**Supporting Information**

# Development of lipidated polycarbonates with broad-spectrum antimicrobial activity

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Polymer Characterization

$^1$H NMR and DP calculation for **P20** (Figure S1) is shown here as representative.[1] Peak f accounts for 2 protons from the initiator. Peak a accounts for 5 protons from M1 benzene ring on side chain, thus the average number of M1 per polymer chain equates to 42.26/5= 8.452. Peak d accounts for 4 protons from M2 methylene groups, therefore, the average number of M2 per polymer chain equates to 93.44/4=23.36.

DP is calculated by summing up these values (8.452+23.36=32) to get the average total number of monomer units per polymer chain.

$M_n$ is calculated by taking the molecular weight of each monomer and multiplying by the number of each of the relevant monomer, and adding the molecular weight of the initiator. $M_n$ for **P20** equates to 250.25 (molecular weight of M1) * 8.452 + 203.19 (molecular weight of M2) * 23.36 + 214.39 (molecular weight of tetradecanol) = 7076.02 (2 significant figures).

**Table S1: $^1$H NMR and MALDI analysis of the synthesized polymers.**

| Polymer | $M_n$[a] | DP[b] | PDI[c] |
|---|---|---|---|
| **P1** | 4586.64 | 21 | 1.07 |
| **P2** | 4103.56 | 19 | 1.27 |
| **P3** | 8982.15 | 43 | 1.40 |
| **P4** | 7845.81 | 37 | 1.21 |
| **P5** | 15130.80 | 71 | 1.32 |
| **P6** | 17058.28 | 79 | 1.33 |
| **P7** | 13201.34 | 61 | 1.30 |
| **P8** | 12705.62 | 56 | 1.30 |
| **P9** | 8079.43 | 36 | 1.30 |
| **P10** | 15464.73 | 69 | 1.72 |
| **P11** | 8185.56 | 35 | 1.43 |
| **P12** | 8555.92 | 39 | 1.03 |
| **P13** | 14997.90 | 65 | 1.81 |
| **P14** | 5419.38 | 26 | 1.39 |

| | | | |
|---|---|---|---|
| **P15** | 3654.93 | 16 | 1.32 |
| **P16** | 8184.90 | 39 | 1.38 |
| **P17** | 6493.09 | 29 | 1.66 |
| **P18** | 8090.21 | 37 | 1.45 |
| **P19** | 8172.30 | 40 | 1.27 |
| **P20** | 7076.02 | 32 | 1.56 |
| **P21** | 9953.64 | 43 | - |
| **P22** | 6880.77 | 30 | 1.26 |
| **P23** | 11571.92 | 56 | 1.21 |
| **P24** | 10975.12 | 50 | 1.28 |
| **P25** | 7370.46 | 35 | 1.82 |
| **P26** | 8333.59 | 37 | 1.36 |
| **P27** | 5906.15 | 25 | 1.49 |
| **P28** | 13886.63 | 60 | - |

a: $M_n$: number average molecular weight.

b: DP: degree of polymerization, determined by $^1$H NMR peak integration analysis as described.

c: PDI: polydispersity, calculated by MALDI-TOF.[2]

