

Supplementary Materials

Fabrication of Magnetic Molecularly Imprinted Beaded Fibers for Rosmarinic Acid

Engy M. Saad ¹, Nesrine Abdelrehim El Gohary ^{1,*}, Basma M. El-Shenawy ², Heba Handoussa ³, Anke Klingner ⁴, Mohamed Elwi ⁵, Youssef Hamed ⁶, Islam S. M. Khalil ⁷, Rasha Mohamed El Nashar ^{8,*} and Boris Mizaikoff ^{9,*}

¹ Pharmaceutical Chemistry Department, Faculty of Pharmacy and Biotechnology, German University in Cairo, Cairo 11835, Egypt; Engy.yehia@guc.edu.eg

² Pharmaceutical Technology Department, Faculty of Pharmacy and Biotechnology, German University in Cairo, Cairo 11835, Egypt; basma.el-shenawy@guc.edu.eg

³ Pharmaceutical Biology Department, Faculty of Pharmacy and Biotechnology, German University in Cairo, Cairo 11835, Egypt; heba.handoussa@guc.edu.eg

⁴ Physics Department, German University in Cairo, Cairo 11835, Egypt; anke.klingner@guc.edu.eg

⁵ Materials Engineering Department, Faculty of engineering and Materials Science, German University in Cairo, Cairo 11835, Egypt; mohamed.elwi@guc.edu.eg

⁶ Mechatronics Department, Faculty of engineering and Materials Science, German University in Cairo, Cairo 11835, Egypt; youssef.sabry@student.guc.edu.eg

⁷ Department of Biomechanical Engineering, University of Twente, 7522 NB Enschede, The Netherlands; i.s.m.khalil@utwente.nl

⁸ Chemistry Department, Faculty of Science, Cairo University, Giza 12613, Egypt

⁹ Institute of Analytical and Bioanalytical Chemistry, Ulm University, 89081 Ulm, Germany

* Correspondence: nesrine.elgohary@guc.edu.eg (N.A.E.G.); rashaelnashar@gmail.com (R.E.N.); Boris.mizaikoff@uni-ulm.de (B.M); Tel.: +20-2-25412990 (N.A.E.G.); +49-731-50-22750 (B.M.); +20-01005044622 (R.E.N.)

Received: 1 July 2020; Accepted: 25 July 2020; Published: date

Table 1. Central composite design experimental runs settings and average response values.

Run	PC (% <i>w/v</i>)	CD (cm)	FR ($\mu\text{L}/\text{min}$)	V (kV)	FD (nm)	NB (/μm^2)	BD (nm)
1	7	5	11	16	412.48	0.023500	2087.21
2	13	5	11	16	1162.23	0.000202	3848.06
3	7	13	11	16	302.38	0.029200	1791.15
4	13	13	11	16	890.32	0.000247	4010.36
5	7	5	17	16	258.41	0.028100	1698.72
6	13	5	17	16	1168.80	0.000139	2960.00
7	7	13	17	16	339.87	0.012200	2287.52
8	13	13	17	16	1201.42	0.000105	3163.56
9	7	5	11	22	454.47	0.021000	1733.38
10	13	5	11	22	1012.75	0.000097	4250.44
11	7	13	11	22	381.65	0.021500	2210.27
12	13	13	11	22	1174.42	0.000139	3249.67
13	7	5	17	22	301.11	0.023300	2106.76
14	13	5	17	22	1153.49	0.000173	1677.14
15	7	13	17	22	277.07	0.019700	1994.42
16	13	13	17	22	1213.98	0.000123	6823.00
17	10	9	14	19	1235.40	0.002220	1850.89
18	10	9	14	19	1114.84	0.002150	1748.96
19	4	9	14	19	108.19	0.226000	1474.11
20	16	9	14	19	1121.70	0.000053	5104.77
21	10	1	14	19	993.07	0.001600	3969.78
22	10	17	14	19	922.02	0.003960	5487.46
23	10	9	8	19	645.52	0.004440	2358.74
24	10	9	20	19	783.77	0.003540	3185.27
25	10	9	14	13	846.82	0.003060	1279.29
26	10	9	14	25	819.10	0.001390	2592.83
27	10	9	14	19	1220.77	0.002430	2299.21
28	10	9	14	19	1092.28	0.002080	3066.58

