

Supporting information

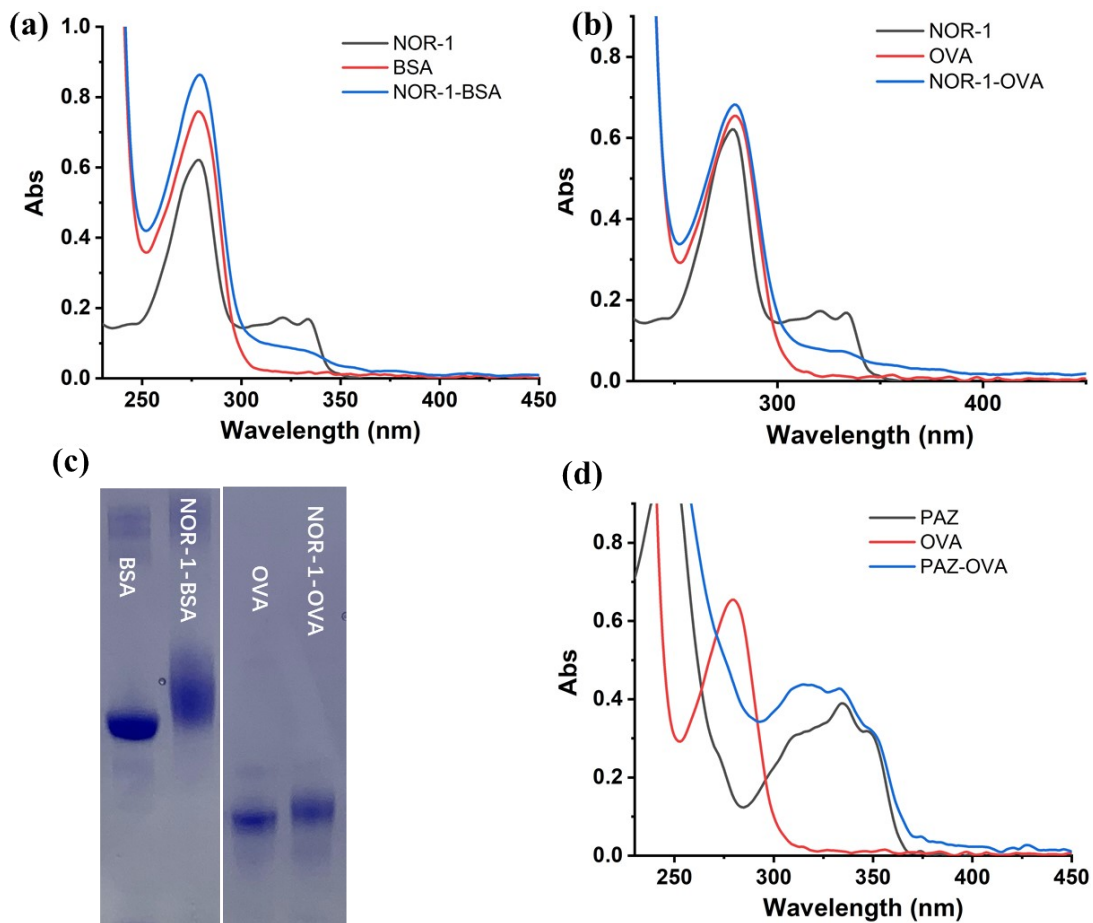


Fig. S1 UV-Vis absorption spectrogram (a,b,d) and SDS-PAGE electrophoretogram (c) of antigens.

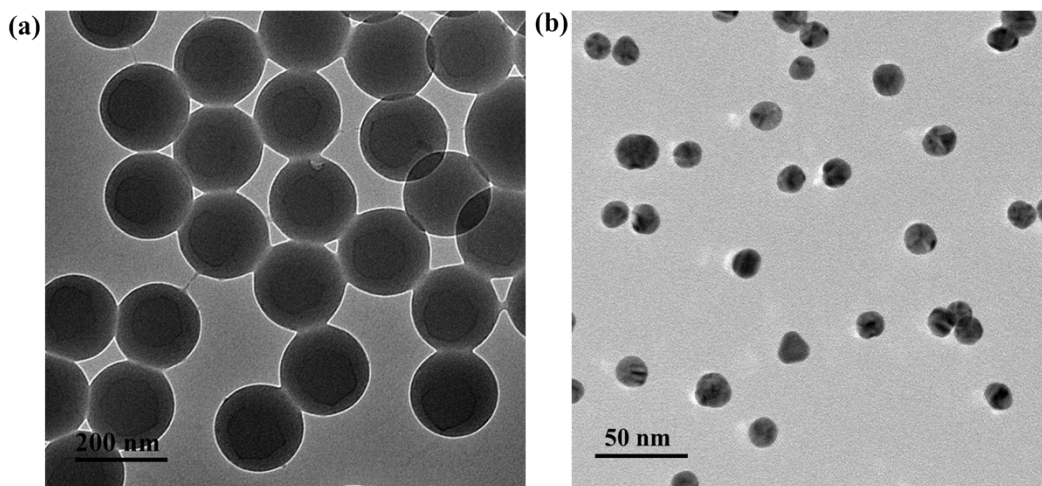


Fig. S2 TEM images of Eu-fluorescence microspheres (a) and colloidal gold nanoparticles (b).

