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Supplementary Material

Effect of alternation of chloropropoxy- and propoxy-units and impact of the ethylol-groups number on properties of surfactants

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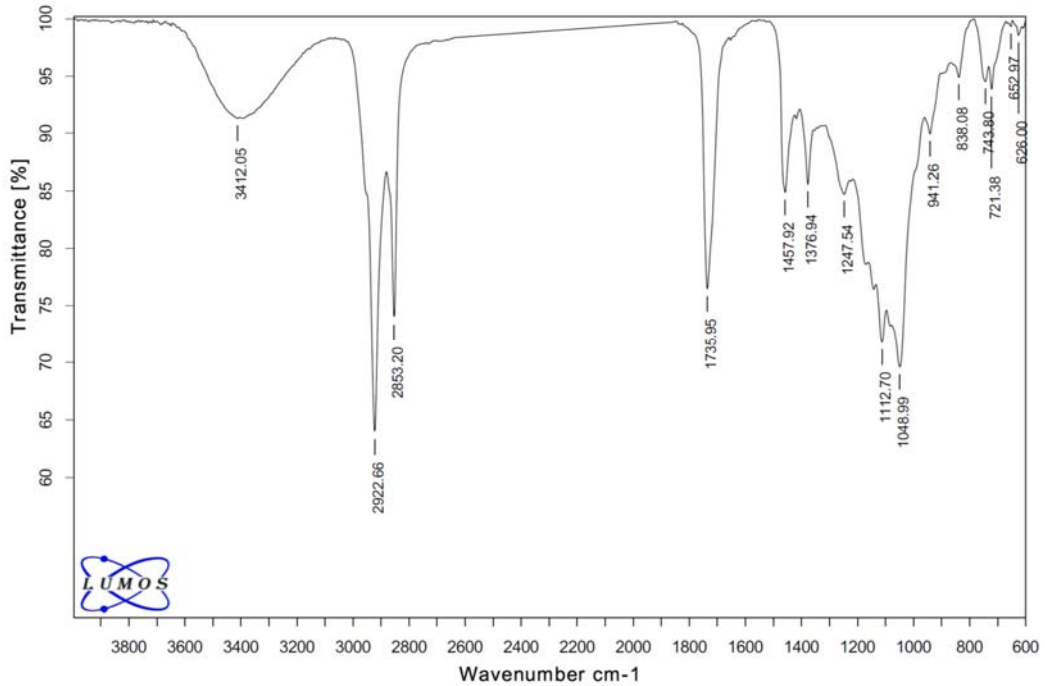

Figure S1. IR spectrum of $C_{14}EP$.

FTIR spectrum of the $C_{14}EP$ (cm^{-1}): 3412 ν (OH), 2922 and 2853 ν (CH), 1735 ν (O–C=O), 1457 and 1376 δ(CH), 1048–1112 (C–O), 744 ν (CH_2Cl), 721 δ $(CH_2)_n$.

