**Supplementary Information**

**Kinetic study of *in vitro* release of curcumin from chitosan biopolymer and the evaluation of biological efficacy**

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A group of graphs showing the different types of data

Description automatically generated with medium confidence[\*charitha.t@sliit.lk](mailto:*charitha.t@sliit.lk)



**Figure 1.** Fitted %CDR data for Peppas-Sahlin model of the drug composite under varying media conditions; (1-8) pH,(9-13) ionic strength,(14-17) drug concentrations

**Figure 2.** *R/F* values of Peppas-Sahlin model of the drug composite under varying media conditions; (18-25) pH,(26-30) ionic strength,(31-34) drug concentrations



**Figure 3.** Fitted %CDR data for Higuchi model of the drug composite under varying media conditions; (35-42) pH,(43-47) ionic strength,(48-51) drug concentrations

**Figure 4.** Fitted %CDR data for Zero order model of the drug composite under varying media conditions; (52-59) pH,(60-64) ionic strength,(65-68) drug concentrations



**Figure 5.** Fitted %CDR data for First order model of the drug composite under varying media conditions; (69-76) pH,(77-81) ionic strength,(82-85) drug concentrations

**Figure 6.** Fitted %CDR data for Hixson–Crowell model of the drug composite under varying media conditions; (86-93) pH,(94-98) ionic strength,(99-102) drug concentrations 

**Table 1(A).** Estimated parameters and R2 values obtained from fitting pH-dependent experimental data to kinetic models.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model/  parameters | pH 1 | pH2.5 | pH 4 | pH 5.5 | pH 7 | pH 7.4 | pH 8.5 | pH 10 |
| Korsmeyer–Peppas | | | | | | | | |
| kP | 1.3538 | 0.8471 | 1.2742 | 1.2794 | 0.9347 | 1.1286 | 1.1227 | 5.0635 |
| n | 0.2726 | 0.3273 | 0.2607 | 0.2868 | 0.3447 | 0.3298 | 0.3282 | 0.1814 |
| R2 | 0.9880 | 0.9901 | 0.9920 | 0.9891 | 0.9844 | 0.9901 | 0.9960 | 0.9773 |
| Peppas - Sahlin | | | | | | | | |
| kD | 1.3566 | 0.1573 | 0.7141 | 0.3392 | 0.4295 | 0.7126 | 0.1665 | 2.2305 |
| kR | 0.0003 | 0.7096 | 0.6513 | 1.1361 | 0.5994 | 0.5372 | 0.9995 | 2.9815 |
| m | 0.2721 | 0.1721 | 0.1565 | 0.1527 | 0.1924 | 0.1988 | 0.1689 | 0.1072 |
| R2 | 0.9880 | 0.9900 | 0.9922 | 0.9892 | 0.9845 | 0.9895 | 0.9961 | 0.9766 |
| Higuchi | | | | | | | | |
| kH | 0.3555 | 0.3065 | 0.3122 | 0.4058 | 0.3745 | 0.4144 | 0.2486 | 0.7812 |
| R2 | 0.9687 | 0.9819 | 0.9822 | 0.9799 | 0.9824 | 0.9823 | 0.9879 | 0.9336 |
| Zero order | | | | | | | | |
| K0 | 0.0151 | 0.0146 | 0.0148 | 0.0193 | 0.0179 | 0.0198 | 0.0118 | 0.0365 |
| R2 | 0.8926 | 0.9215 | 0.9195 | 0.9172 | 0.9323 | 0.9226 | 0.9308 | 0.8353 |
| First order | | | | | | | | |
| K1 | 0.0376 | 0.0331 | 0.0325 | 0.0425 | 0.0395 | 0.0441 | 0.0434 | 0.0799 |
| R2 | 0.8926 | 0.9215 | 0.9195 | 0.9172 | 0.9323 | 0.9226 | 0.9465 | 0.8353 |
| Hixson–Crowell | | | | | | | | |
| kHC | 0.0109 | 0.0095 | 0.0096 | 0.0113 | 0.0118 | 0.0129 | 0.0127 | 0.0232 |
| R2 | 0.9307 | 0.9517 | 0.9470 | 0.9468 | 0.9585 | 0.9523 | 0.9669 | 0.8826 |

