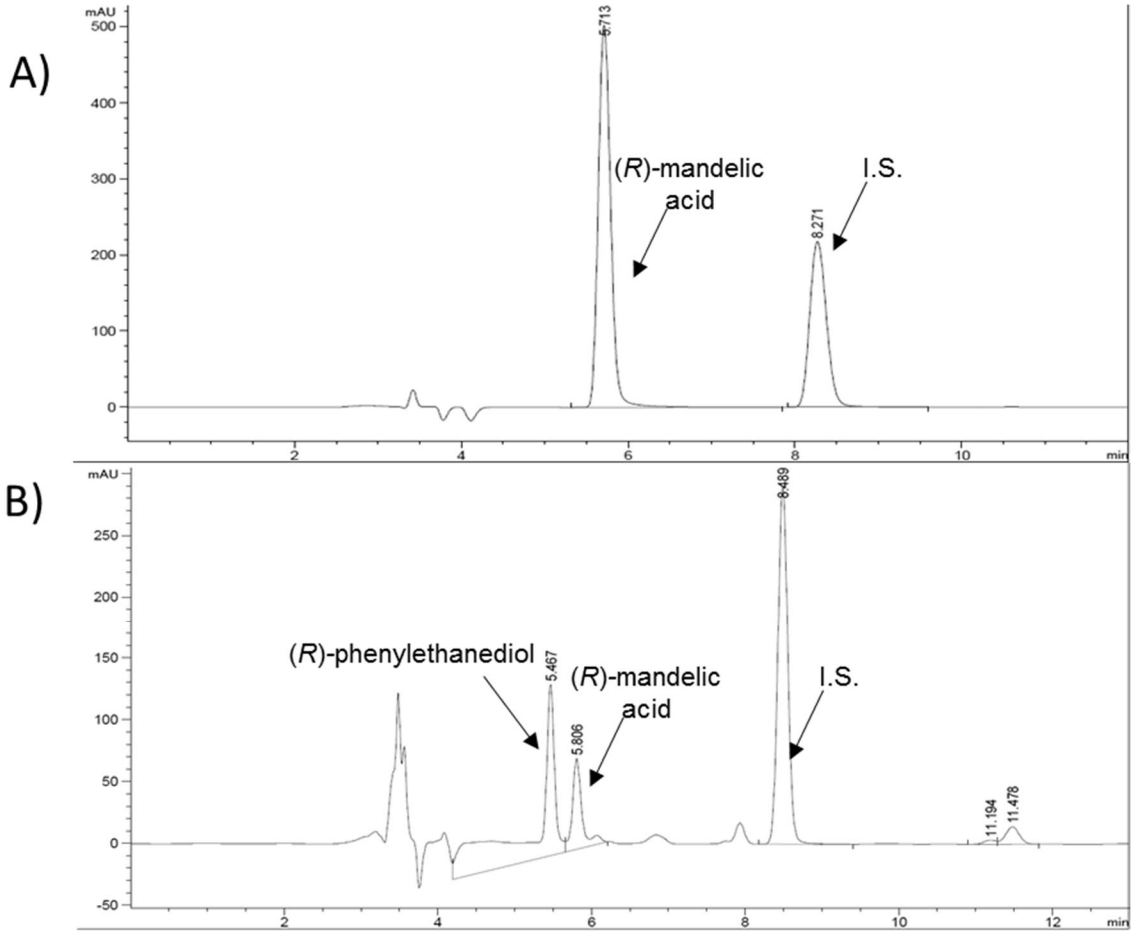
A)
mAU
5.713
(R)-mandelic acid
I.S.
8.271
B)
mAU
8.489
(R)-phenylethanediol
5.467
(R)-mandelic acid
5.806
I.S.
11.194
11.478
min