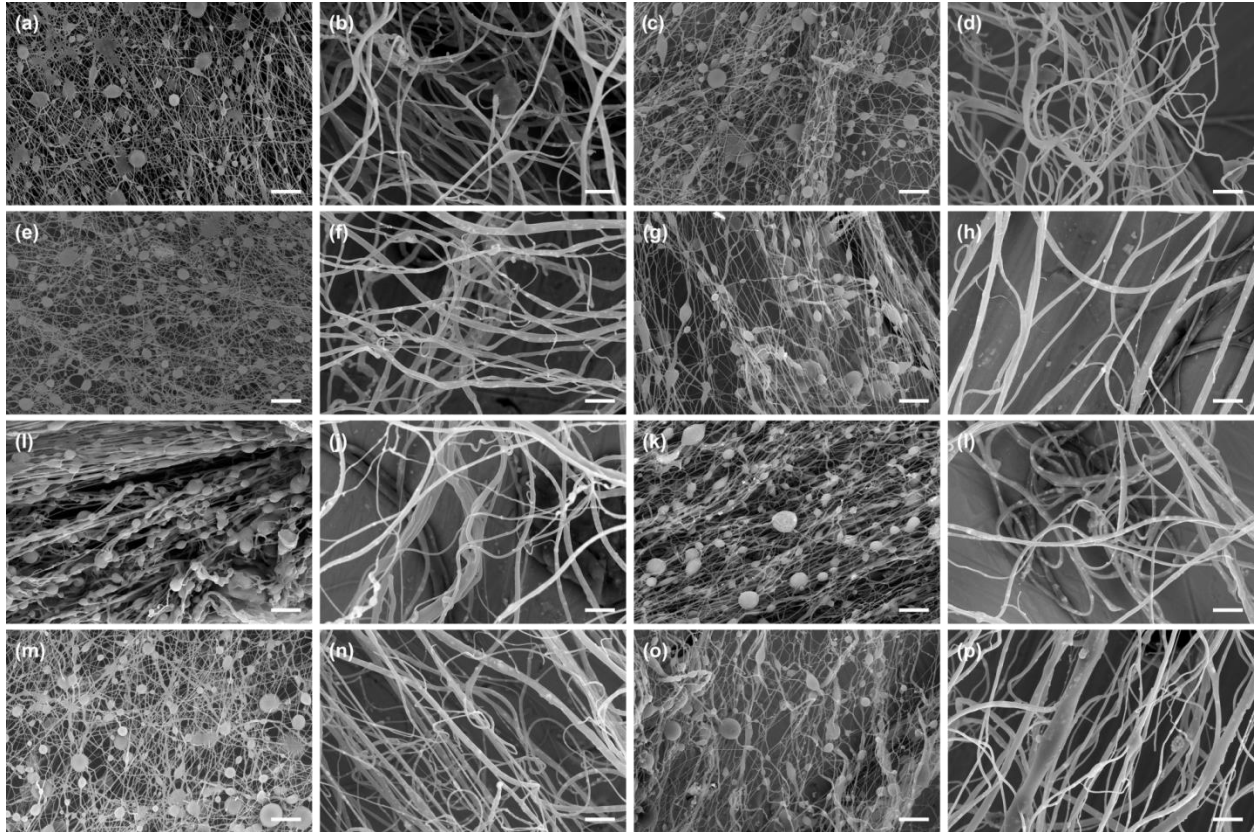


Figure S1: SEM images of runs (1–16) of central composite experimental design at 4000 \times . (a) cube point 1, (b) cube point 2, (c) cube point 3, (d) cube point 4, (e) cube point 5, (f) cube point 6, (g) cube point 7, (h) cube point 8, (i) cube point 9, (j) cube point 10, (k) cube point 11, (l) cube point 12, (m) cube point 13, (n) cube point 14, (o) cube point 15, (p) cube point 16. Scale bar is 10 μm .