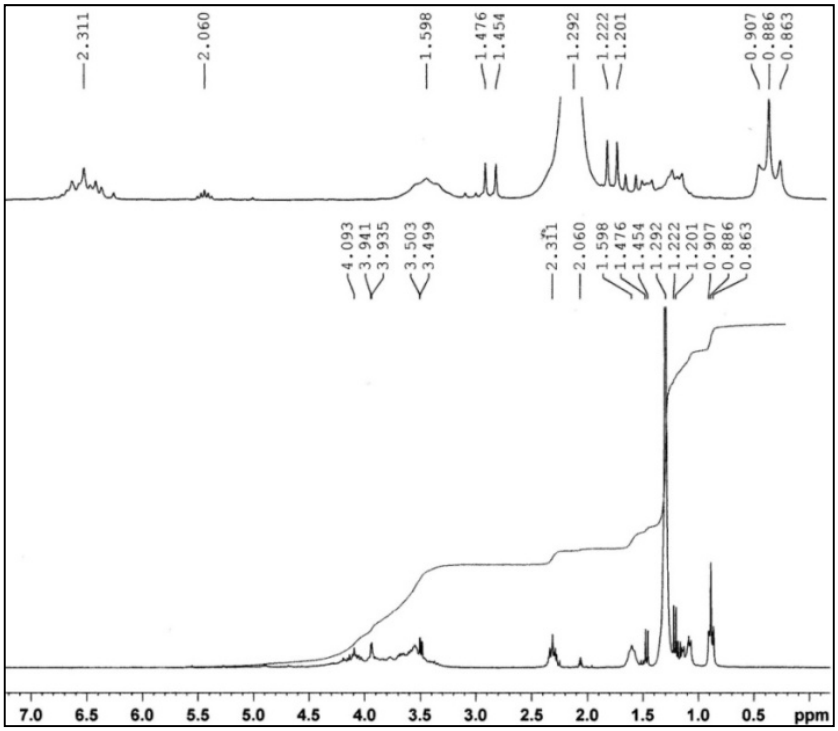

Figure S2. ^{1}H-NMR spectrum of $C_{14}EP$.

^{1}H NMR spectrum of the $C_{14}EP$ (300.18 MHz, acetone-d_6) (δ, ppm): 0.86-0.91 ($C\underline{H}_3$), 1.2 ($CH–C\underline{H}_3$), 1.29 ($C\underline{H}_2$ alkyl chain), 1.60 ($C\underline{H}_2–CH_2–COO$), 2.31 ($C\underline{H}_2–COO$), 3.4–3.6 ($CH_2–C\underline{H}–O$), ($CH_2Cl$), 3.9–4.1 [$C(O)–O–C\underline{H}_2–CH$].

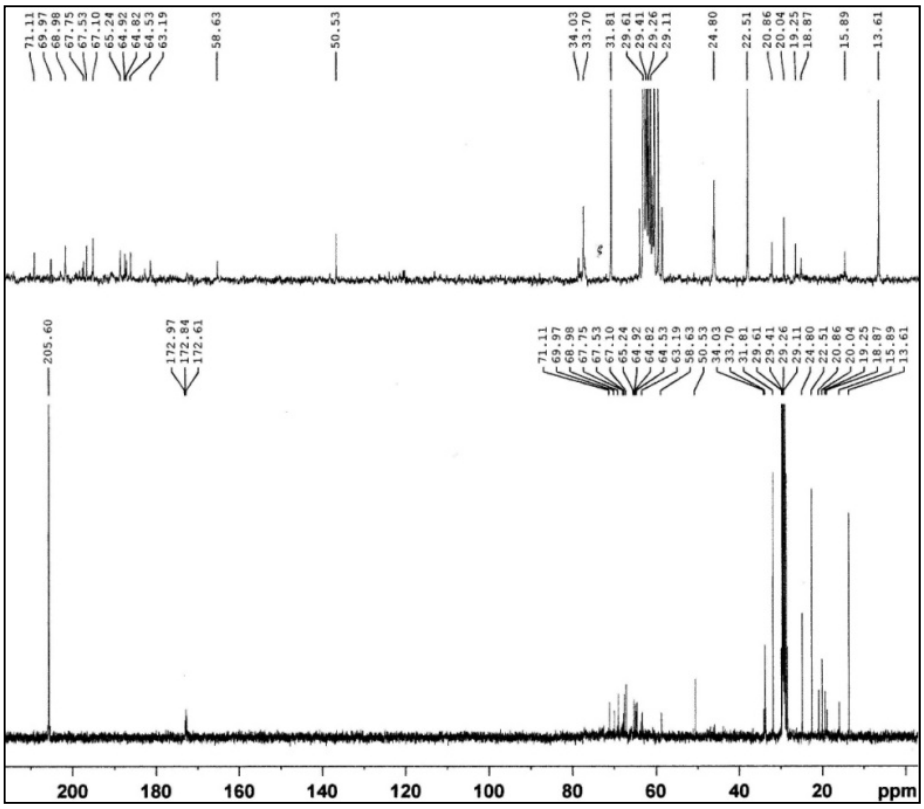

Figure S3. ^{13}C-NMR spectrum of C_{14}EP.

