Supporting information

Opto-sensing of sotalol using Parafilm and Poly(methyl methacrylate) micro-plates decorated by silver nanoparticles: State-of-the-art on one-drop pharmaceutical analysis

Farnaz Bahavarnia [a], Milad Baghal Behyar [b], Azadeh Nilghaz [c], Mohammad Hasanzadeh [d,*], Nasrin Shadjou [e]

[a] Nutrition Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

[b] Asian Nano Ink Science Based Company, Tabriz University of Medical Sciences, Tabriz, Iran.

[c] Drug Delivery, Disposition and Dynamics, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville, VIC 3052, Australia.

[d] Pharmaceutical Analysis Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

[e] Department of Nanotechnology, Faculty of Science and Chemistry, Urmia University, Urmia, Iran.

Corresponding Author

* (Mohammad Hasanzadeh)

Pharmaceutical Analysis Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

E-mail address: (*) hasanzadehm@tbzmed.ac.ir.

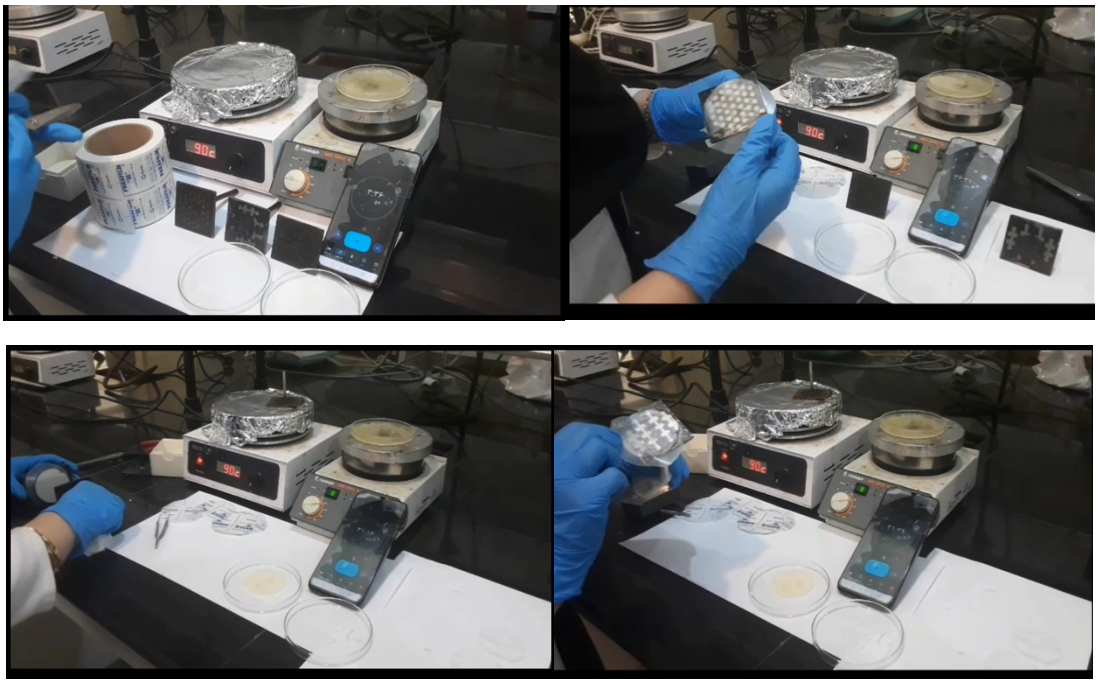

Fig. S1. Fabrication process of PF-based PCDs.