FIG. 4

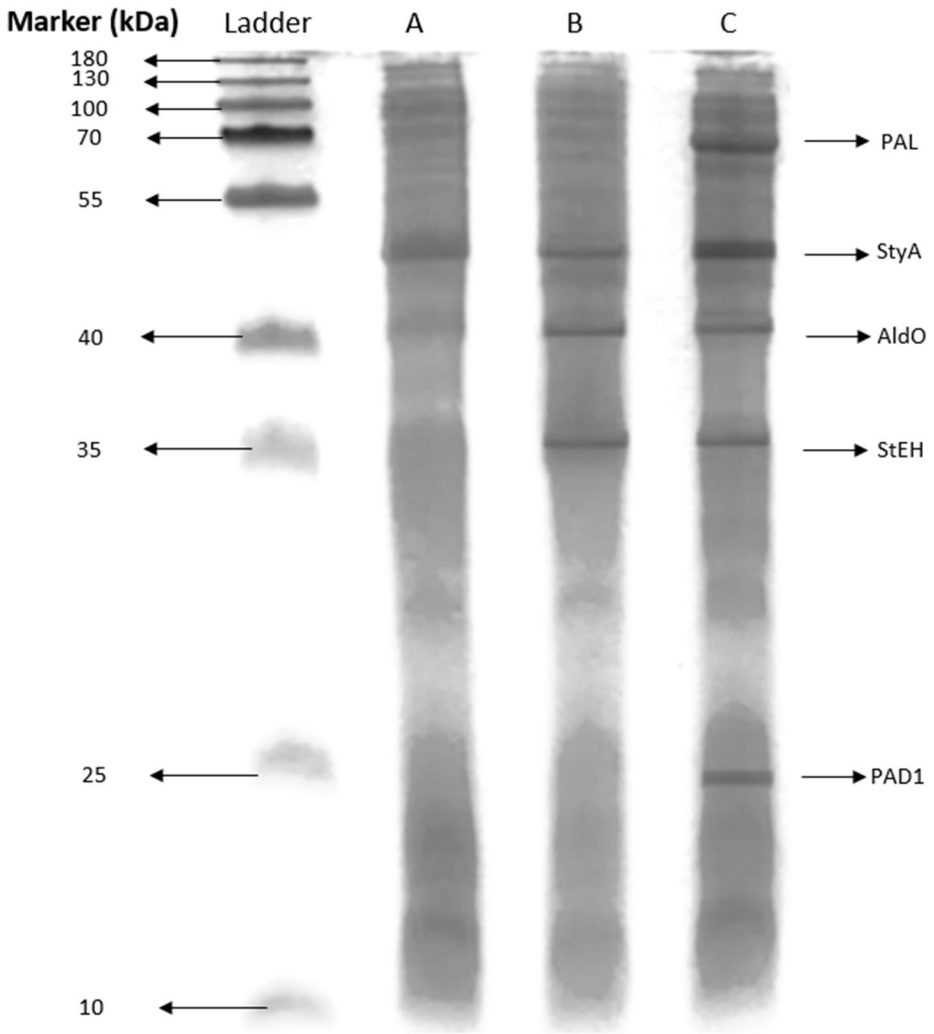
Marker (kDa)
Ladder
A
B
C
180
130
100
70
55
40
35
25
10
PAL
StyA
AldO
StEH
PAD1