**Table 1(B)**. Estimated parameters and R2 values obtained from fitting ionic strength-dependent experimental data to kinetic models.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model / parameters | 0.1M | 0.2M | 0.3M | 0.4M | 0.5M |
| Korsmeyer–Peppas | | | | | |
| kP | 0.8458 | 0.7160 | 1.1285 | 0.8869 | 1.1294 |
| n | 0.3388 | 0.3179 | 0.3167 | 0.3179 | 0.2917 |
| R2 | 0.9908 | 0.9943 | 0.9921 | 0.9926 | 0.9918 |
| Peppas - Sahlin | | | | | |
| kD | 0.5984 | 0.7040 | 0.2718 | 0.0754 | 1.1295 |
| kR | 0.3708 | 0.2100 | 0.9080 | 0.8258 | 0.0001 |
| m | 0.2061 | 0.2156 | 0.1678 | 0.1621 | 0.2916 |
| R2 | 0.9911 | 0.9951 | 0.9921 | 0.9926 | 0.9918 |
| Higuchi | | | | | |
| kH | 0.3274 | 0.2725 | 0.3836 | 0.3037 | 0.3317 |
| R2 | 0.9898 | 0.9946 | 0.9861 | 0.9859 | 0.9820 |
| Zero order | | | | | |
| K0 | 0.0141 | 0.0130 | 0.0183 | 0.0145 | 0.0158 |
| R2 | 0.9440 | 0.9526 | 0.9303 | 0.9299 | 0.9204 |
| First order | | | | | |
| K1 | 0.0347 | 0.0290 | 0.0399 | 0.0326 | 0.0350 |
| R2 | 0.9440 | 0.9526 | 0.9314 | 0.9299 | 0.9204 |
| Hixson–Crowell | | | | | |
| kHC | 0.0094 | 0.0085 | 0.0122 | 0.0097 | 0.0105 |
| R2 | 0.9652 | 0.9703 | 0.9561 | 0.9559 | 0.9487 |

**Table 1(C).** Estimated parameters and R2 values obtained from fitting experimental drug release data of different concentrations to kinetic models.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model / parameters | 2.5 mg | 5 mg | 7.5 mg | 10 mg |
| Korsmeyer–Peppas | | | | |
| kp | 1.6368 | 1.2430 | 0.9968 | 0.4276 |
| n | 0.3179 | 0.3032 | 0.2957 | 0.3652 |
| R2 | 0.9904 | 0.9948 | 0.9878 | 0.9936 |
| Peppas - Sahlin | | | | |
| kD | 0.6986 | 0.7817 | 0.6910 | 0.1248 |
| kR | 0.6701 | 0.5928 | 0.4163 | 0.3332 |
| m | 0.2129 | 0.1829 | 0.1841 | 0.1942 |
| R2 | 0.9880 | 0.9950 | 0.9883 | 0.9936 |
| Higuchi | | | | |
| kH | 0.5606 | 0.3907 | 0.2998 | 0.1932 |
| R2 | 0.9802 | 0.9898 | 0.9849 | 0.9908 |
| Zero order | | | | |
| K0 | 0.0267 | 0.0186 | 0.0143 | 0.0093 |
| R2 | 0.9173 | 0.9372 | 0.9312 | 0.9433 |
| First order | | | | |
| K1 | 0.0597 | 0.0412 | 0.0313 | 0.0219 |
| R2 | 0.9173 | 0.9372 | 0.9312 | 0.9433 |
| Hixson–Crowell | | | | |
| kHC | 0.0175 | 0.0122 | 0.0094 | 0.0061 |
| R2 | 0.9485 | 0.9601 | 0.9560 | 0.9658 |