^{13}C NMR spectrum of the C_{14}EP (75.49 MHz, acetone-d_6) (δ, ppm): 13.6 ($\underline{C}H_3$), 15.9-19.2 ($\underline{C}H_3$–CH), 20.0-22.5 ($\underline{C}H_2$–CH_3), 24.8 ($\underline{C}H_2$–CH_2–COO), 29.1–29.6 $(\underline{C}H_2)_n$, 31.9 ($\underline{C}H_2$–CH_2–CH_3), 33.7–34.0 ($\underline{C}H_2$–COO), 50.5 ($\underline{C}H_2Cl$), 58.6–71.1 (O–$\underline{C}H_2$–$\underline{C}$H–O), 172.6-173.0 ($\underline{C}$OO).

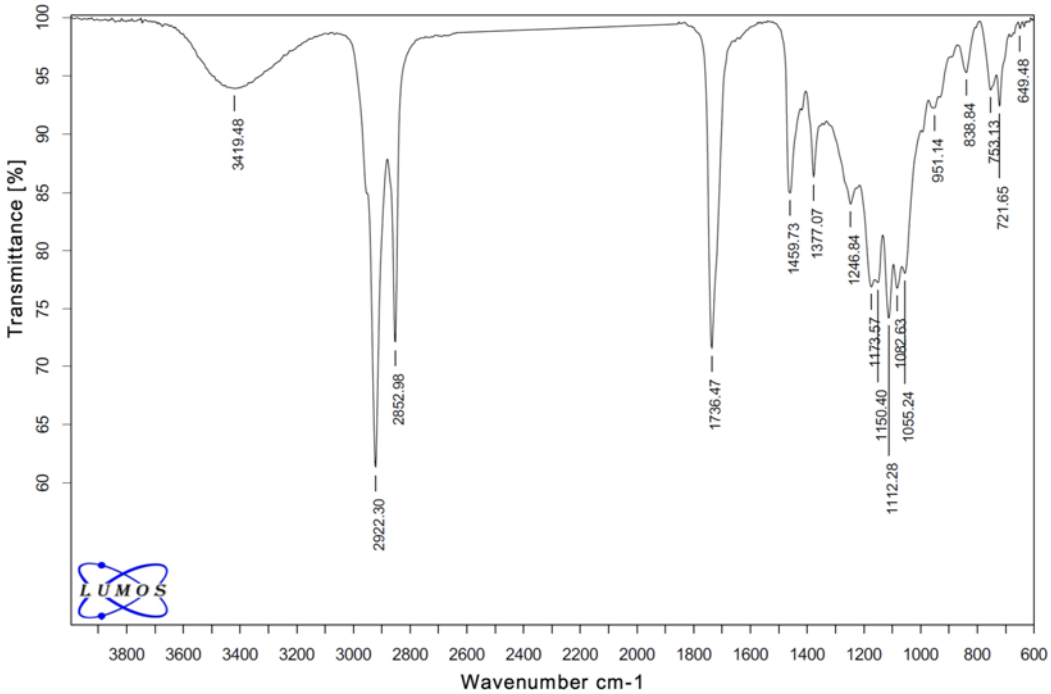

Figure S4. IR spectrum of C_{14}PE.

FTIR spectrum of the C_{14}PE (cm^{-1}): 3419 ν (OH), 2922 and 2852 ν (CH), 1736 ν (O–C=O), 1459 and 1377 δ (CH), 1055–1112 (C–O), 753 ν (CH_2Cl), 721 δ $(CH_2)_n$.

