**SUPPLEMENTARY DATA**

Comparison of the Lipoamide Synthesis by Direct Amidation and via Amidation of Fatty Acid Methyl Esters

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1. Research Instruments and Materials

The materials used in this study were stearic acid (Pudak Scientific), oleic acid, aniline, cyclohexylamine, *p*-anisidine, *p*-nitroaniline, dry methanol, HCl 37%, anhydrous sodium sulfate, dichloromethane, toluene, acetic acid glacial, and silica gel 60 (0.063-0.200 mm) for column chromatography were purchased from Merck (Darmstadt, Germany); *p-*xylene 99% (Loba Chemie); 2′,7′-dichlorofluorescein and TLC silica gel 60 F254 were purchased from Sigma-Aldrich; ethyl acetate and hexane with technical grade. FTIR (SHIMADZU IRPrestige-21) and 1H NMR (Bruker Avance Neo-Ascend 500) were used for characterization.

1. Data Analysis
   1. TLC Profile of Synthesis of Lipoamides

**Table S.1.** TLC profile during synthesis of lipoamides stearate-aniline and lipoamide stearate-cyclohexylamine every 6 hours for 18 hours

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reaction time (h) | Lipoamide stearate-aniline | | Lipoamide stearate-cyclohexylamine | |
| Direct amidation | FAME | Direct amidation | FAME |
| 6 | A black arrow pointing to a green screen  Description automatically generated | A green screen with a black arrow  Description automatically generated | A black arrow pointing to a green screen  Description automatically generated | A green background with a black arrow  Description automatically generated |
| 12 | A green screen with a black arrow  Description automatically generated | A green screen with a black arrow pointing to a black spot  Description automatically generated | A green screen with a black arrow pointing to a black object  Description automatically generated | A black arrow on a green screen  Description automatically generated |
| 18 | A black arrow pointing at a green screen  Description automatically generated | A black arrow on a green background  Description automatically generated | A green screen with a black arrow pointing to a green screen  Description automatically generated | A green screen with a black arrow  Description automatically generated |

*SM = starting material, X = reaction mixture, LA = lipoamide*

**Table S.2.** TLC profile during synthesis of lipoamides oleate-aniline and lipoamide oleate-cyclohexylamine every 6 hours for 18 hours

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reaction time (h) | Lipoamide oleate-aniline | | Lipoamide oleate-cyclohexylamine | |
| Direct amidation | FAME | Direct amidation | Direct amidation |
| 6 | A green screen with a black stick  Description automatically generated | A black arrow on a green background  Description automatically generated | A green screen with a black arrow pointing to a green screen  Description automatically generated | A green screen with a black line  Description automatically generated |
| 12 | A black arrow pointing at a black object  Description automatically generated | A green screen with a black arrow  Description automatically generated | A black arrow on a green background  Description automatically generated | A green screen with a black border  Description automatically generated |
| 18 | A green screen with a black arrow  Description automatically generated | A black arrow on a green background  Description automatically generated | A shadow of a person's foot on a green background  Description automatically generated | A green screen with a black line  Description automatically generated |

*SM = starting material, X = reaction mixture, LA = lipoamide*

**Table S.3.** TLC profile during synthesis of lipoamides stearate-*p*-anisidine and lipoamide stearate-*p*-nitroaniline every 6 hours for 18 hours

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reaction time (h) | Lipoamide stearate-*p*-anisidine | | Lipoamide stearate-*p*-nitroaniline | |
| Direct amidation | FAME | Direct amidation | FAME |
| 6 |  |  |  |  |
| 12 |  |  |  |  |
| 18 | - | - |  |  |

*SM = starting material, X = reaction mixture, LA = lipoamide*

**Table S.4.** TLC profile during synthesis of lipoamides oleate-*p*-anisidine and lipoamide oleate-*p*-nitroaniline every 6 hours for 18 hours