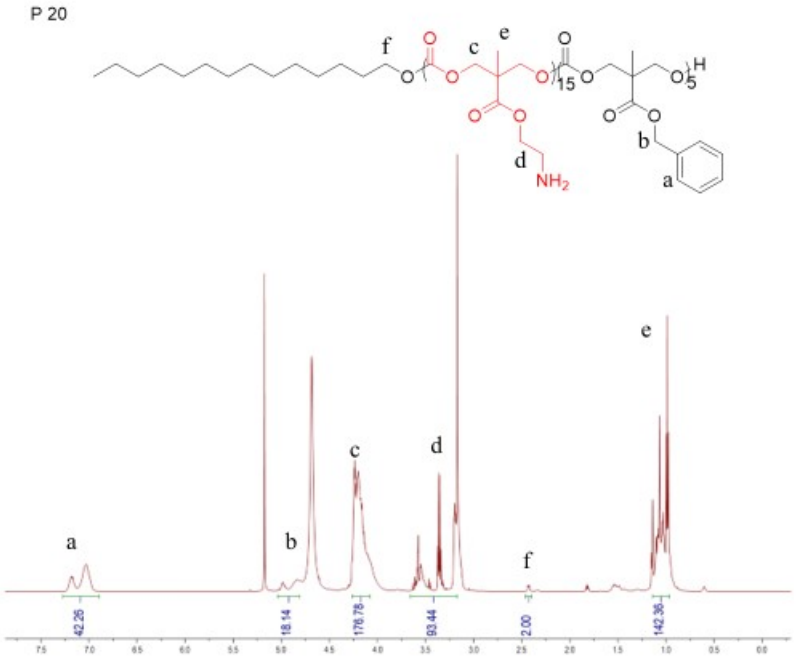


**Figure S1:** $^1$H NMR (600 MHz, $D_2O$) spectrum of **P20.**

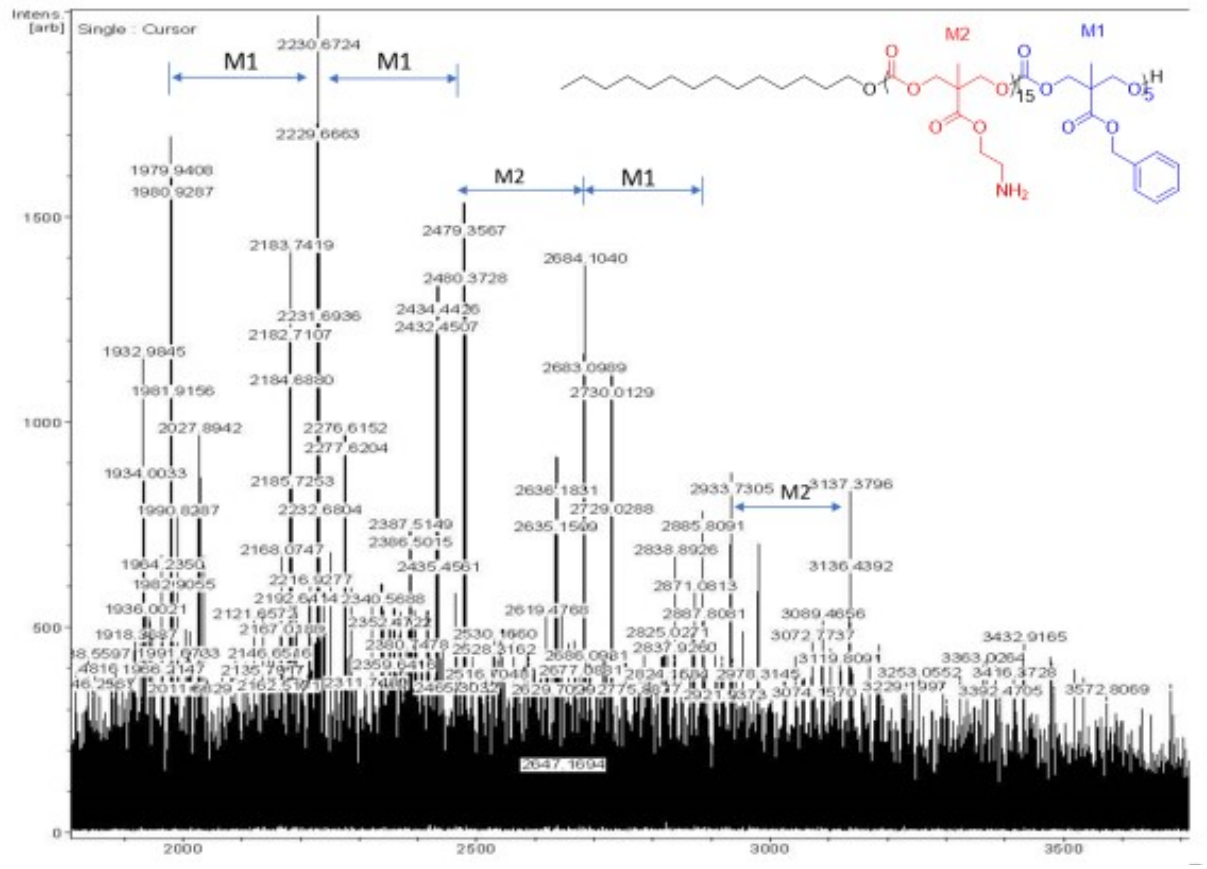


**Figure S2:** MALDI spectrum for **P20**. Mass between two nearby peaks belongs to the mass of M1 or M2.

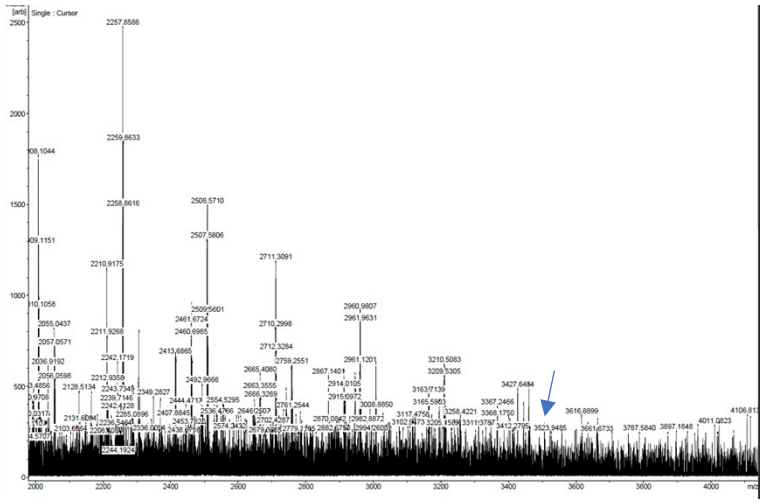

**Figure S3**: MALDI spectrum for **P7**. The expected m/z was observed from the spectrum (blue arrow).

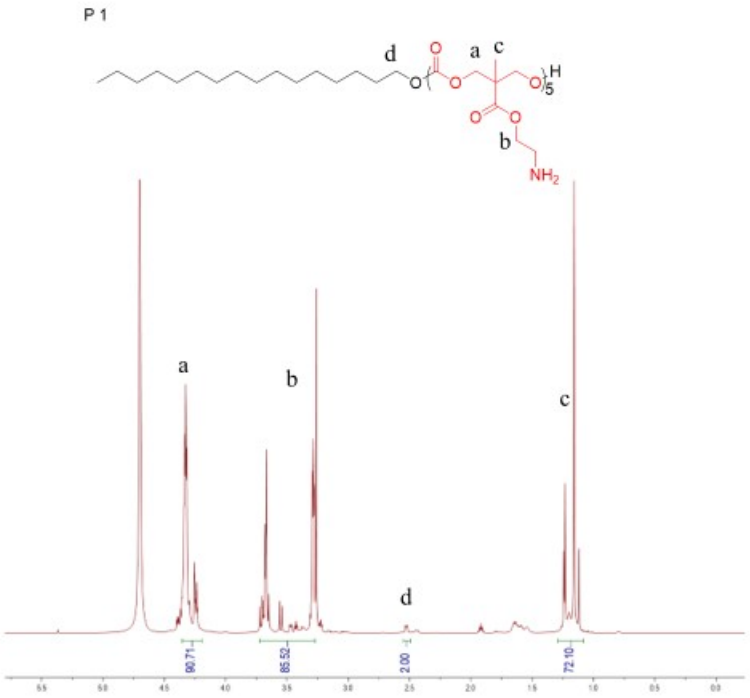


**Figure S4**: $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P1.**

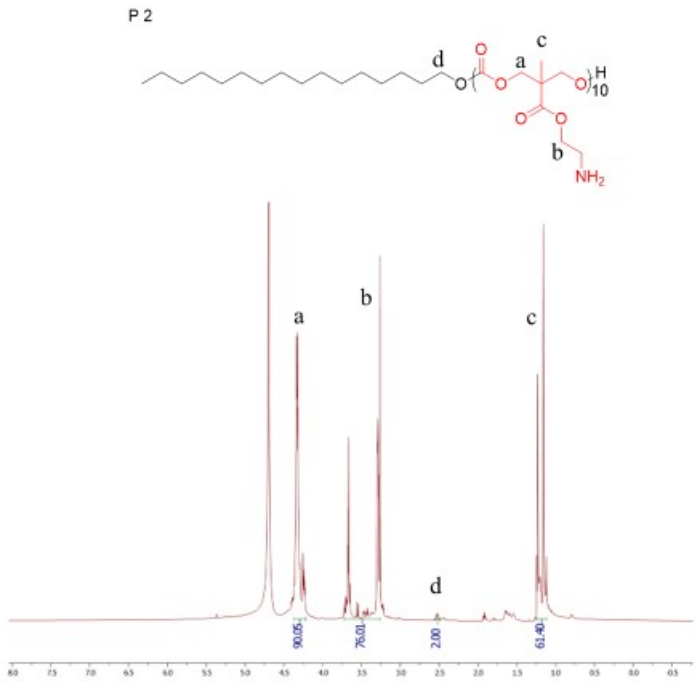