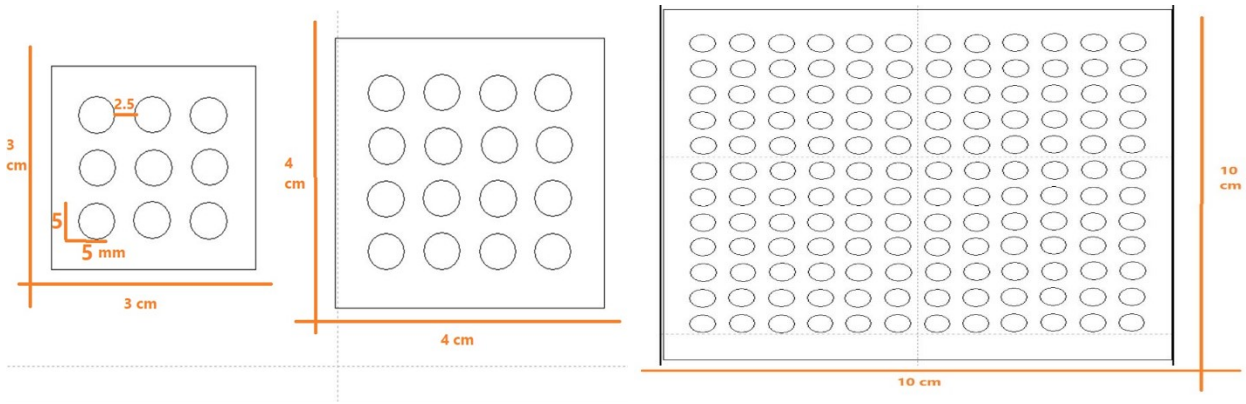

Fig. S2. Fabrication template of PMMA-based PCDs using laser cutting.

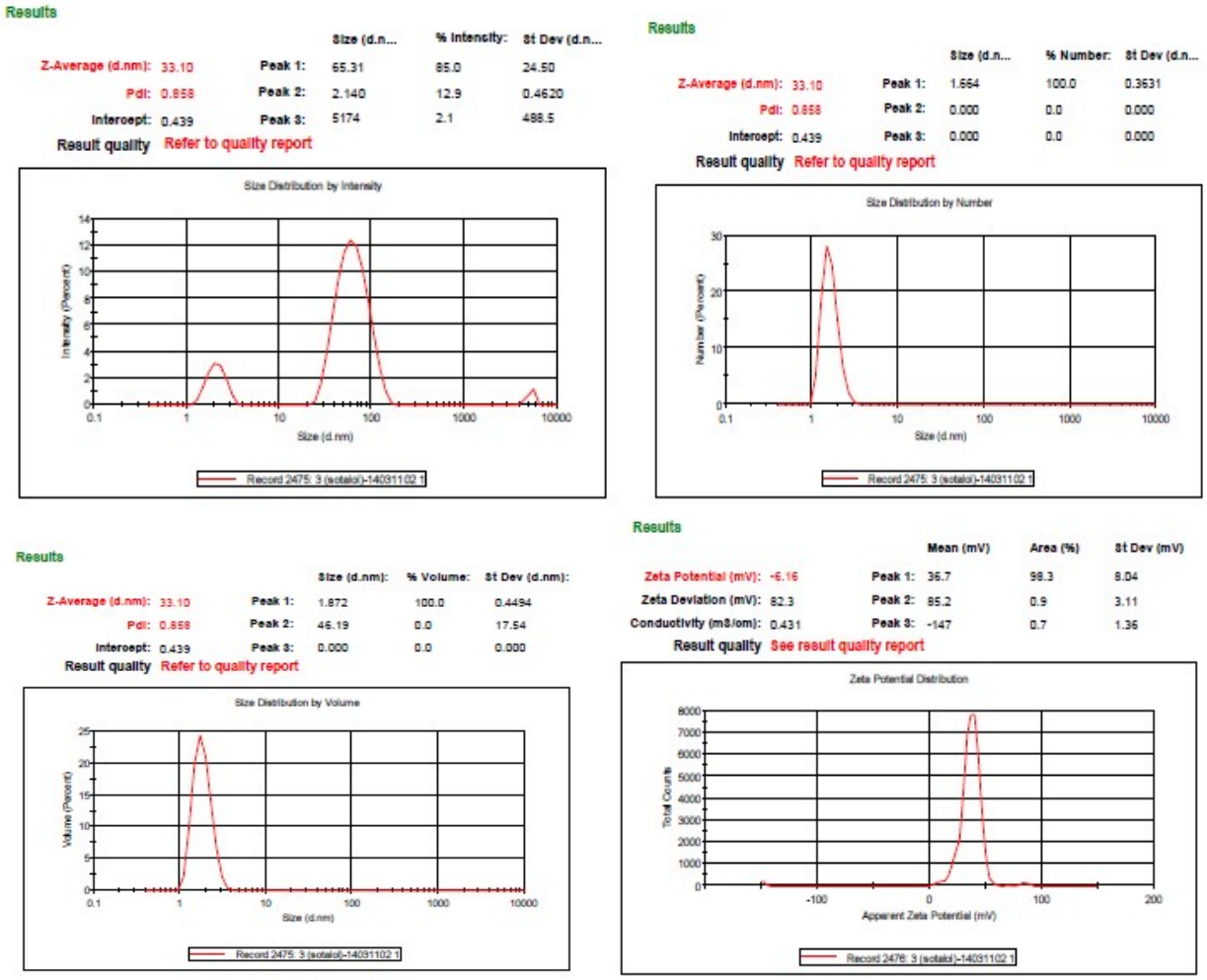

Fig. S3. DLS graphs and Zeta potential of AgNPs/Sotalol, after 5 min reaction time, respectively.