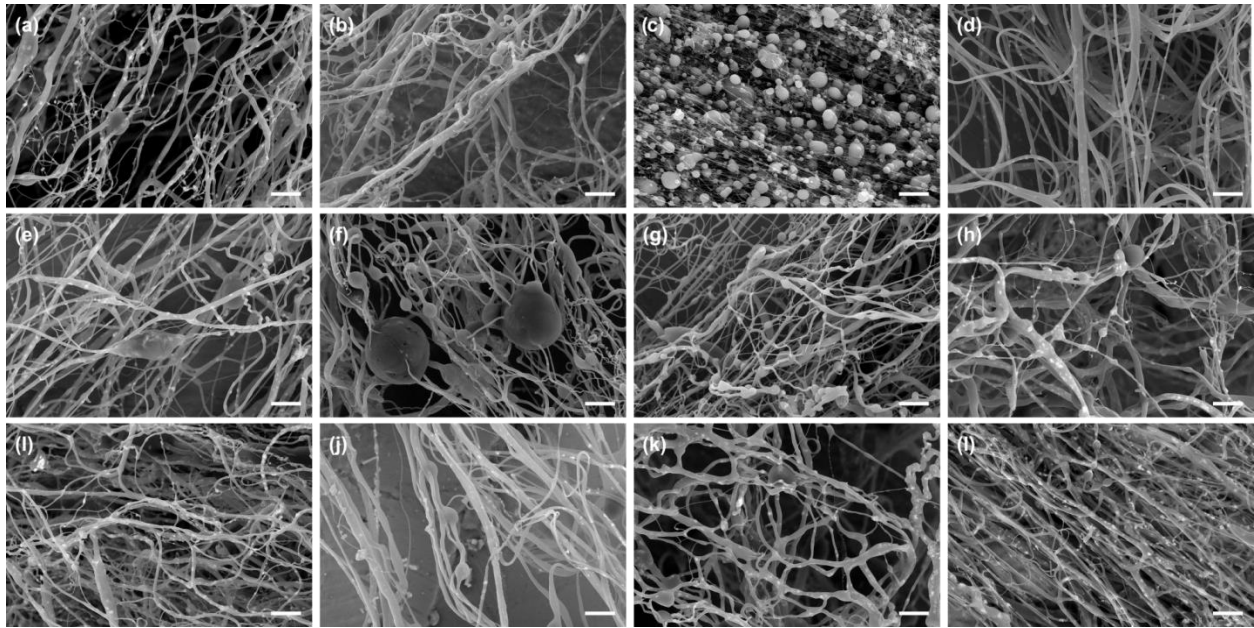
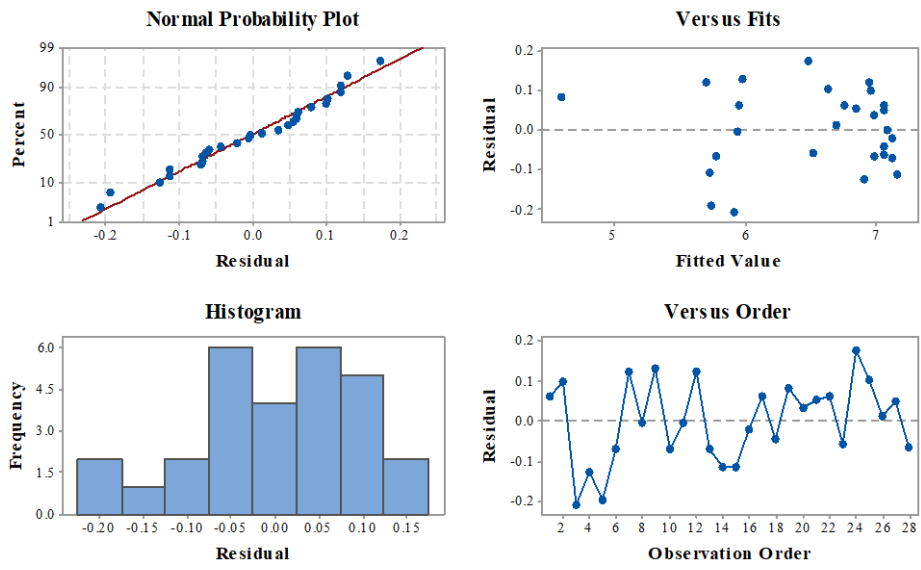


Figure S2: SEM images of runs (17–28) of central composite experimental design at 4000 \times . (a) center point 17, (b) center point 18, (c) axial point 19, (d) axial point 20, (e) axial point 21, (f) axial point 22, (g) axial point 23, (h) axial point 24, (i) axial point 25, (j) axial point 26, (k) center point 27, (l) center point 28. Scale bar is 10 μm .