FIG. 5

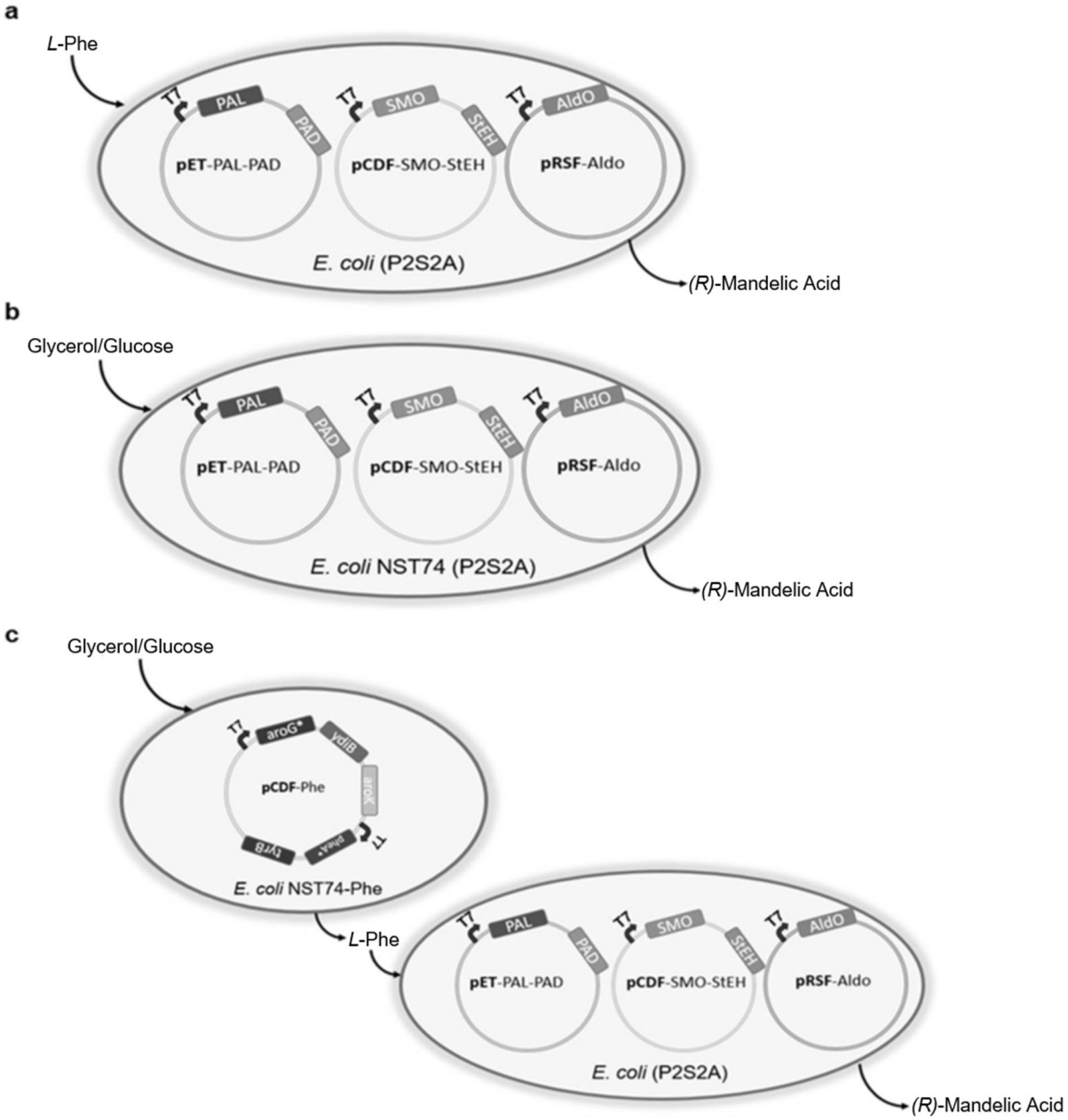
a
L-Phe
PAL
PAD
SMO
StEH
AldO
pET-PAL-PAD
pCDF-SMO-StEH
pRSF-Aldo
E. coli (P2S2A)
(R)-Mandelic Acid
b
Glycerol/Glucose
PAL
PAD
SMO
StEH
AldO
pET-PAL-PAD
pCDF-SMO-StEH
pRSF-Aldo
E. coli NST74 (P2S2A)
(R)-Mandelic Acid
c
Glycerol/Glucose
aroG*
ydiB
aroK
pCDF-Phe
tyrB
pheA*
E. coli NST74-Phe
L-Phe
PAL
PAD
SMO
StEH
AldO
pET-PAL-PAD
pCDF-SMO-StEH
pRSF-Aldo
E. coli (P2S2A)
(R)-Mandelic Acid