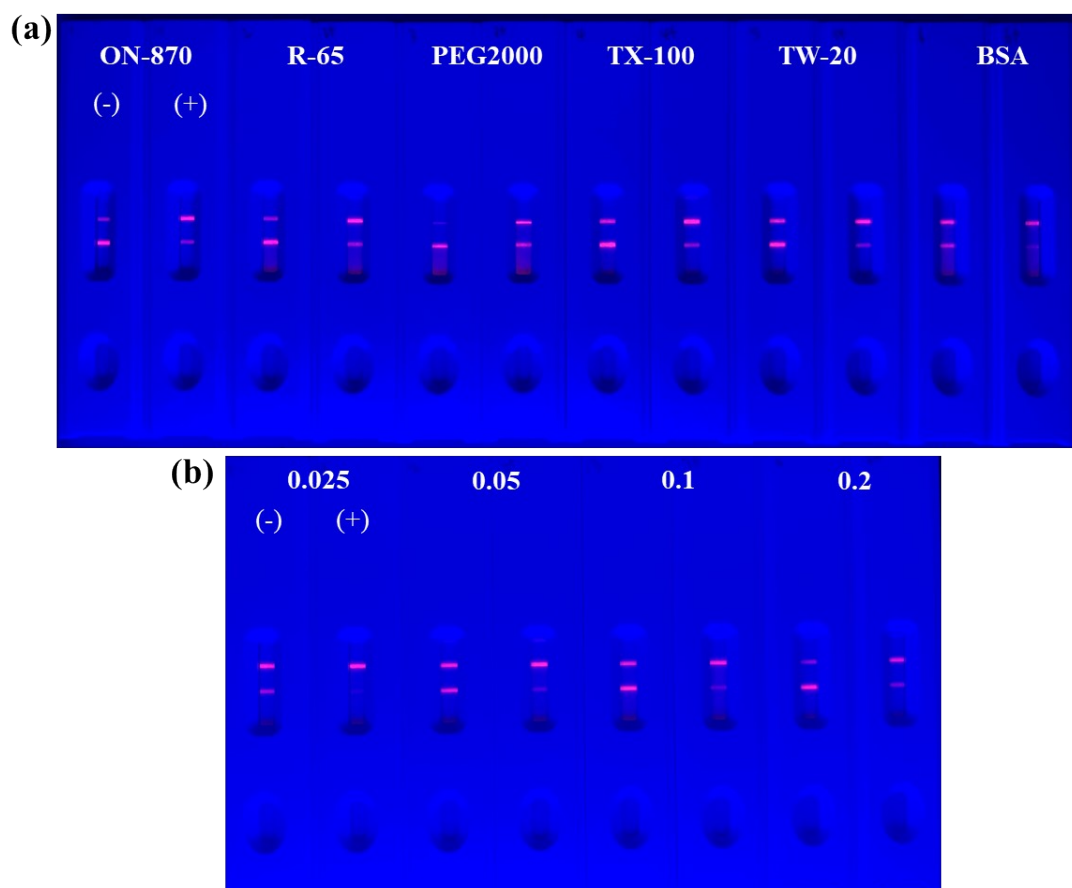


Fig. S3 The effect of surfactant (a) and the concentration of coating antigen (b) on the performance of the EFM-based ICA. (-) norfloxacin: 0 $\mu\text{g}/\text{kg}$; (+) norfloxacin: 1 $\mu\text{g}/\text{kg}$.

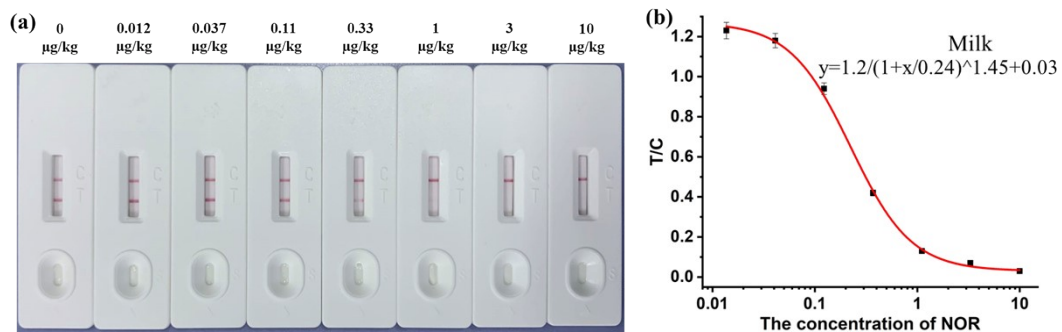


Fig. S4 The test images (a) and calibration curves (b) of GNP-based LFIA for the determination of NOR in milk.