(A)



(B)

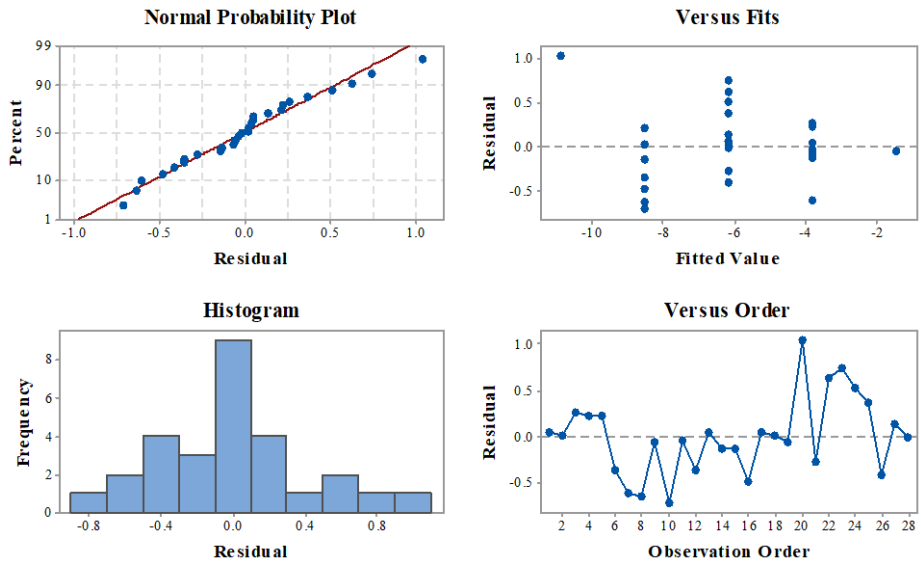


Figure S3: Residual plots of (A) ln FD and (B) ln NB models.