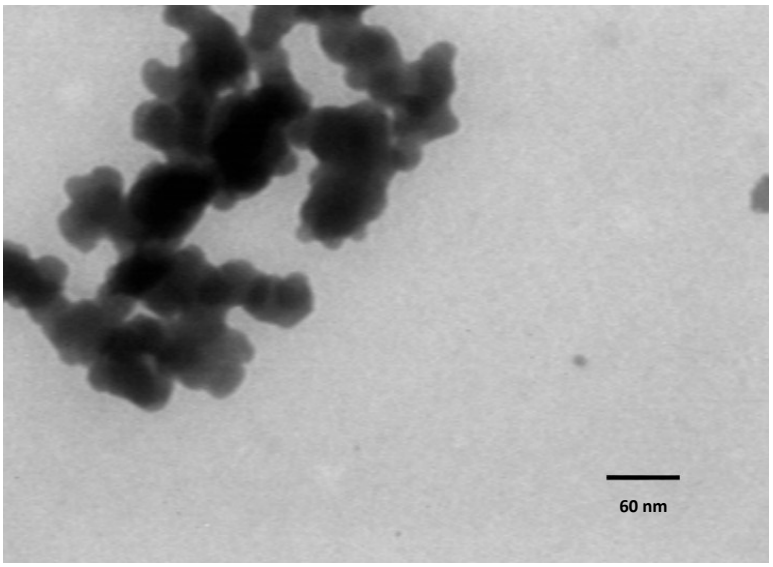

Fig. S4. TEM image of AgNPs.

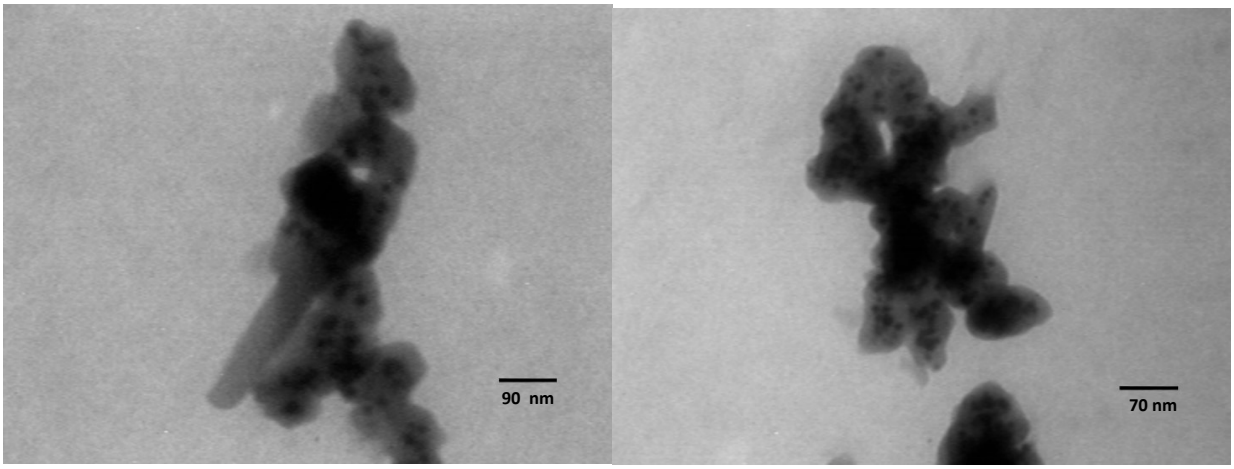

Fig. S5. TEM image of AgNPs after incubation with Sotalol.