**Figure S5:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P2.**

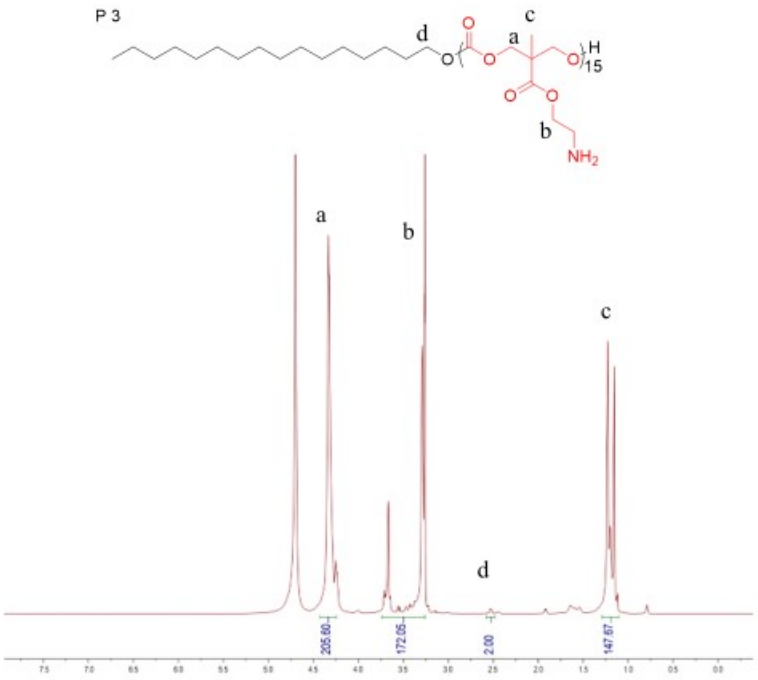


**Figure S6:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P3.**

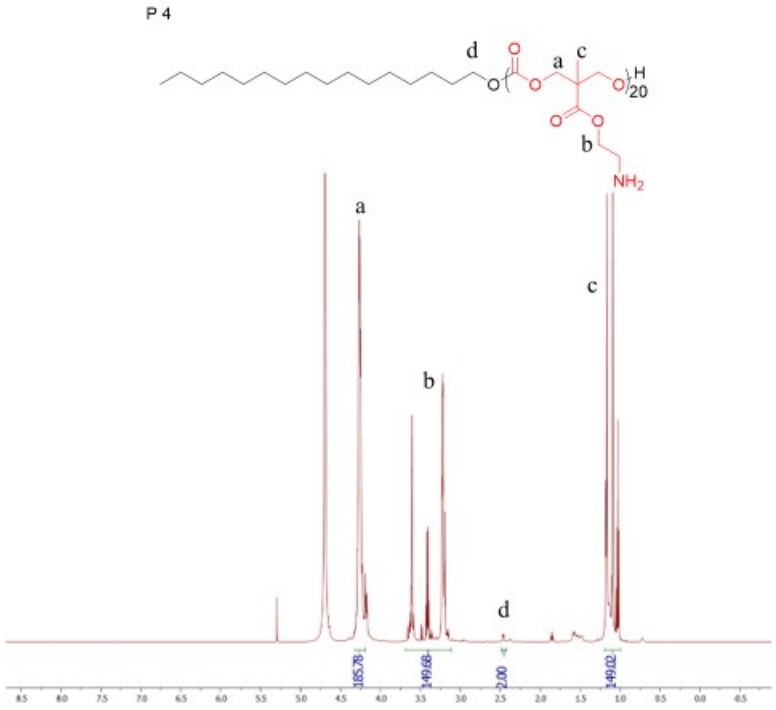


**Figure S7:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P4.**

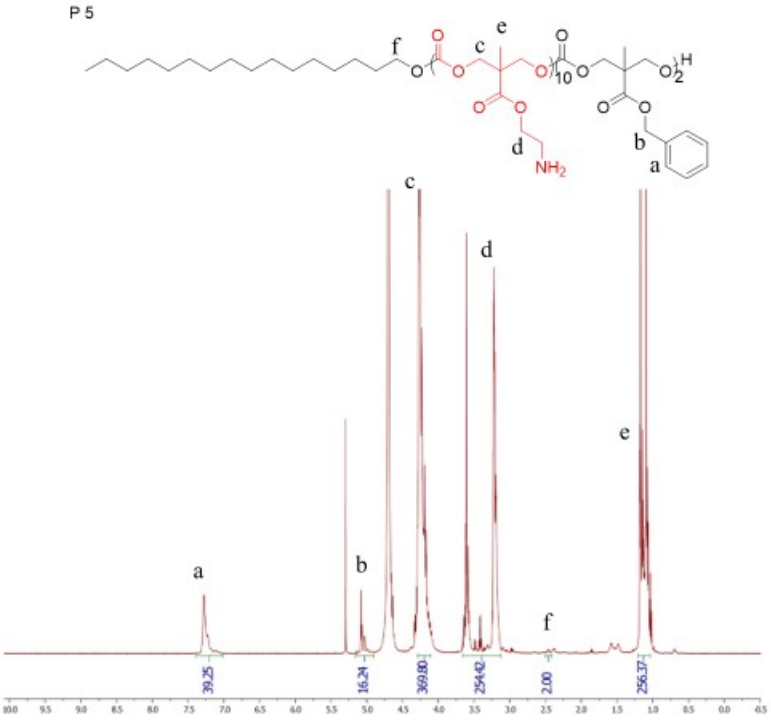


**Figure S8:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P5.**

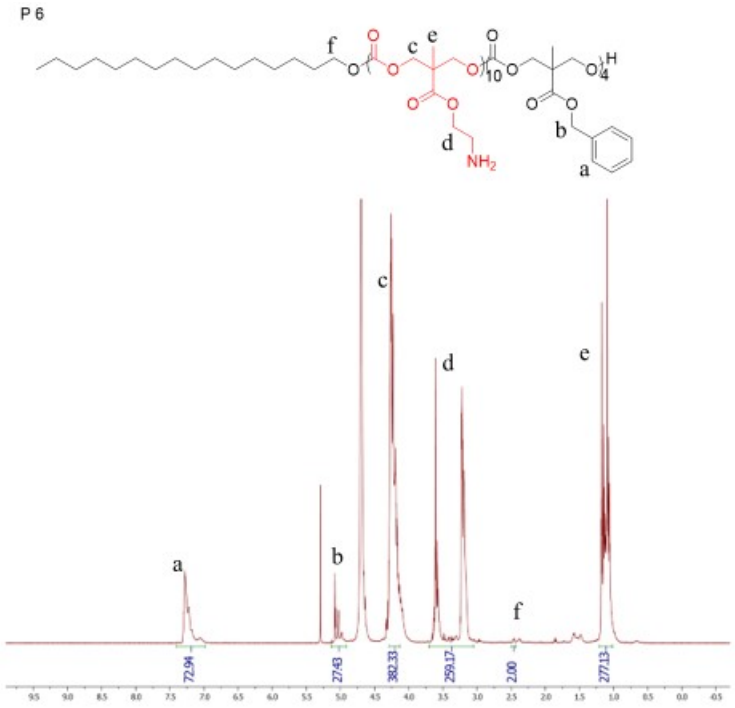


**Figure S9:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P6.**

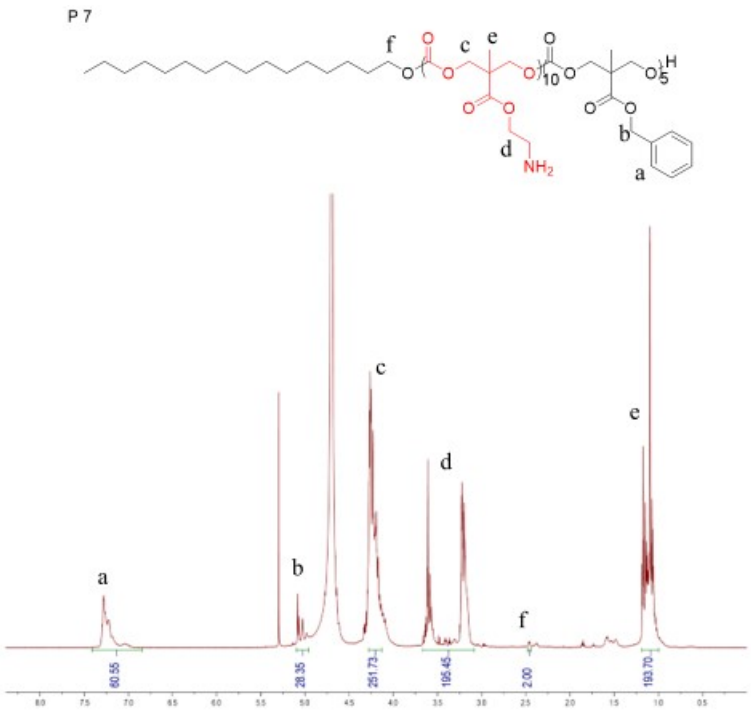