Tab. S1 References of the immunoassays for the determination of norfloxacin and its analogues in fish and milk.

Reference	Year	Immunoassay	Sample	Sensitivity (fluoroquinolone)	Time
(Xiao et al., 2022)	2022	IC-elisa Gold-labeled microwell immunochromatographic strip	Aquatic products	IC ₅₀ (1c-elisa in standard solution): 1.4 ng/mL (norfloxacin) 1.3 ng/mL (pefloxacin) 2.1 ng/mL (ofloxacin) 1.5 ng/mL (lomefloxacin) LOD (the strip in sample): 4 ng/mL (pefloxacin)	10 min
(Liu et al., 2021)	2021	DC-CLIA/FIA	Milk	IC ₅₀ (CLIA/ FIA): 0.345/1.206 ng/g (norfloxacin)	>4 h
(Ren et al., 2021)	2021	Black phosphorus-based immunochromatography	tap water and river water	LOD: 0.045 ng/mL (Norfloxacin)	20 min
(Han et al., 2021)	2021	Chemiluminescence immunoassay	Milk	LOD: 0.05 ng/mL (norfloxacin) 0.11 ng/mL (pefloxacin) 0.14 ng/mL (ciprofloxacin) 0.16 ng/mL (danofloxacin)	>1.5 h
(Acaroz et al., 2020)	2020	Generic enzyme-immunoassay	NULL	IC ₅₀ : 0.05-73.2 ng/mL (32 FQs)	>3 h
(Hu et al., 2020)	2020	Colloidal gold, quantum dots (QDs), and upconversion nanoparticles (UCNPs) immunochromatographic assay	Milk	Visual detection limit (norfloxacin): 20.0 µg/L (colloidal gold) 10.0 µg/L (QDs) 5.0 µg/L (UCNPs)	10 min
(Liu et al., 2018)	2018	Electrochemical immunosensor	Standard solutions	LOD: 0.3837 µg/L (norfloxacin)	>50 min
(Peng et al., 2017a)	2017	Immunochromatographic strip (colloidal gold)	Milk	Cut-off value: 1 ng/mL (norfloxacin) 0.5-20 ng/mL (other nine FQs)	5 min
(Peng et al., 2017b)	2017	Gold nanoparticle-based paper sensor	Milk	The cut-off values: 1-100 ng/mL (32 quinolones) LOD: 0.1–10 ng/mL (32 quinolones)	10 min
(Hu et al., 2015)	2015	Fluorescence immunoassay	Milk	LOD: 0.01 ng/mL (norfloxacin)	>53 min

Tab. S2 The test result of ic-ELISA for 4D7 using several different coating antigens.

NOR ($\mu\text{g/L}$)	mAb ($\mu\text{g/mL}$)	Coating antigen ($\mu\text{g/mL}$)											
		Nor-1-OVA		NOR-OVA		GAT-OVA		SPA-OVA		MOX-OVA		PAZ-OVA	
		0.09	0.03	0.09	0.03	0.09	0.03	0.09	0.03	0.09	0.03	0.09	0.03
0	0.03	3.122	2.928	3.015	2.806	2.353	1.861	2.087	1.217	1.297	0.852	1.581	0.917
	0.01	2.661	2.283	2.547	2.083	1.514	1.161	1.073	0.55	0.566	0.378	0.757	0.338
0.05	0.1	3.14	2.904	2.949	2.655	1.665	1.285	0.887	0.469	0.591	0.383	0.418	0.252
	0.03	2.397	1.929	2.219	1.715	0.962	0.71	0.379	0.201	0.244	0.169	0.137	0.085
Inhibition ratio		-1%	1%	2%	5%	29%	31%	57%	61%	54%	55%	74%	73%
		10%	16%	13%	18%	36%	39%	65%	63%	57%	55%	82%	75%

Tab. S3 The cross-reaction (CR) of 4D7 to fluoroquinolones.

Chemicals	IC ₅₀ (ng/mL)	CR	Chemicals	IC ₅₀ (ng/mL)	CR
Norfloxacin	0.027	100%	Sparfloxacin	1.5	1.8%
Pefloxacin	0.056	48.2%	Difloxacin	2.3	1.2%
Enoxacin	0.06	45%	Sarafloxacin	>5	<1%
Lomefloxacin	0.062	43.5%	Prulifloxacin	>5	<1%
Ofloxacin	0.071	38%	Flumequine	>5	<1%
Danofloxacin	0.087	31%	Nadifloxacin	>5	<1%
Fleroxacin	0.1	27%	Moxifloxacin	>5	<1%
Enrofloxacin	0.11	24.5%	Gatifloxacin	>5	<1%
Ciprofloxacin	0.14	19.3%	Balofloxacin	>5	<1%
Marbofloxacin	0.25	10.8%	Besifloxacin	>5	<1%
Pazufloxacin	0.62	4.4%	Orbifloxacin	>5	<1%

Reference:

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