FIG. 6a-c

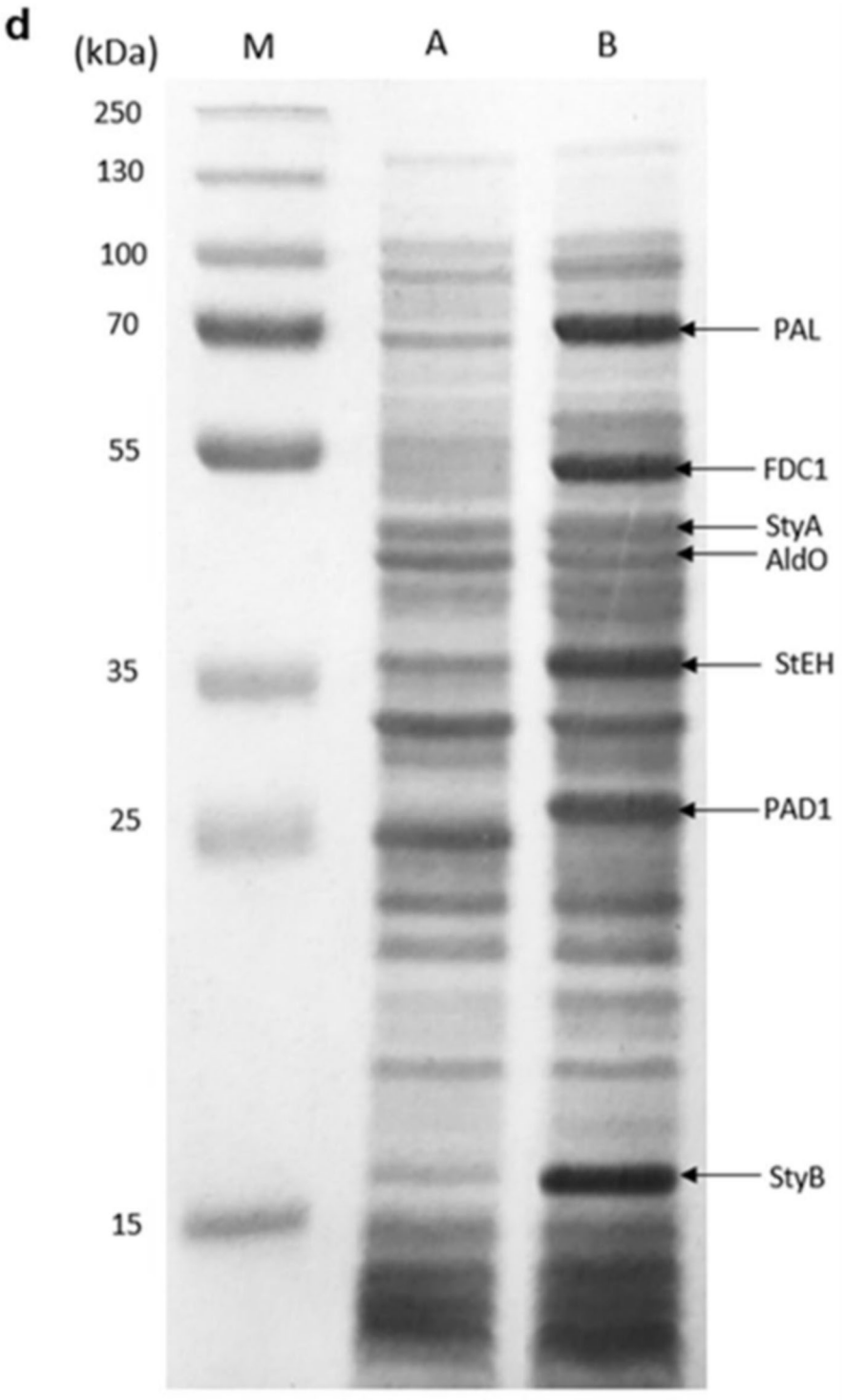
d
(kDa)
M
A
B
250
130
100
70
55
35
25
15
PAL
FDC1
StyA
AldO
StEH
PAD1
StyB

FIG. 6d

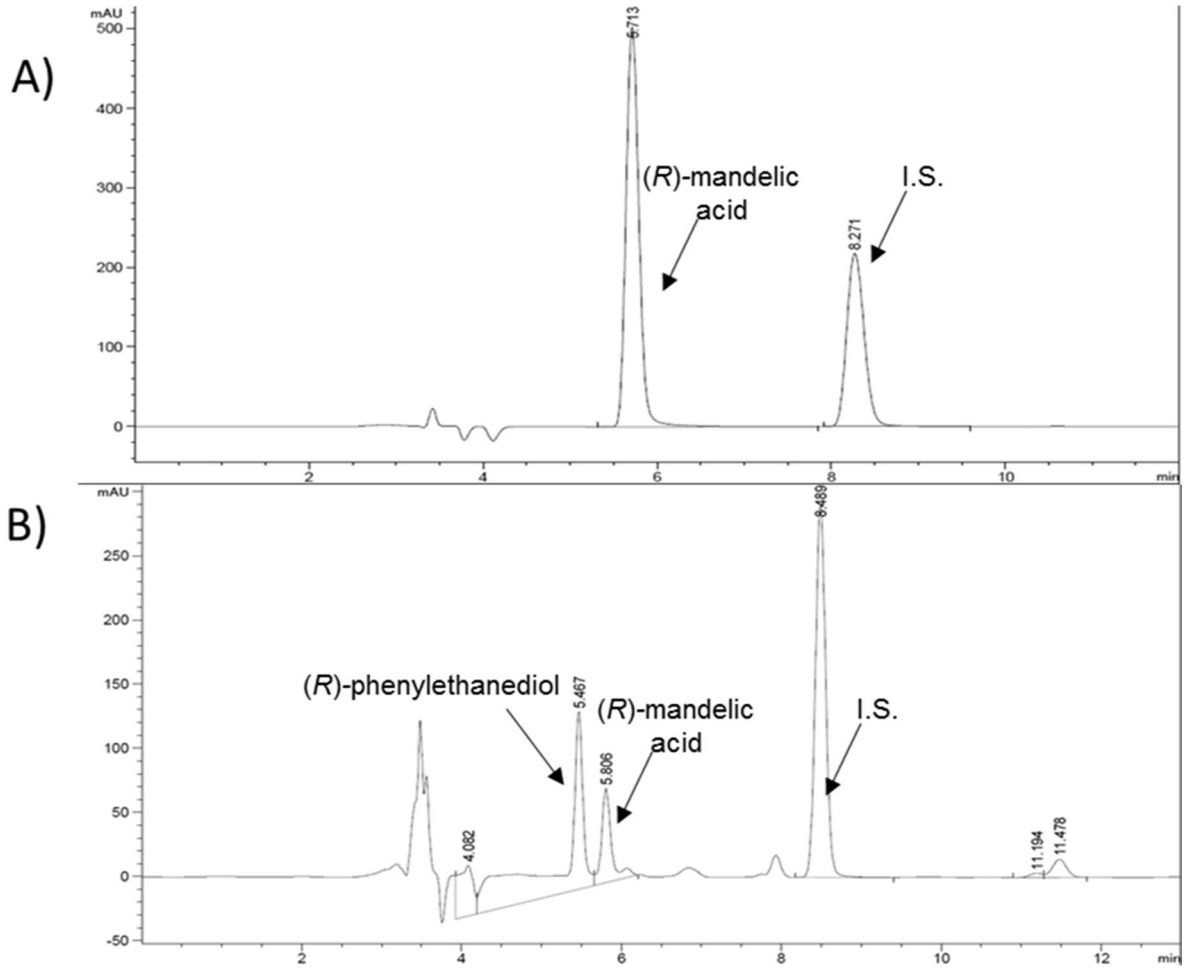
A)
mAU
500
400
300
200
100
0
5.713
(R)-mandelic acid
I.S.
8.271
2
4
6
8
10
min
B)
mAU
250
200
150
100
50
0
-50
8.489
(R)-phenylethanediol
5.467
(R)-mandelic acid
I.S.
5.806
4.082
11.194
11.478
2
4
6
8
10
12
min