**Figure S10:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P7.**

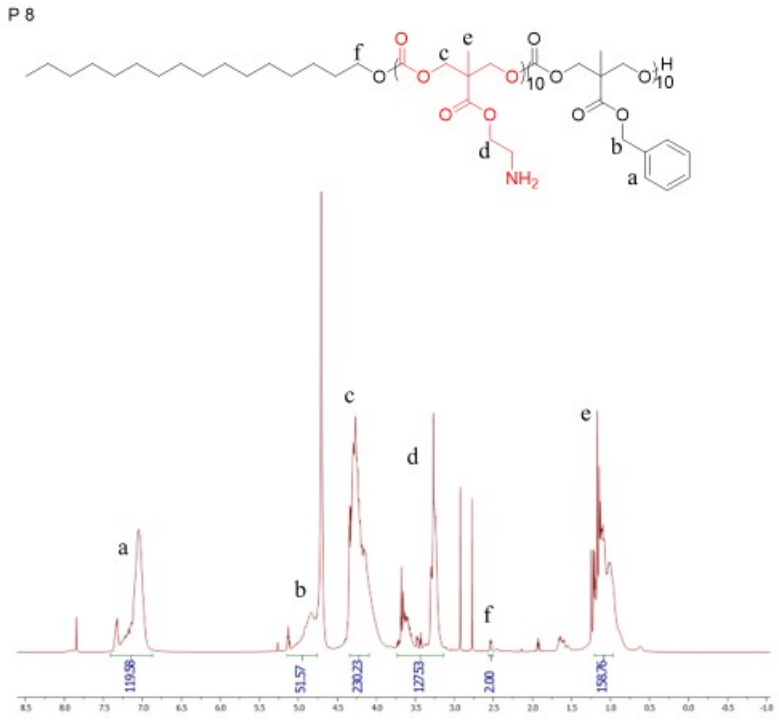


**Figure S11:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P8.**

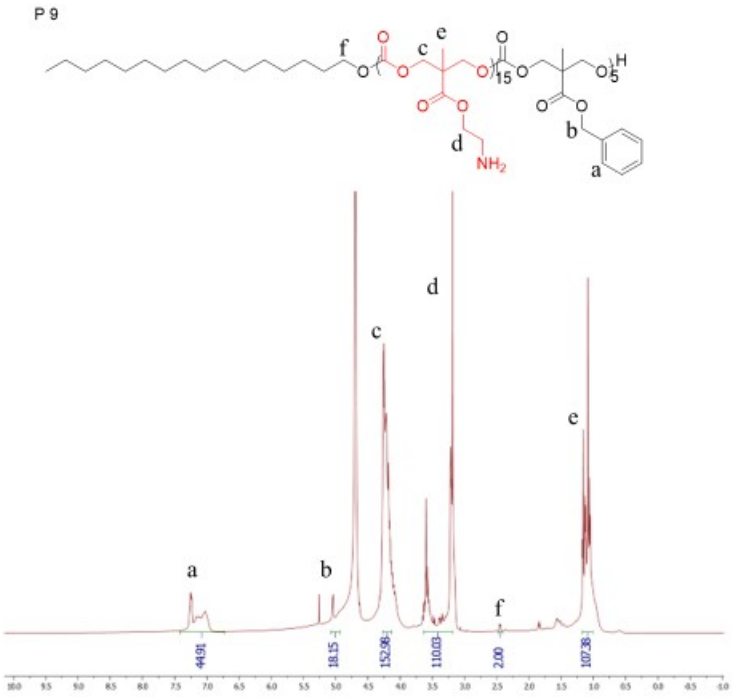


**Figure S12:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P9.**

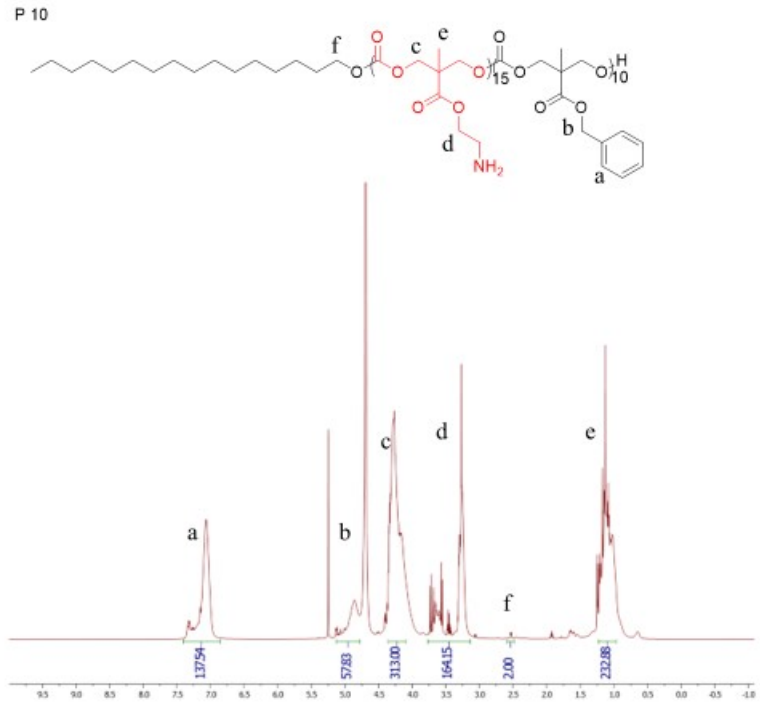


**Figure S13:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P10.**

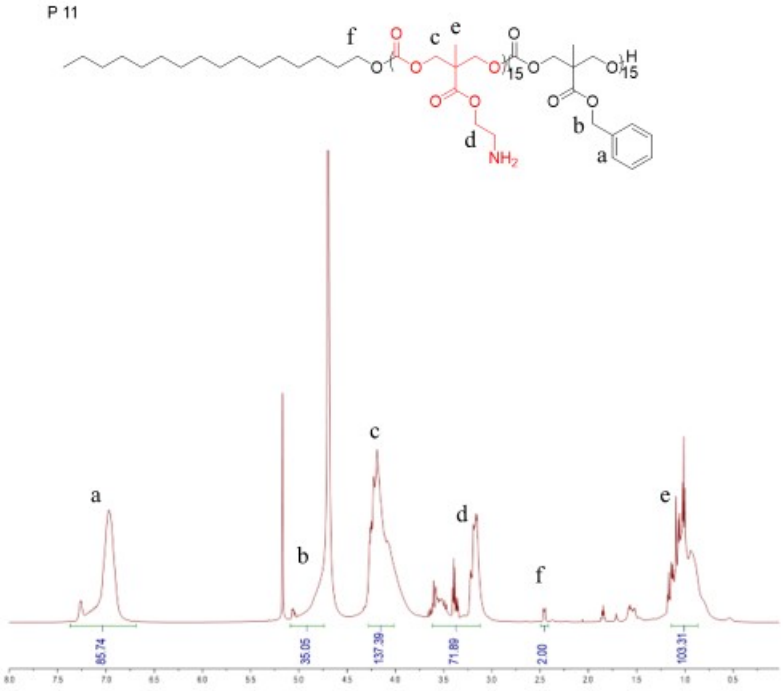