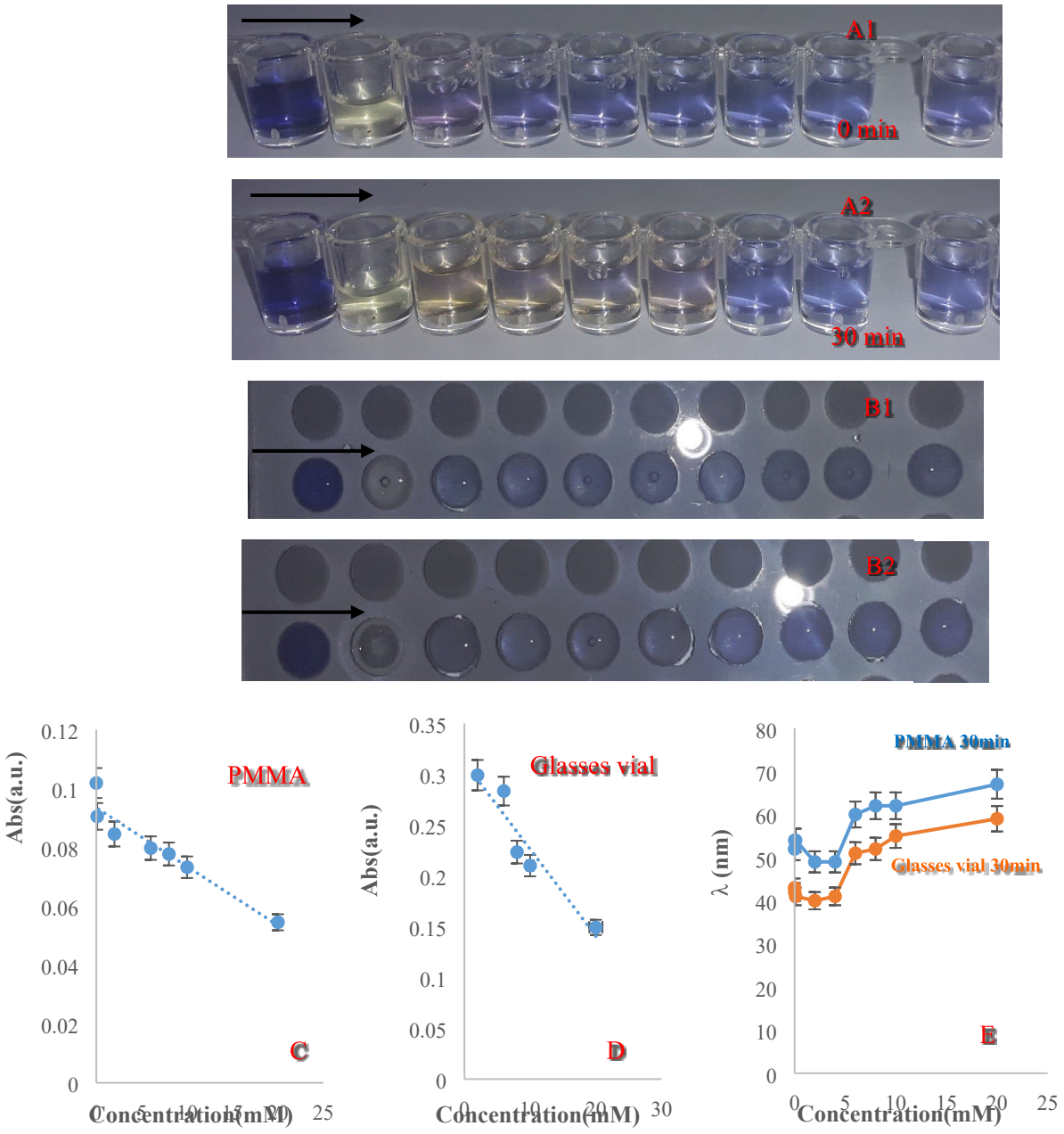

Fig. S6 (A1, A2) and (B1, B2): Colorimetric images of **(1)** AgNPs **(2)** Plasma **(3)** AgNPs/20 mM Sotalol/Plasma **(4)** AgNPs/10 mM Sotalol/Plasma **(5)** AgNPs/8mM Sotalol/Plasma **(6)** AgNPs/6 mM Sotalol/Plasma **(7)** AgNPs/4 mM Sotalol/Plasma **(8)** AgNPs/2 mM Sotalol/Plasma **(9)** AgNPs/0.1 mM Sotalol/Plasma (**10**) AgNPs/0.001 mM Sotalol/Plasma (75 µl,150 µl, and 25 µl) in two incubation times of 0 and 30 min on the polymeric vial and PMMA, respectively **(C, D).** A calibration curve of the absorption peak intensity of the solution in 30 min of incubation times by PMMA Plate, glasses vial. **(E)** Variation of λ(nm) of optosensor *versus* concentration of Sotalol in various substrates in 30 min of incubation time.