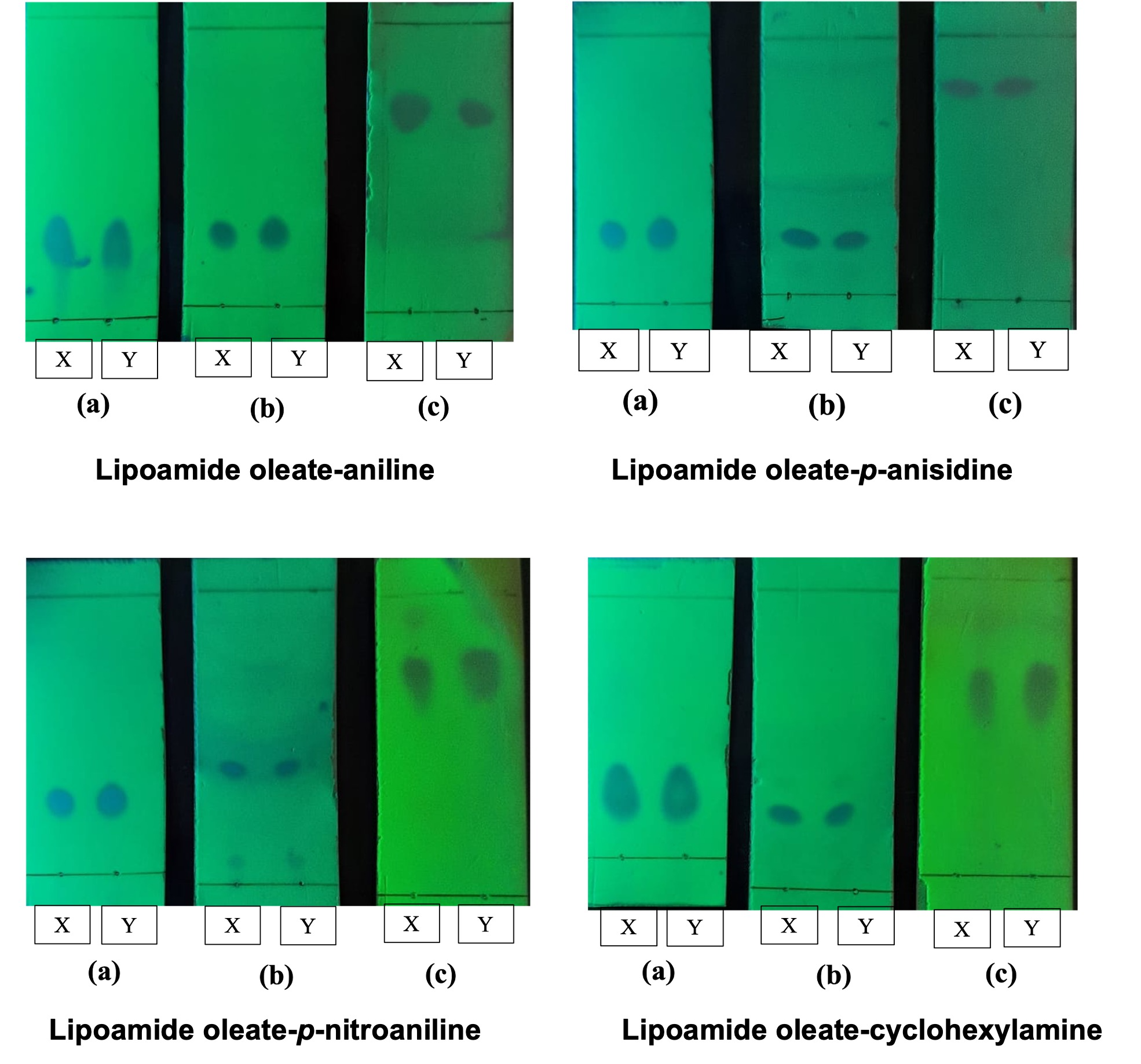
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reaction time (h) | Lipoamide oleate-*p*-anisidine | | Lipoamide oleate-*p*-nitroaniline | |
| Direct amidation | FAME | Direct amidation | FAME |
| 6 |  |  |  |  |
| 12 |  |  |  |  |
| 18 | - | - |  |  |

*SM = starting material, X = reaction mixture, LA = lipoamide*

A collage of images of different types of cyanobacterium

Description automatically generated

**Figure S.1.** TLC examination on lipoamides stearate obtained from direct amidation and via amidation of FAME using several eluent systems: toluene-ethyl acetate 95:5 (a), hexane-ethyl acetate  95:5 (b),  chloroform-methanol  95:5 (c). (X =  lipoamides obtained from direct amidation and Y = lipoamides obtained via amidation of FAME)



**Figure S.2.** TLC examination on lipoamides oleate obtained from direct amidation and via amidation of FAME using several eluent systems: toluene-ethyl acetate 95:5 (a), hexane-ethyl acetate  95:5 (b),  chloroform-methanol  95:5 (c). (X =  lipoamides obtained from direct amidation and Y = lipoamides obtained via amidation of FAME)

* 1. FTIR Spectra of Lipoamides Synthesis

|  |  |
| --- | --- |
| A graph of different types of substances  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.3.** FTIR spectra of lipoamide stearate-aniline (a) and lipoamide oleate-aniline (b) compared to its corresponding fatty acid

|  |  |
| --- | --- |
| A graph of different types of pharmacological tests  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.4.** FTIR spectra of lipoamide stearate-cyclohexylamine (a) and lipoamide oleate-cyclohexylamine (b) compared to its corresponding fatty acid

|  |  |
| --- | --- |
| A graph of different types of energy  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.5.** FTIR spectra of lipoamide stearate-*p*-anisidine (a) and lipoamide oleate-*p*-anisidine (b) compared to its corresponding fatty acid

|  |  |
| --- | --- |
| A graph of different types of minerals  Description automatically generated with medium confidence | |
| (a) | (b) |
| A graph of different types of minerals  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.6.** FTIR spectra of lipoamide stearate-*p*-nitroaniline (a) and lipoamide oleate-*p*-nitroaniline (b) compared to its corresponding fatty acid.

|  |  |
| --- | --- |
| A graph of a certain amount of water  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.7.** FTIR spectra of lipoamide stearate-aniline (a) and lipoamide oleate-aniline (b) compared to its corresponding fatty acid methyl ester.

|  |  |
| --- | --- |
| A graph of a chemical reaction  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.8.** FTIR spectra of lipoamide stearate-cyclohexylamine (a) and lipoamide oleate-cyclohexylamine (b) compared to its corresponding fatty acid methyl ester.

|  |  |
| --- | --- |
| A graph of a couple of graphs  Description automatically generated with medium confidence | |
| (a) | (b) |

**Figure S.9.** FTIR spectra of lipoamide stearate-*p*-anisidine (a) and lipoamide oleate-*p*-anisidine (b) compared to its corresponding fatty acid methyl ester.

|  |  |
| --- | --- |
| A graph of different types of chlorophyll  Description automatically generated | |
| (a) | (b) |

**Figure S.10.** FTIR spectra of lipoamide stearate-*p*-nitroaniline (a) and lipoamide oleate-*p*-nitroaniline (b) compared to its corresponding fatty acid methyl ester.