**Figure S14:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P11.**

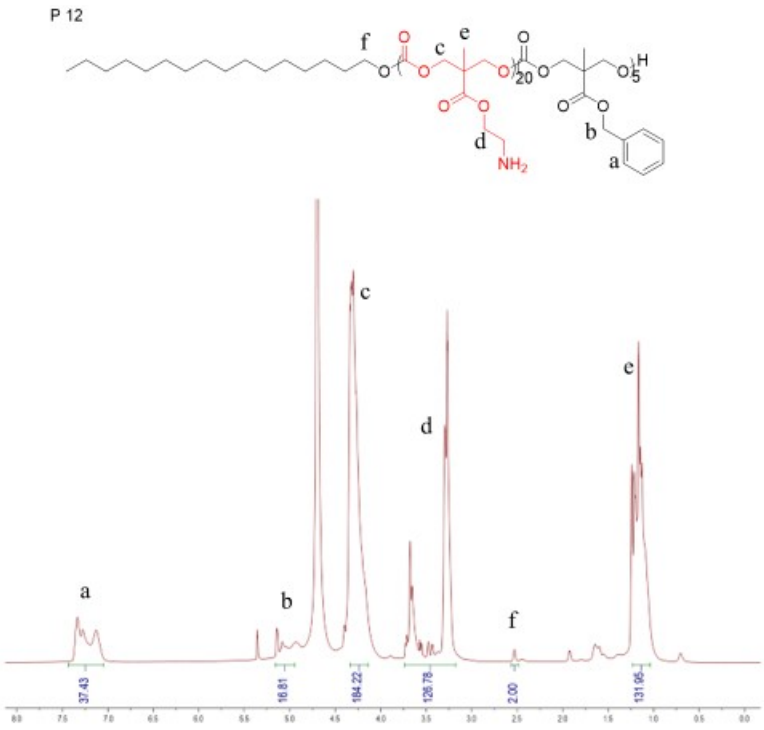


**Figure S15:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P12.**

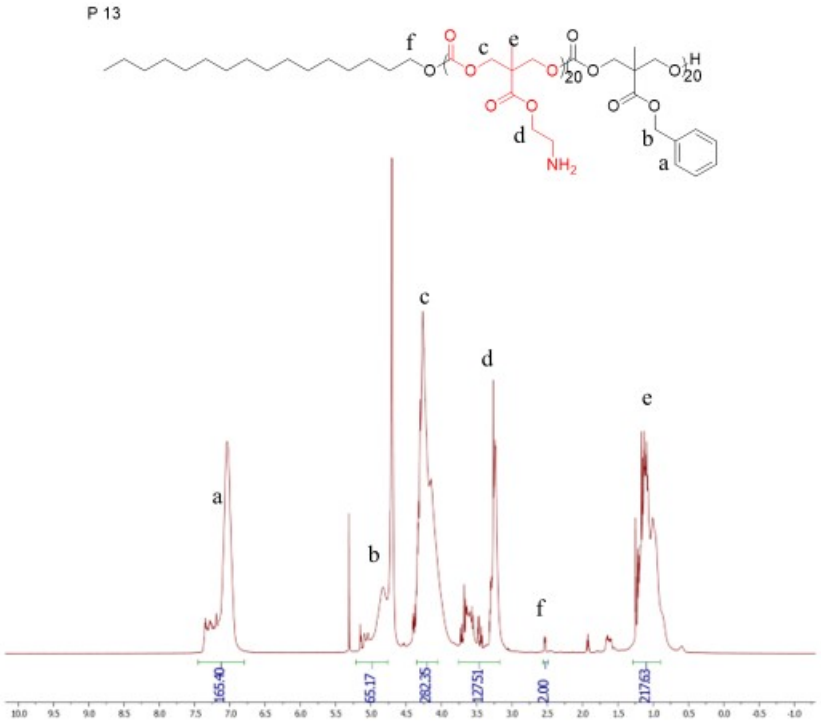


**Figure S16:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P13.**

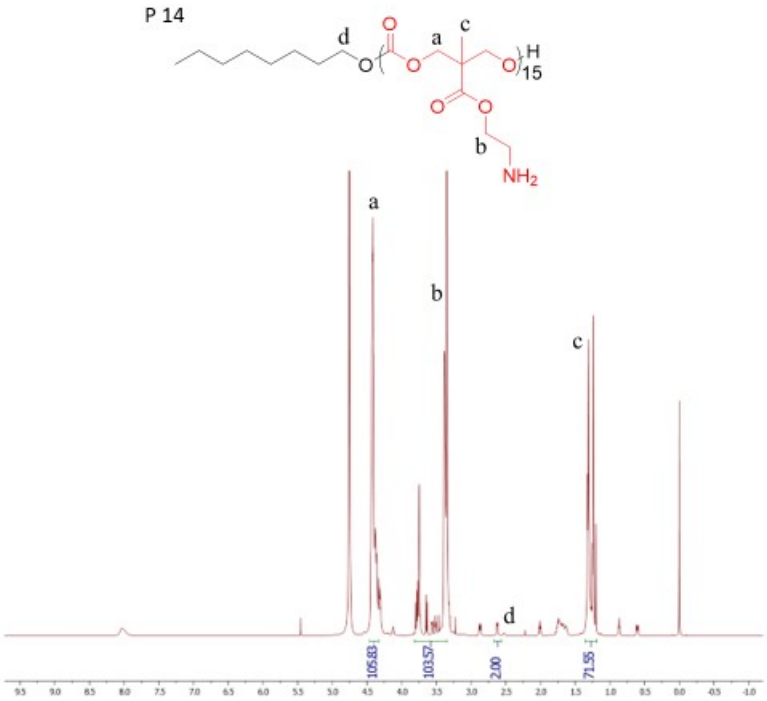


**Figure S17:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P14.**

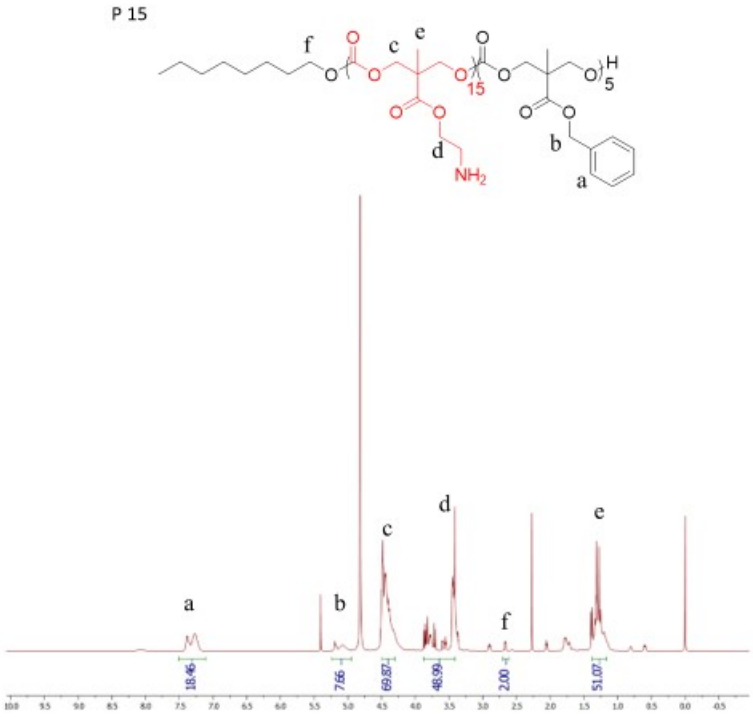


**Figure S18:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P15.**

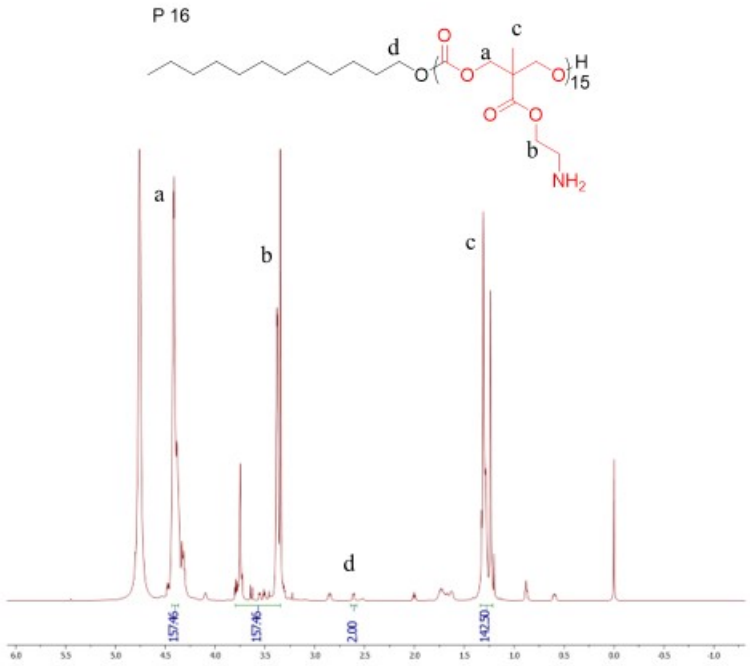


