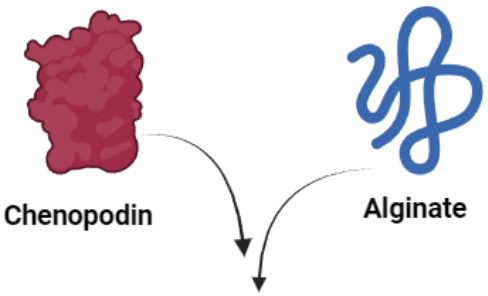
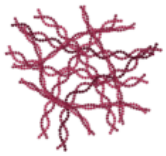
# Supplementary material




| | Size (nm) | PDI | Zeta potential (mV) | Proportion in QPA complex |
|---|---|---|---|---|
| Chenopodin (QP) | 59.8 | 0.421 | -31.0 | 0.6 |
| Alginate (Alg) | 743.9 | 0.616 | -59.6 | 0.4 |

***** Evaluated at pH 6.0 and 25°C

Calculated values
Size = 333.4 nm
PDI = 0.499
Zeta potential = -42.4 mV



QPA complex

***Calculation example:***

$$\text{Calculated size}^{*} = \left(\text{QP size} \times \text{Proportion of QP in the QPA complex}\right) + \left(\text{alginate size} \times \text{Proportion of Alg in the QPA complex}\right)$$

***** Calculated PDI and calculated zeta potential are obtained in the same way

**Figure S1.** Determination of calculated values of size, PDI and zeta potential of the QPA complex

**Table S1**. Release of Qt at 8 h of study from the formulations

| | % Release at 8 h (Mean ± SD) | | | |
|---|---|---|---|---|
| | PBS1X | | Krebs | |
| **Sample** | **pH 7.4** | **pH 5.4** | **pH 7.4** | **pH 5.4** |
| **Qt libre** | 70.48 ± 4.90[a] | 62.45 ± 0.45[a*] | 64.13 ± 4.95[a] | 57.29 ± 3.13[a*] |
| **F1Qt** | 36.13 ± 1.91[b] | 35.86 ± 2.49[b] | 21.69 ± 1.99[b] | 20.32 ± 0.25[b] |
| **F4Qt** | 28.74 ± 5.87[c] | 35.90 ± 3.89[b*] | 10.76 ± 0.48[c] | 14.25 ± 0.74[b] |
| **F5Qt** | 24.56 ± 8.04[c] | 32.02 ± 5.10[b*] | 10.05 ± 0.40[c] | 13.89 ± 0.54[b] |
| **P4Qt** | 22.88 ± 1.60[c] | 32.55 ± 0.46[b*] | 14.13 ± 0.39[c] | 17.94 ± 0.37[b] |
| **P5Qt** | 20.73 ± 0.72[c] | 27.61 ± 1.91[c*] | 11.83 ± 0.94[c] | 15.91 ± 0.81[b] |

[a, b, c.] Different letters in the same column represent a significant difference ($p<0.05$)

* significant difference vs pH 7.4 in the same buffer ($p<0.05$)