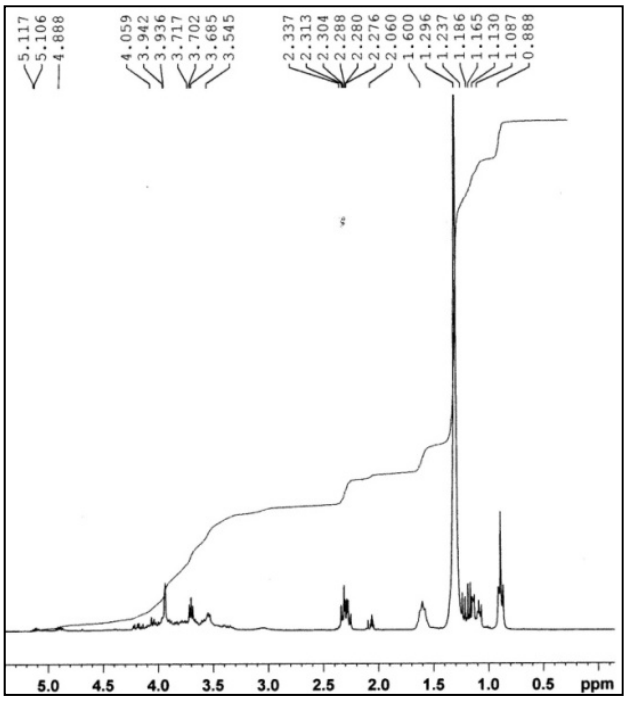

Figure S5. ^{1}H-NMR spectrum of C_{14}PE.

^{1}H NMR spectrum of the C_{14}PE (300.18 MHz, acetone-d_6) (δ, ppm): 0.89 (C<u>H</u>$_3$), 1.1-1.13 (CH–C<u>H</u>$_3$), 1.23-1.29 (C<u>H</u>$_2$ alkyl chain), 1.60 (C<u>H</u>$_2$–CH$_2$–COO), 2.28-2.33 (C<u>H</u>$_2$–COO), 3.6–3.7 (CH$_2$−C<u>H</u>–O), 3.9–4.1 [C(O)–O–C<u>H</u>$_2$–CH], 5.1 (O<u>H</u>).