FIG. 7

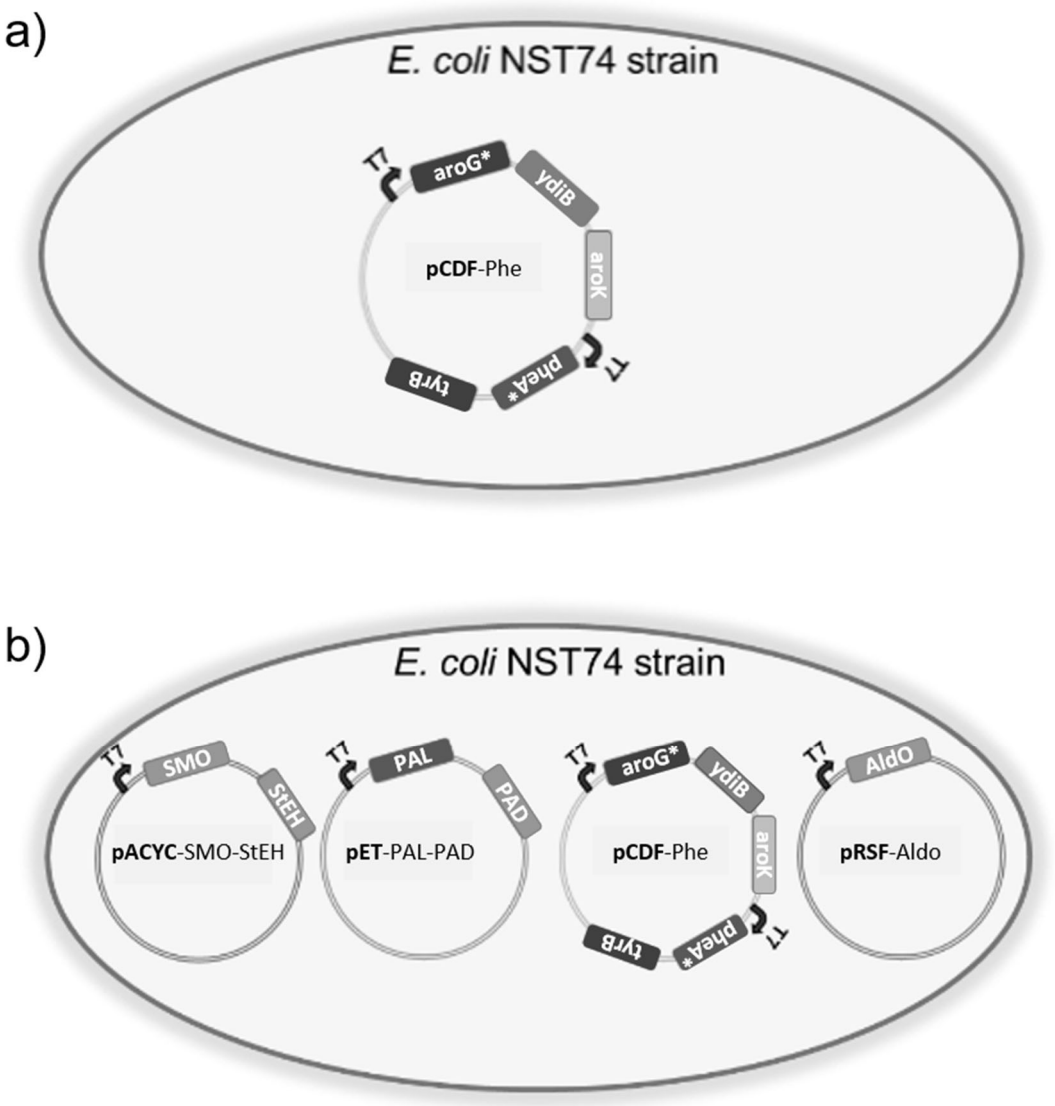
a)
E. coli NST74 strain
T7
aroG*
ydiB
aroK
T7
pheA*
tyrB
pCDF-Phe
b)
E. coli NST74 strain
T7
SMO
StEH
pACYC-SMO-StEH
T7
PAL
PAD
pET-PAL-PAD
T7
aroG*
ydiB
aroK
T7
pheA*
tyrB
pCDF-Phe
T7
AldO
pRSF-Aldo