**Figure S19:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P16.**

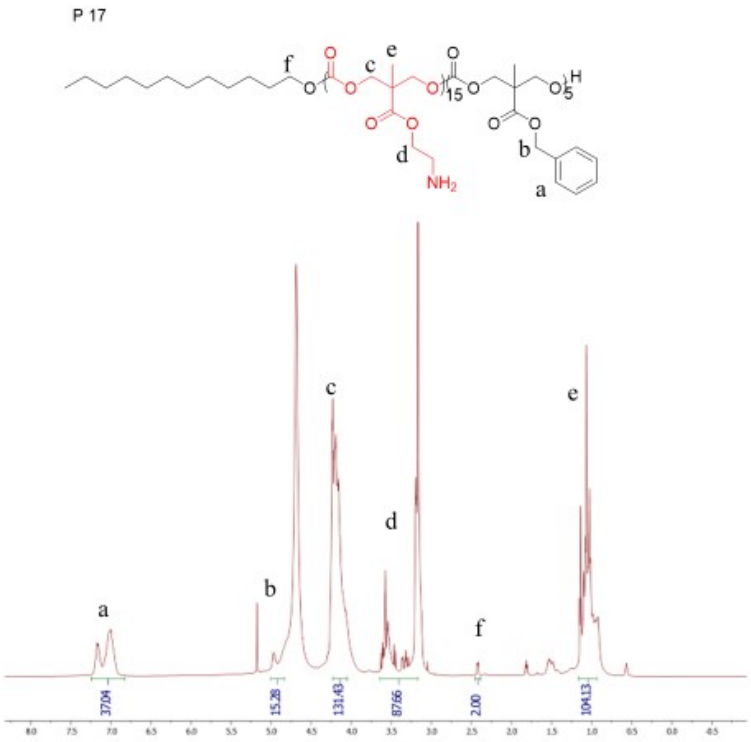


**Figure S20:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P17.**

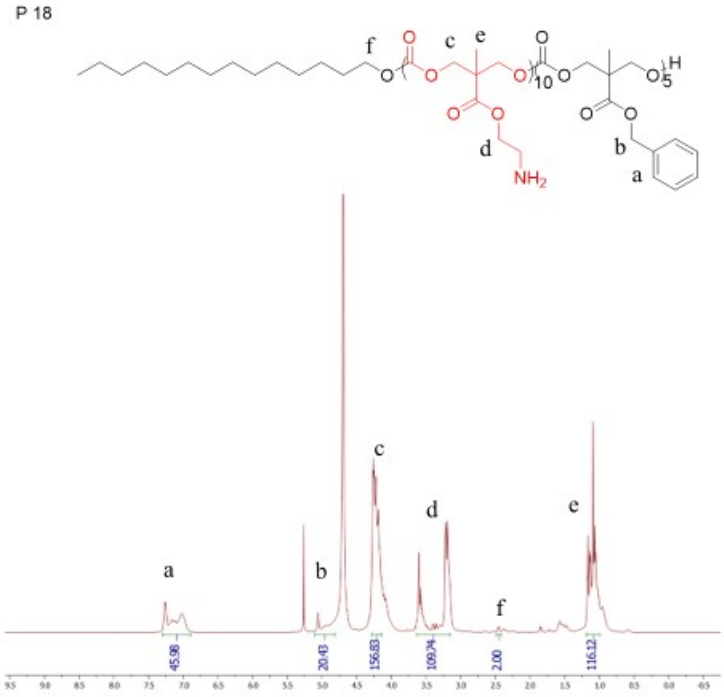


**Figure S21:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P18.**

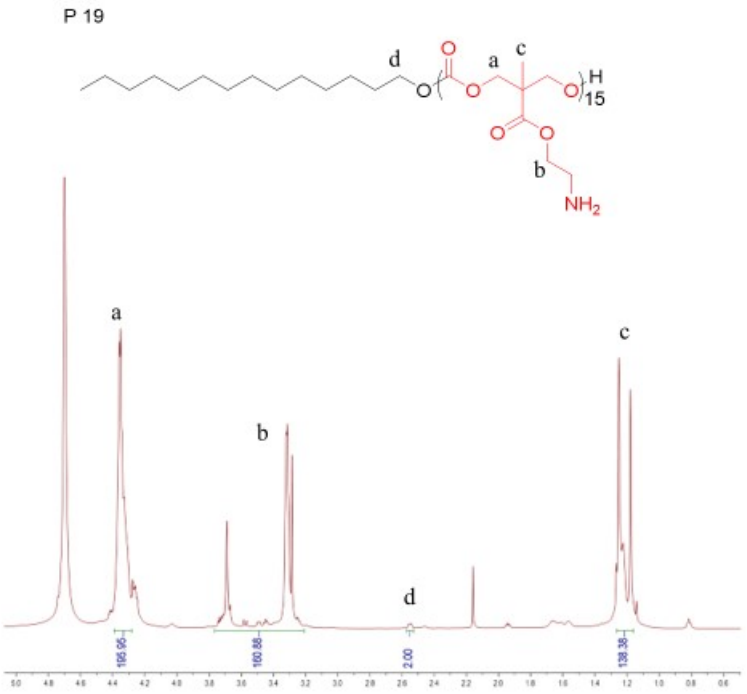


**Figure S22:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P19.**

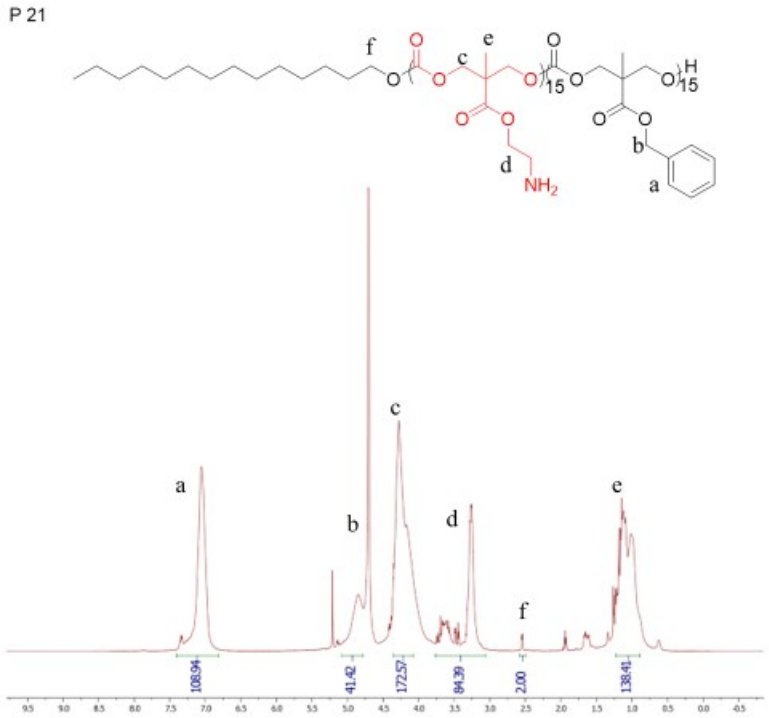