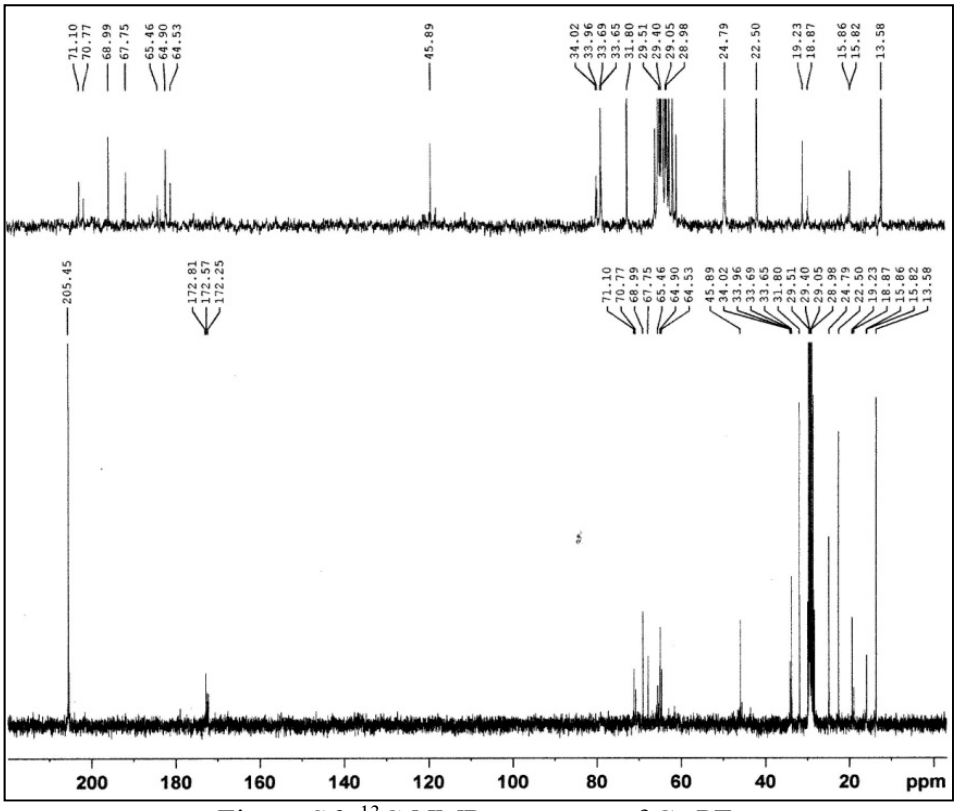

Figure S6. ^{13}C-NMR spectrum of C_{14}PE.

^{13}C NMR spectrum of the C_{14}PE (75.48 MHz, acetone-d_6) (δ, ppm): 14.1 (<u>C</u>H$_3$), 18.8-19.2 (<u>C</u>H$_3$–CH), 22.5 (<u>C</u>H$_2$–CH$_3$), 24.8 (<u>C</u>H$_2$–CH$_2$–COO), 28.9–29.5 (<u>C</u>H$_2$)$_n$, 31.8 (<u>C</u>H$_2$–CH$_2$–CH$_3$), 33.7–34.0 (<u>C</u>H$_2$–COO), 45.9 (<u>C</u>H$_2$Cl), 64.5–71.1 (O–<u>C</u>H$_2$–<u>C</u>H–O), 172.3-172.8 (<u>C</u>OO).

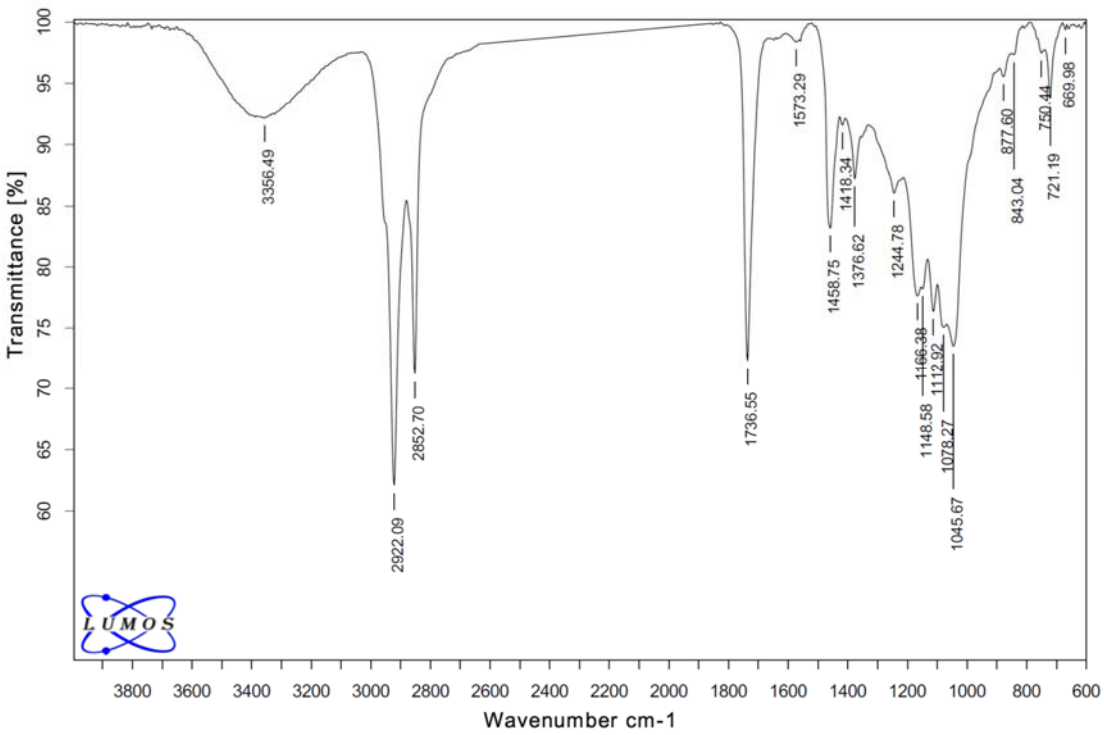

Figure S7. IR spectrum of C_{14}EPMD.