FIG. 8

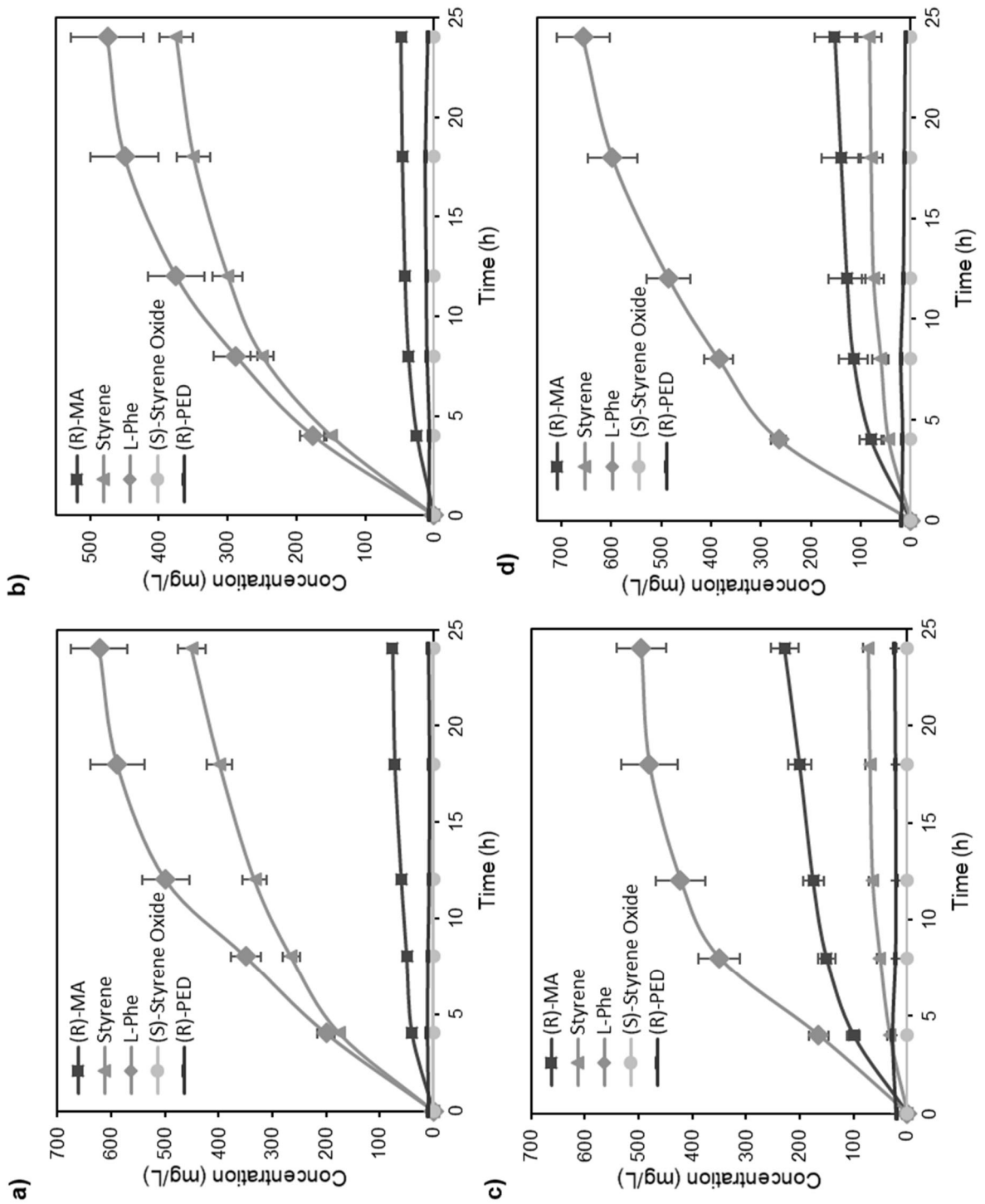
a)
b)
c)
d)
Concentration (mg/L)
Time (h)
(R)-MA
Styrene
L-Phe
(S)-Styrene Oxide
(R)-PED