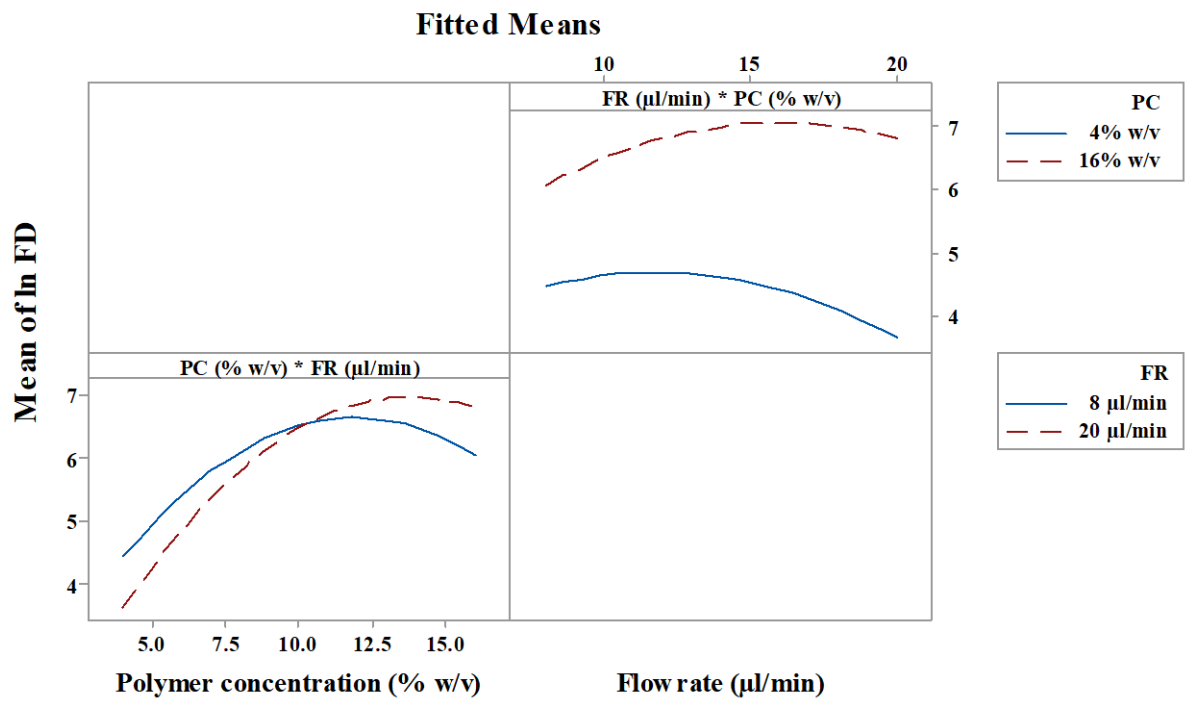
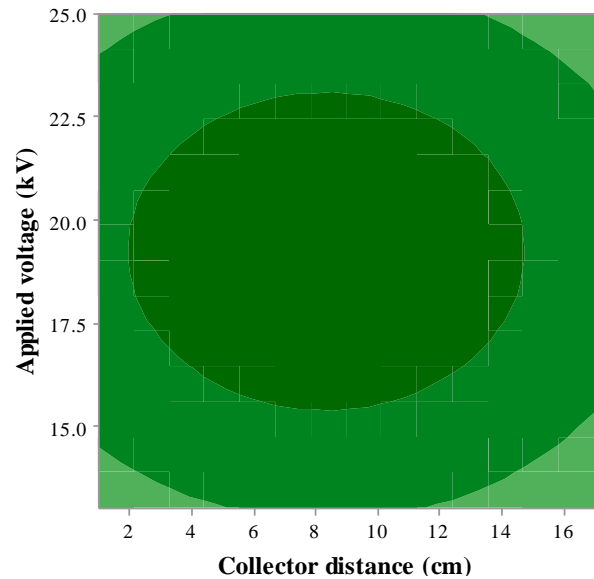
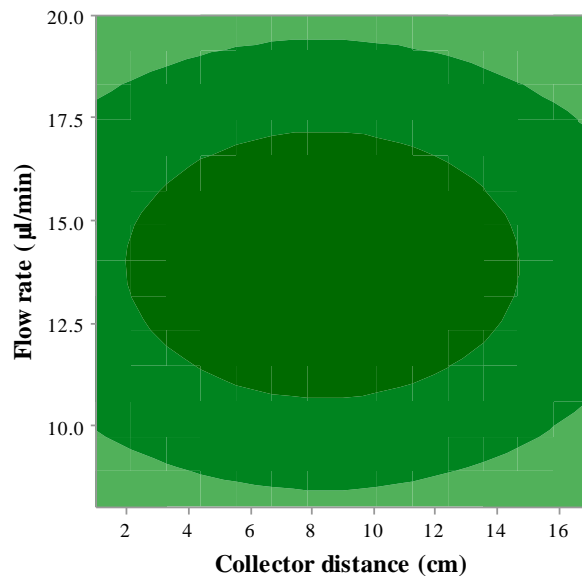
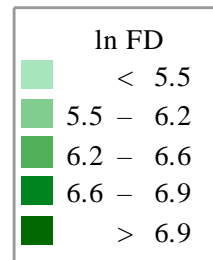
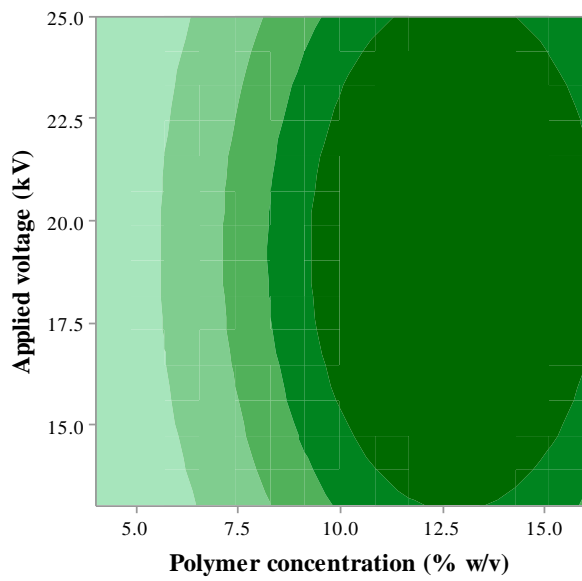
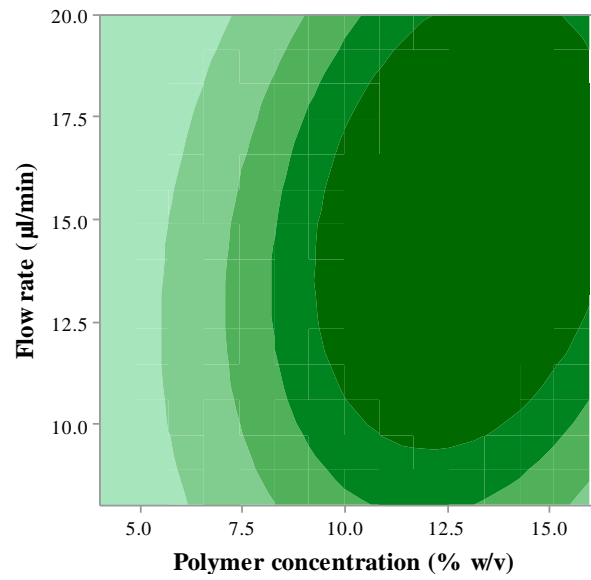
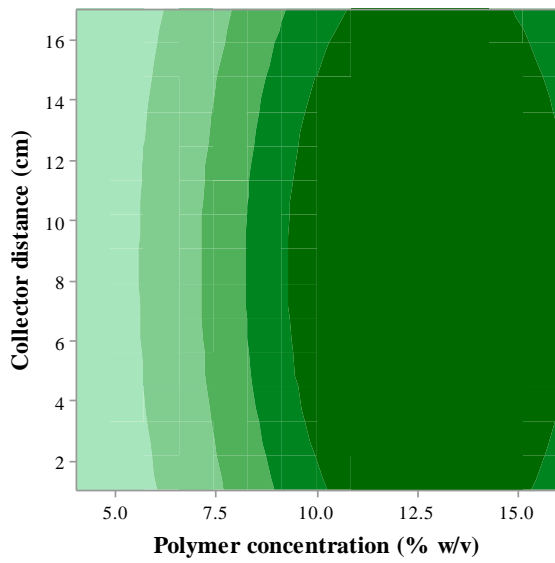