FTIR spectrum of the C_{14}PEMD (cm^{-1}): 3356 ν (OH), 2922 and 2852 ν (CH), 1736 ν (O–C=O), 1458 and 1376 δ(CH), 1045–1112 (C–O), 721 δ $(CH_2)_n$.

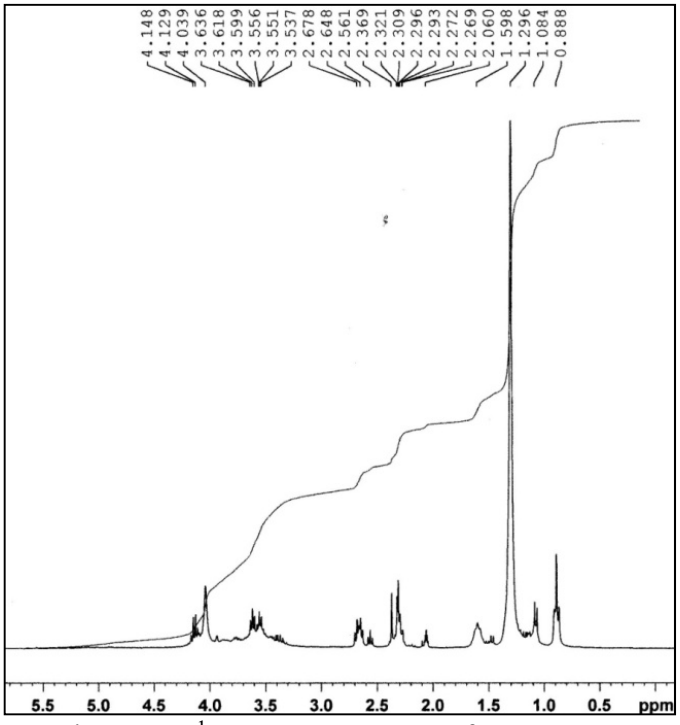

Figure S8. ^{1}H-NMR spectrum of C_{14}EPMD.

^{1}H NMR spectrum of the C_{14}EPMD (300.18 MHz, acetone-d_6) (δ, ppm): 0.89 ($C\underline{H}_3$), 1.08 ($CH–C\underline{H}_3$), 1.29 ($C\underline{H}_2$ alkyl chain), 1.60 ($C\underline{H}_2–CH_2–COO$), 2.27-2.37 ($C\underline{H}_2–COO$) ($N^+$-$C\underline{H}_3$), 3.5–4.2 ($CH_2–C\underline{H}–O$), [C(O)–O–$C\underline{H}_2$–CH], ($C\underline{H}_2–C\underline{H}_2–OH$).