**Figure S23:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P21.**

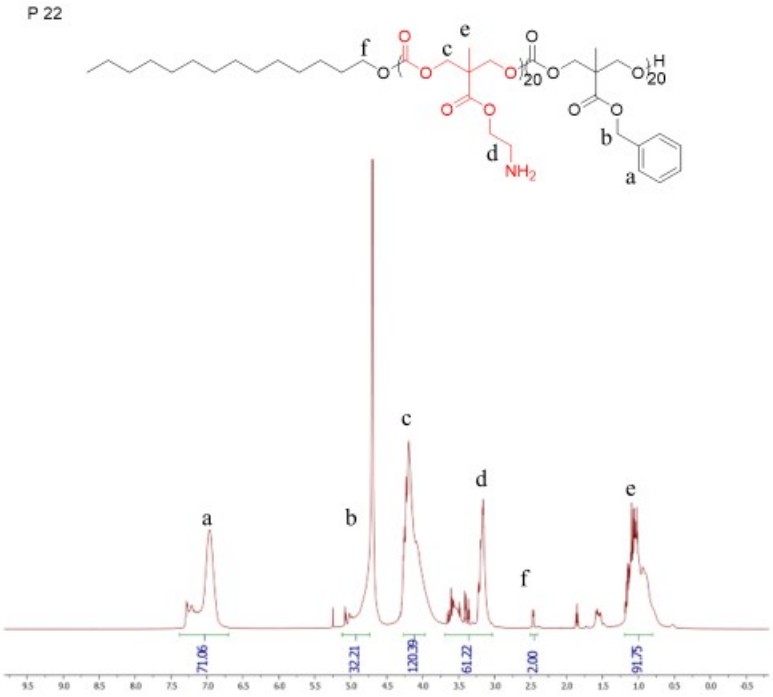


**Figure S24:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P22.**

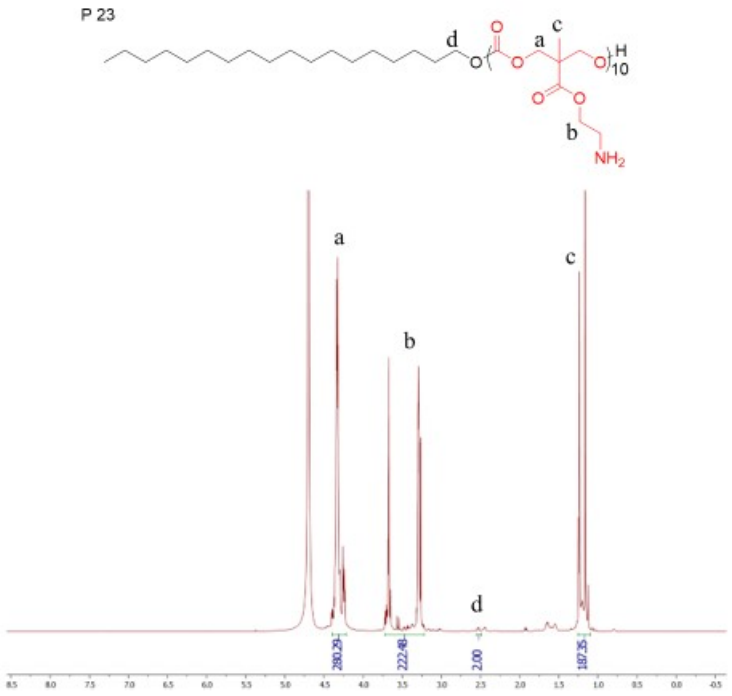


**Figure S25:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P23.**

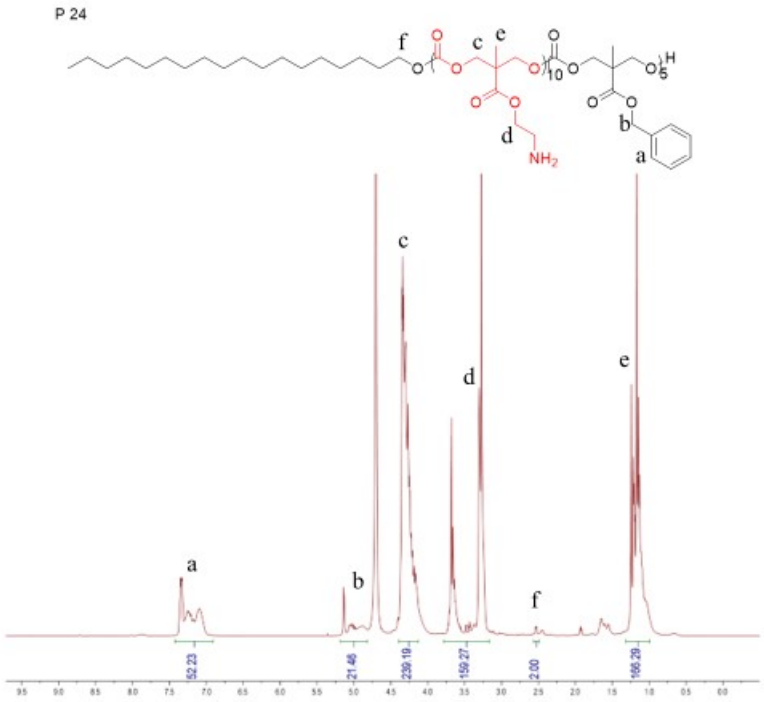


**Figure S26:** $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P24.**

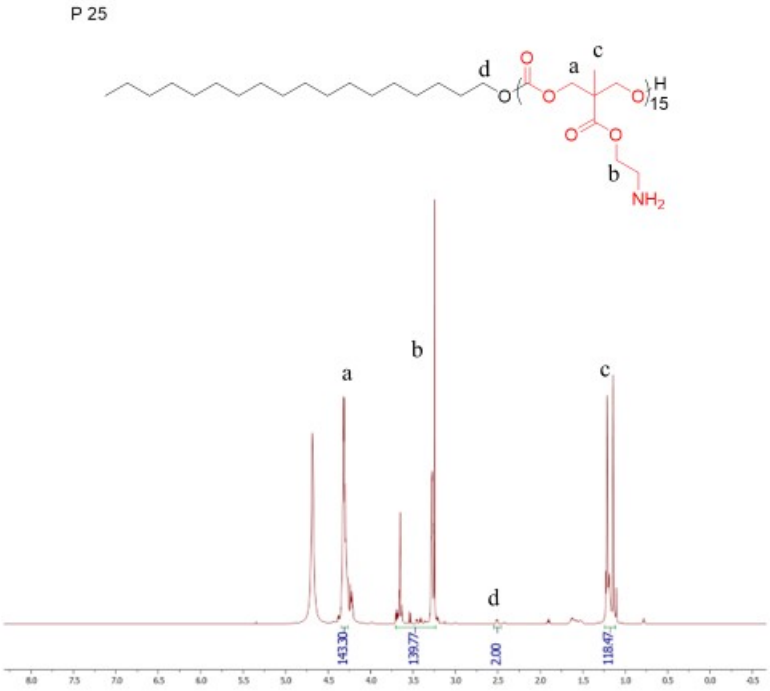


**Figure S27:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P25.**

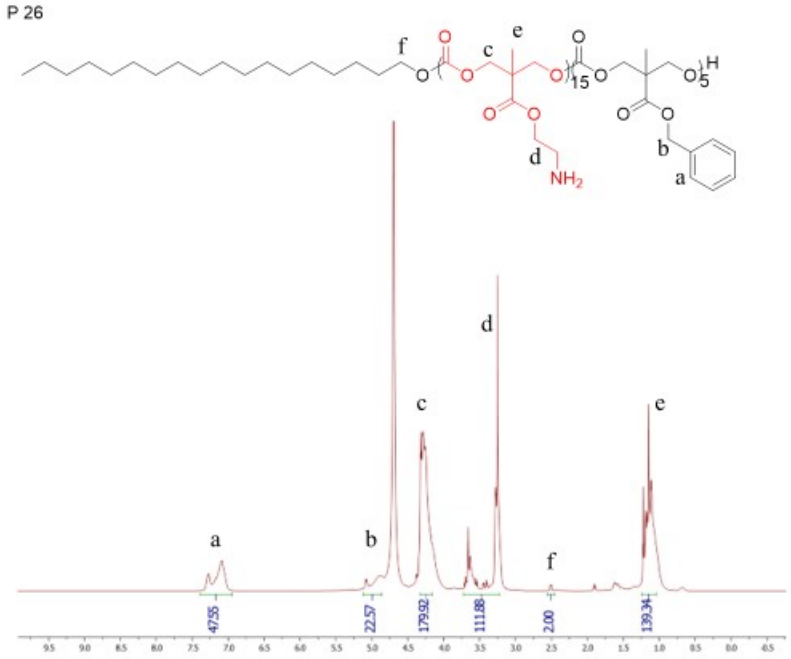