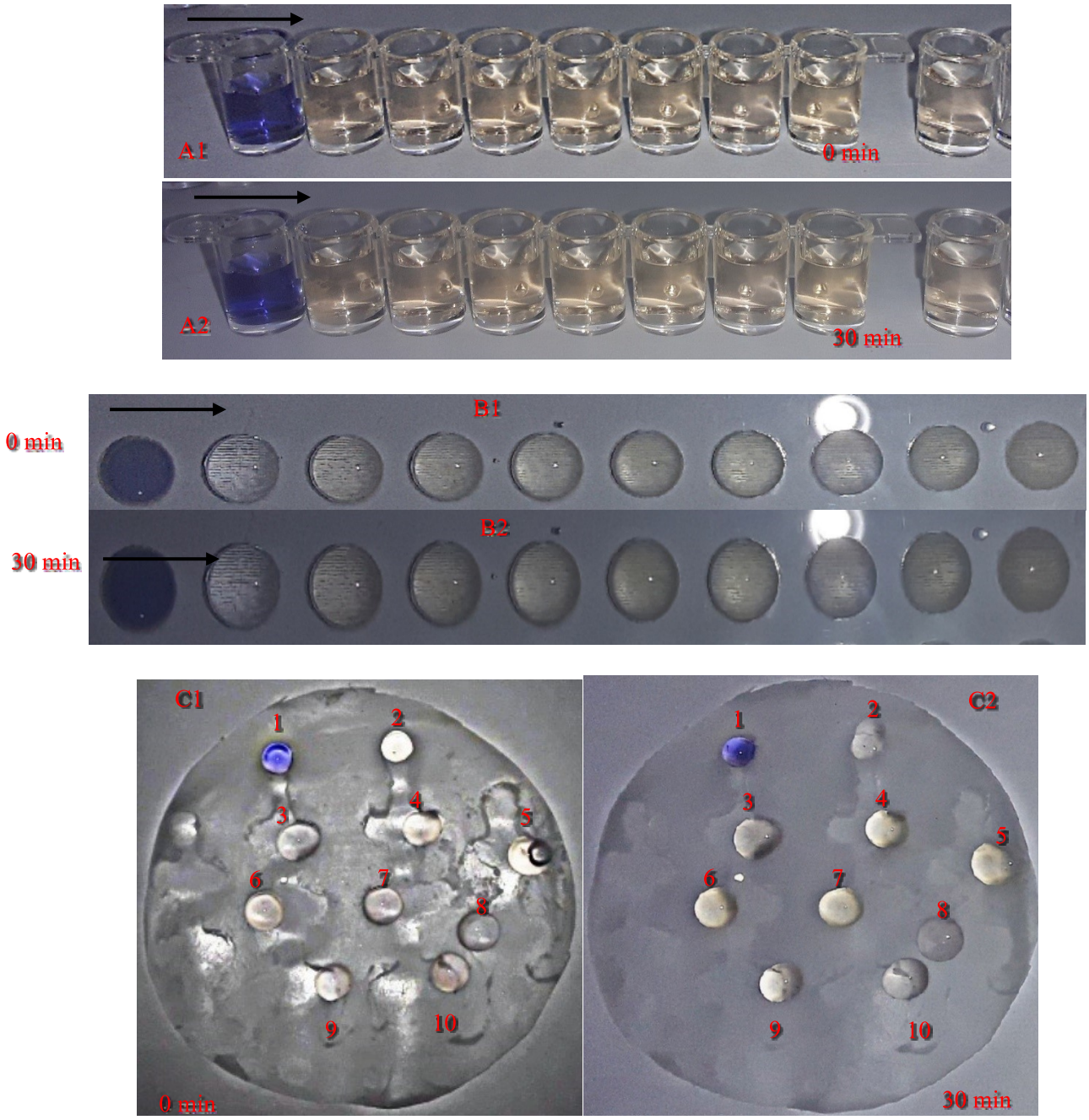

Fig. S7: Photographic image of colorimetric detection of **(1)** AgNPs **(2)** AgNPs/ Sotalol /famotidine **(3)** AgNPs/ Sotalol /indomethacin **(4)** AgNPs/ Sotalol /Diazepam **(5)** AgNPs/ Sotalol / Uric acid **(6)** AgNPs/ Sotalol /Ibuprofen **(7)** AgNPs/ Sotalol/ bilirubin **(8)** AgNPs/ Sotalol /Codeine **(9)** AgNPs/ Sotalol /Pantoprazole in two incubation times of 0 and 30 min in vial **(A1, A2),** PMMA-PCDs **(B1, B2)** and PF-PCDs **(C1, C2)** substrates.

Table S1. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in standard sample.