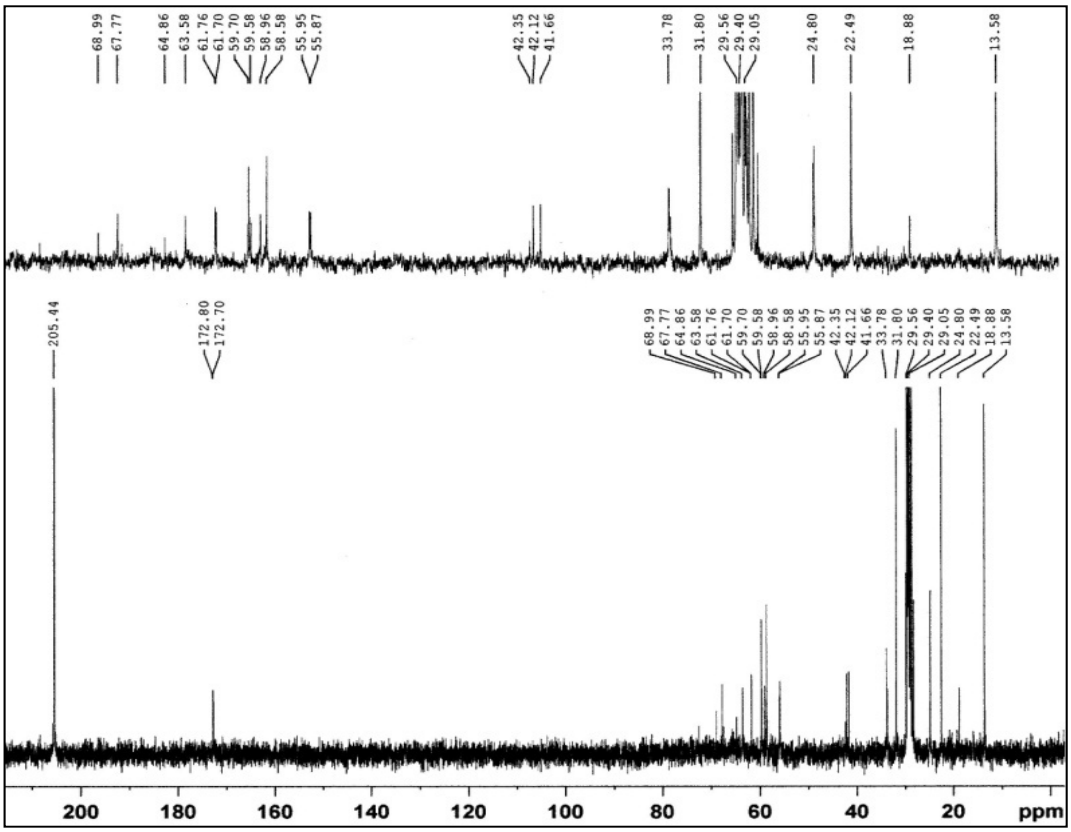

Figure S9. ^{13}C-NMR spectrum of C_{14}EPMD.

^{13}C NMR spectrum of the C_{14}PE (75.48 MHz, acetone-d_6) (δ, ppm): 13.6 (<u>C</u>H$_3$), 18.9 (<u>C</u>H$_3$–CH), 22.5 (<u>C</u>H$_2$–CH$_3$), 24.8 (<u>C</u>H$_2$–CH$_2$–COO), 29.1–29.6 (<u>C</u>H$_2$)$_n$, 31.8 (<u>C</u>H$_2$–CH$_2$–CH$_3$), 33.8 (<u>C</u>H$_2$–COO), 55.9 (N-<u>C</u>H$_3$), 58.6–69.0 (O–<u>C</u>H$_2$–<u>C</u>H–O), 172.7-172.8 (<u>C</u>OO).