Figure S4: Interaction plot for ln FD.



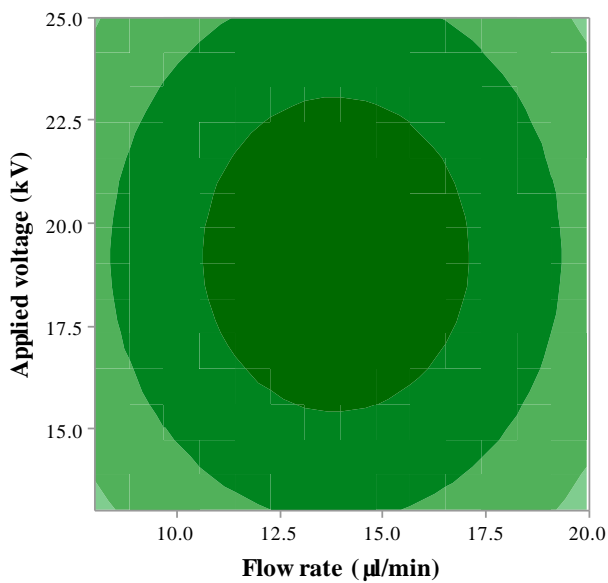


Figure S5: Contour plots for In FD. The hold values are 10% *w/v* polymer concentration, 9 cm collector distance, 14 $\mu\text{L}/\text{min}$ flow rate, and 19 kV applied voltage.