Type of solution	W_C	W_M	W_Y
AgNPs	69	71	59
AgNPs/Sotalol 20 mM	50	54	69
AgNPs/ Sotalol 10 mM	48	55	67
AgNPs/ Sotalol 8 mM	45	51	63
AgNPs/ Sotalol 6 mM	48	54	57
AgNPs/ Sotalol 41mM	58	60	49
AgNPs/ Sotalol 2 mM	55	57	42
AgNPs/ Sotalol 0.1 mM	59	61	43
AgNPs/ Sotalol 0.01 mM	62	64	43
AgNPs/ Sotalol 0.001 mM	62	64	40

Table S2. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in human plasma sample.

Type of solution	W_C	W_M	W_Y
AgNPs	81	81	65
AgNPs/Sotalol 20 mM/Plasma	53	56	59
AgNPs/ Sotalol 10 mM/Plasma	54	56	55
AgNPs/ Sotalol 8 mM/Plasma	54	55	52
AgNPs/ Sotalol 6 mM /Plasma	55	56	51
AgNPs/ Sotalol 41mM /Plasma	62	59	41
AgNPs/ Sotalol 2 mM /Plasma	60	57	40
AgNPs/ Sotalol 0.1 mM/Plasma	61	59	41
AgNPs/ Sotalol 0.01 mM/Plasma	61	59	42
AgNPs/ Sotalol 0.001 mM/Plasma	60	58	43

Table S3. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in standard sample in Parafilm substrate.

Type of solution	W_C	W_M	W_Y
AgNPs	59	60	47
AgNPs/Sotalol 20 mM	53	53	66
AgNPs/ Sotalol 10 mM	53	54	64
AgNPs/ Sotalol 8 mM	43	44	54
AgNPs/ Sotalol 6 mM	49	49	60
AgNPs/ Sotalol 41mM	51	50	58
AgNPs/ Sotalol 2 mM	39	42	49
AgNPs/ Sotalol 0.1 mM	61	62	49
AgNPs/ Sotalol 0.01 mM	56	56	45
AgNPs/ Sotalol 0.001 mM	42	42	37

Table S4. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in standard sample in PMMA Plate**.**

Type of solution	W_C	W_M	W_Y
AgNPs	71	72	64
AgNPs/Sotalol 20 mM	64	63	62
AgNPs/ Sotalol 10 mM	59	59	58
AgNPs/ Sotalol 8 mM	53	53	53
AgNPs/ Sotalol 6 mM	53	52	53
AgNPs/ Sotalol 41mM	54	54	51
AgNPs/ Sotalol 2 mM	68	69	63
AgNPs/ Sotalol 0.1 mM	65	64	58
AgNPs/ Sotalol 0.01 mM	62	61	54
AgNPs/ Sotalol 0.001 mM	53	52	46

Table S5. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in human plasma sample in vial.

Type of solution	W_C	W_M	W_Y
AgNPs	81	81	65
AgNPs/Sotalol 20 mM/Plasma	53	56	59
AgNPs/ Sotalol 10 mM/Plasma	54	56	55
AgNPs/ Sotalol 8 mM/Plasma	54	55	52
AgNPs/ Sotalol 6 mM /Plasma	55	56	51
AgNPs/ Sotalol 41mM /Plasma	62	59	41
AgNPs/ Sotalol 2 mM /Plasma	60	57	40
AgNPs/ Sotalol 0.1 mM/Plasma	61	59	41
AgNPs/ Sotalol 0.01 mM/Plasma	61	59	42
AgNPs/ Sotalol 0.001 mM/Plasma	60	58	43

Table S6. Wavelength, Average Intensity of CMYK of developed chemosensor of Sotalol using the Samsung A5 smartphone camera in human plasma sample in PMMA Plate**.**

Type of solution	W_C	W_M	W_Y
AgNPs	84	84	75
AgNPs/Sotalol 20 mM/Plasma	74	73	67
AgNPs/ Sotalol 10 mM/Plasma	70	69	62
AgNPs/ Sotalol 8 mM/Plasma	70	69	62
AgNPs/ Sotalol 6 mM /Plasma	69	67	60
AgNPs/ Sotalol 41mM /Plasma	65	63	49
AgNPs/ Sotalol 2 mM /Plasma	65	64	49
AgNPs/ Sotalol 0.1 mM/Plasma	67	65	54
AgNPs/ Sotalol 0.01 mM/Plasma	67	64	54
AgNPs/ Sotalol 0.001 mM/Plasma	67	65	52