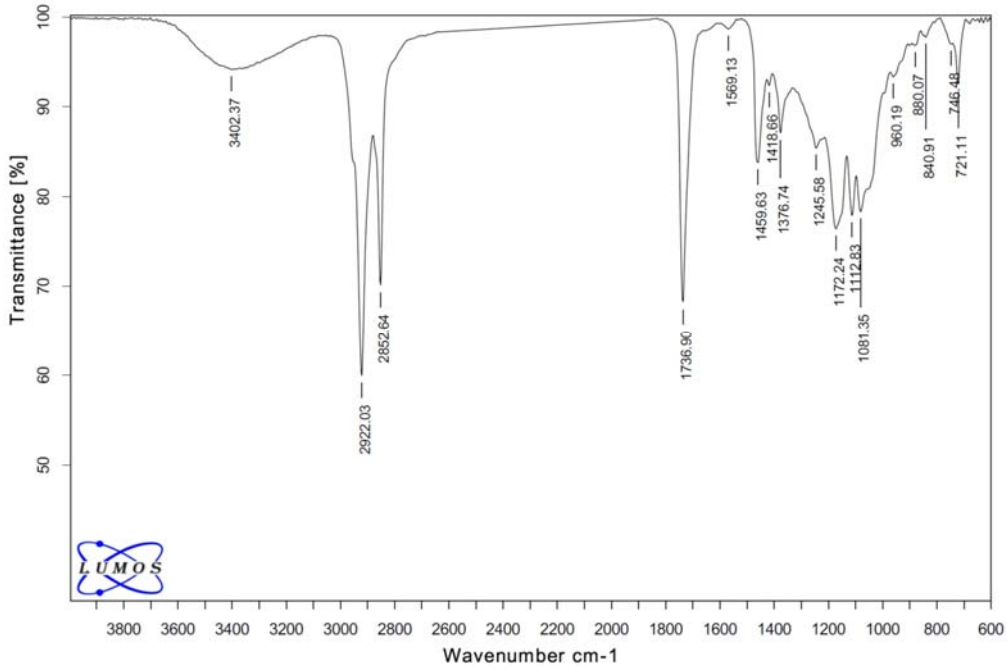

Figure S10. IR spectrum of C_{14}PEMD.

FTIR spectrum of the C_{14}PEMD (cm^{-1}): 3402 ν (OH), 2922 and 2852 ν (CH), 1736 ν (O–C=O), 1459 and 1376 δ(CH), 1081–1112 (C–O), 721 δ (CH$_2$)$_n$.

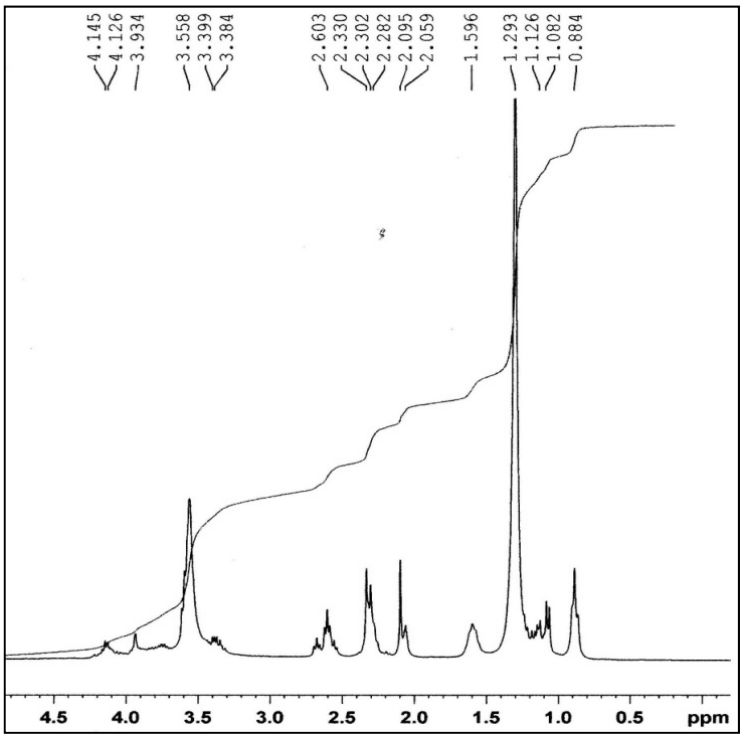

Figure S11. ^{1}H-NMR spectrum of C_{14}PEMD.

^{1}H NMR spectrum of the C_{14}PEMD (300.18 MHz, acetone-d_6) (δ, ppm): 0.88 ($C\underline{H}_3$), 1.08-1.13 ($CH–C\underline{H}_3$), 1.29 ($C\underline{H}_2$ alkyl chain), 1.6 ($C\underline{H}_2–CH_2–COO$), 2.28-2.33 ($C\underline{H}_2–COO$) ($N^+$-$C\underline{H}_3$), 3.4–4.2 ($CH_2–C\underline{H}–O$), [$C(O)–O–C\underline{H}_2–CH$], ($C\underline{H}_2–C\underline{H}_2–OH$).