**Figure S28**: $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P26.**

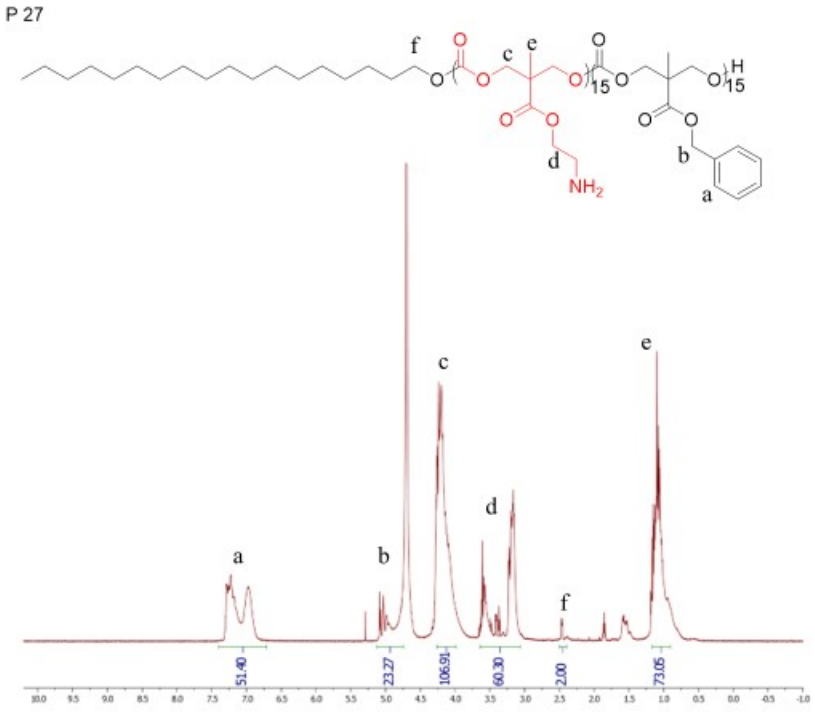


**Figure S29**: $^{1}H$ NMR (600 MHz, $D_2O$) spectrum of **P27.**

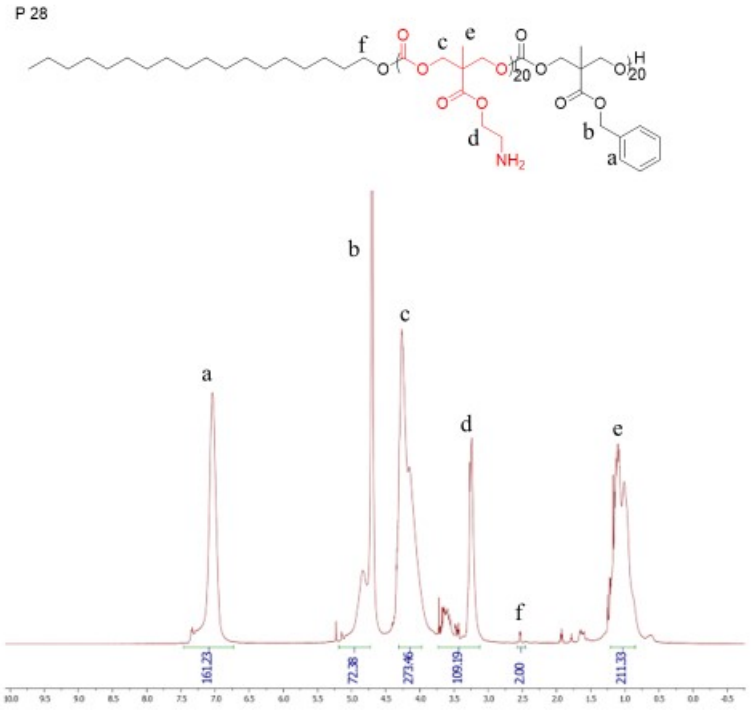


**Figure S30:** $^{1}$H NMR (600 MHz, $D_2O$) spectrum of **P28.**

References

1. K. E. S. Locock, T. D. Michl, N. Stevens, J. D. Hayball, K. Vasilev, A. Postma, H. J. Griesser, L. Meagher and M. Haeussler, *ACS Macro Letters*, 2014, **3**, 319-323.
2. H. Räder and W. Schrepp, *Acta Polymerica*, 1998, **49**, 272-293.