FIG. 9

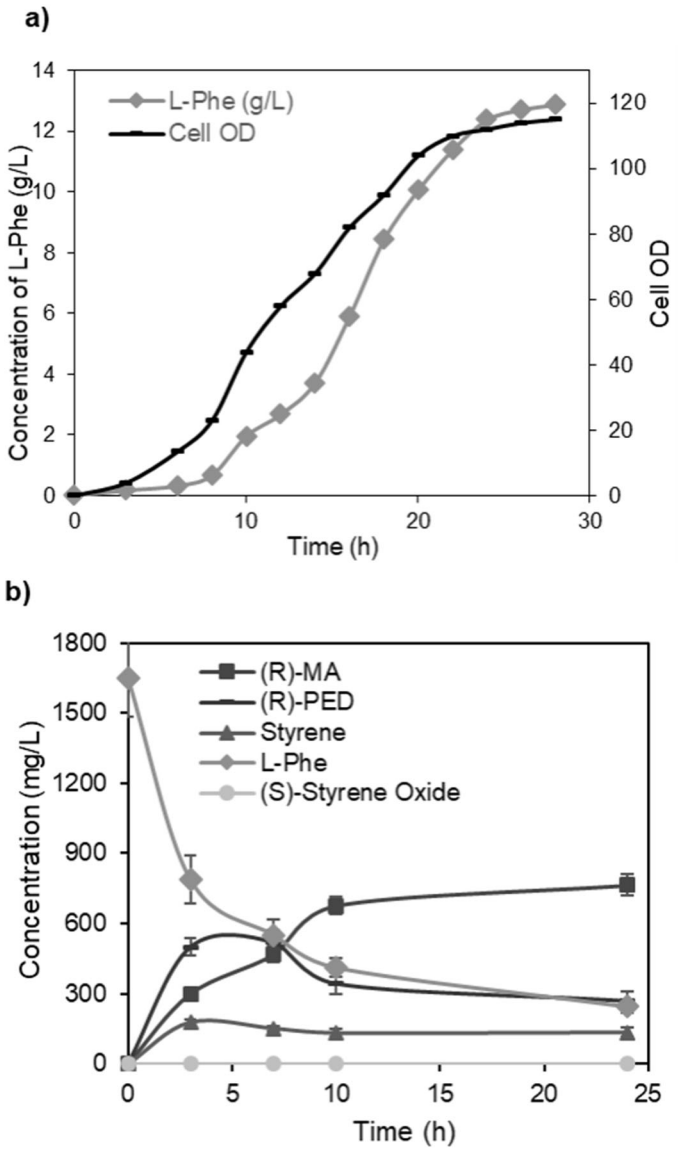
a)
L-Phe (g/L)
Cell OD
Concentration of L-Phe (g/L)
Cell OD
Time (h)
b)
(R)-MA
(R)-PED
Styrene
L-Phe
(S)-Styrene Oxide
Concentration (mg/L)
Time (h)

FIG. 10

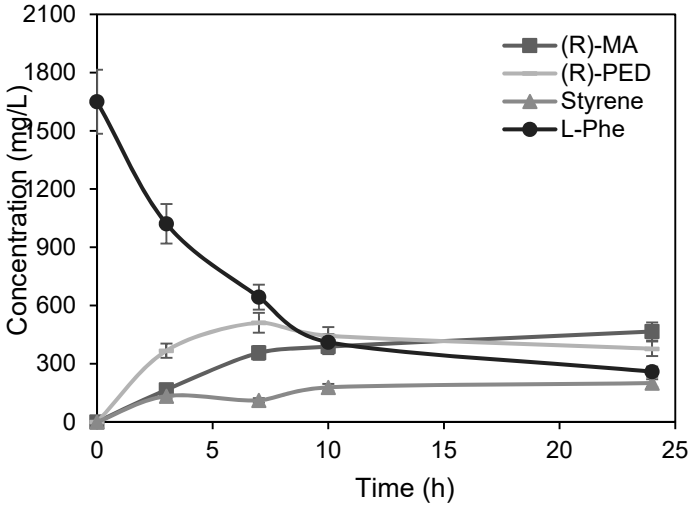
(R)-MA
(R)-PED
Styrene
L-Phe
Concentration (mg/L)
Time (h)