**Table S2**. Release profile similarity (f2)

| Formulations | *f*2 value | Formulations | *f*2 value |
|---|---|---|---|
| **Free Qt** | | **P4Qt with QP/Tw80 (60/40)** | |
| PBS1X-7.4 and PBS1X-5.4 | 48 | PBS1X-7.4 and PBS1X-5.4 | 64 |
| Krebs-7.4 and Krebs-5.4 | 53 | Krebs-7.4 and Krebs-5.4 | 78 |
| PBS1X-7.4 and Krebs-7.4 | 53 | PBS1X-7.4 and Krebs-7.4 | 55 |
| PBS1X-5.4 and Krebs-5.4 | 57 | PBS1X-5.4 and Krebs-5.4 | 50 |
| **F1Qt with Tw80** | | **F5Qt with QPA/Tw80 (70/30)** | |
| PBS1X-7.4 and PBS1X-5.4 | 73 | PBS1X-7.4 and PBS1X-5.4 | 69 |
| Krebs-7.4 and Krebs-5.4 | 88 | Krebs-7.4 and Krebs-5.4 | 83 |
| PBS1X-7.4 and Krebs-7.4 | 43 | PBS1X-7.4 and Krebs-7.4 | 50 |
| PBS1X-5.4 and Krebs-5.4 | 41 | PBS1X-5.4 and Krebs-5.4 | 48 |
| **F4Qt with QPA/Tw80 (60/40)** | | **P5Qt with QP/T80 (70/30)** | |
| PBS1X-7.4 and PBS1X-5.4 | 71 | PBS1X-7.4 and PBS1X-5.4 | 72 |
| Krebs-7.4 and Krebs-5.4 | 84 | Krebs-7.4 and Krebs-5.4 | 81 |
| PBS1X-7.4 and Krebs-7.4 | 46 | PBS1X-7.4 and Krebs-7.4 | 56 |
| PBS1X-5.4 and Krebs-5.4 | 45 | PBS1X-5.4 and Krebs-5.4 | 54 |

**Table S3.** Parameters of the Korsmeyer-Peppas mathematical model for Qt release profiles in PBS1X and Krebs buffer at pH 7.4 and 5.4.

| | PBS1X | | | | | | Krebs | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pH 7.4 | | | pH 5.4 | | | pH 7.4 | | | pH 5.4 | | |
| | n | $R^2$ | T50 (h) | n | $R^2$ | T50 (h) | n | $R^2$ | T50 (h) | n | $R^2$ | T50 (h) |
| F1Qt | 0.8499 | 0.9163 | 8.5 | 1.0102 | 0.8548 | 8.69 | 0.9377 | 0.9781 | 18.4 | 0.9871 | 0.9428 | 18.2 |
| F4Qt | 1.074 | 0.9194 | 10.4 | 1.0968 | 0.9836 | 9.1 | 1.2021 | 0.9338 | 21.7 | 1.2394 | 0.9767 | 19.3 |
| F5Qt | 0.8624 | 0.9285 | 15.2 | 1.2558 | 0.9640 | 8.5 | 0.8810 | 0.953 | 42.4 | 1.1893 | 0.9777 | 21.5 |
| P4Qt | 0.8302 | 0.9960 | 12.9 | 0.8801 | 0.9506 | 9.4 | 0.8188 | 0.931 | 29.3 | 0.9188 | 0.9483 | 21.3 |
| P5Qt | 0.7955 | 0.9567 | 14.5 | 0.8079 | 0.9771 | 13.0 | 0.8488 | 0.9213 | 28.5 | 0.8770 | 0.982 | 25.7 |

"n" is the exponent of release of the mathematical model.

**Table S4.** Parameters of the Korsmeyer-Peppas mathematical model for Qt release profiles in the presence of *B. thetaiotaomicron* and *E. coli*.

| | ***B. thetaiotaomicron*** | | | ***E. coli.*** | | |
|---|---|---|---|---|---|---|
| | n | $R^2$ | T50 (h) | n | $R^2$ | T50 (h) |
| F1Qt control | 0.7065 | 0.9683 | 28.5 | 0.8822 | 0.9047 | 19.1 |
| F4Qt control | 0.4897 | 0.9739 | 20.3 | 0.6285 | 0.9597 | 18.0 |
| P4Qt control | 0.6735 | 0.9628 | 19.6 | 0.8219 | 0.9586 | 21.3 |
| F1Qt + bacteria | 0.6308 | 0.9454 | 20.6 | 0.6974 | 0.9722 | 18.9 |
| F4Qt + bacteria | 0.6416 | 0.9891 | 6.2 | 0.7302 | 0.9827 | 10.9 |
| P4Qt + bacteria | 0.699 | 0.9924 | 8 | 0.8125 | 0.9849 | 11.3 |

"n" is the exponent of release of the mathematical model.