FIG. 11

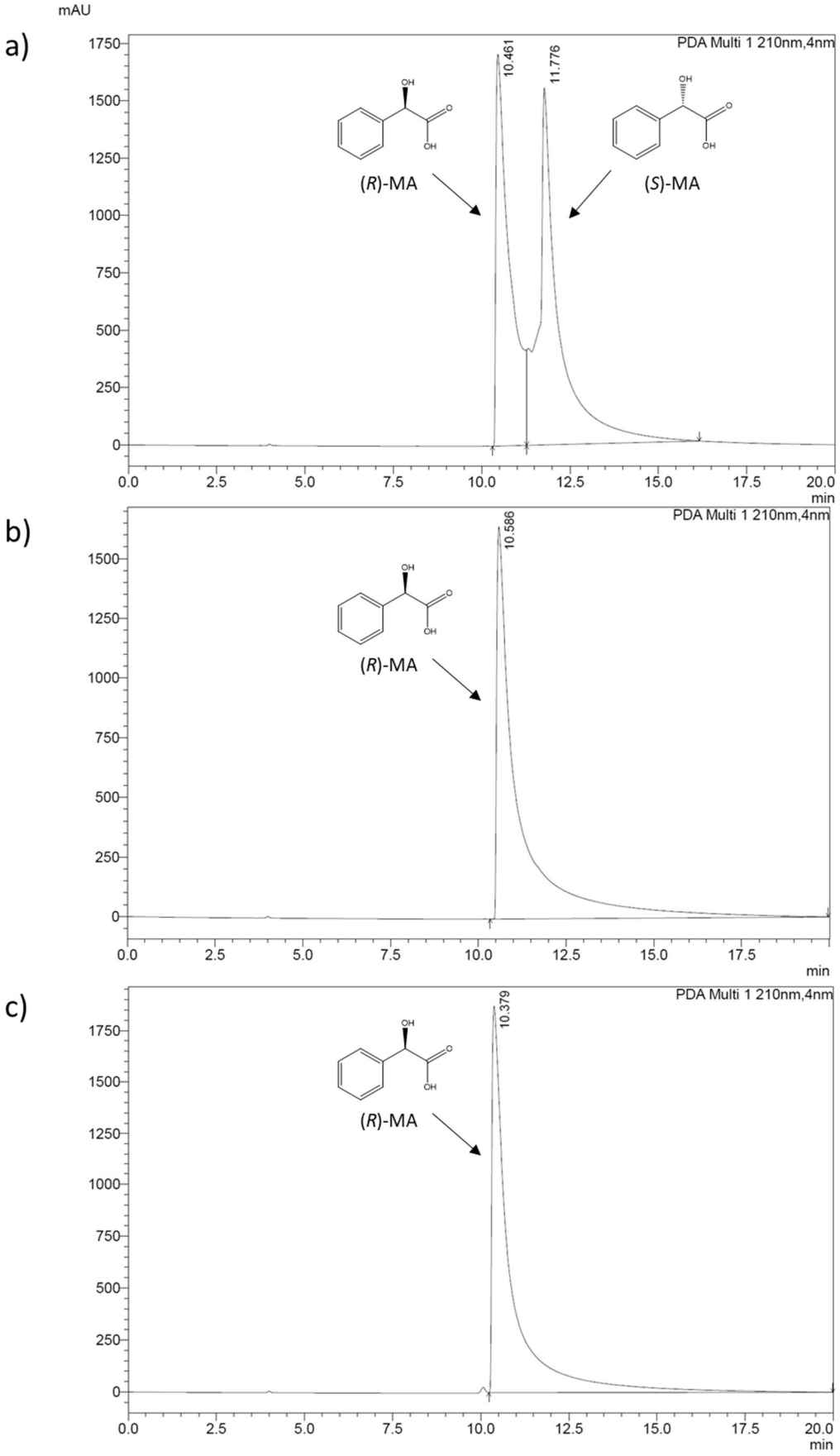
a)
mAU
PDA Multi 1 210nm,4nm
10.461
11.776
(R)-MA
(S)-MA
min
b)
PDA Multi 1 210nm,4nm
10.586
(R)-MA
min
c)
PDA Multi 1 210nm,4nm
10.379
(R)-MA
min

FIG. 12