Biotransformation of food-grade and nanometric TiO_2 in the oral-gastro-intestinal tract: driving forces and effect on the toxicity toward intestinal epithelial cells

Arianna Marucco[1], Marion Prono [2], David Beal[2], Enrica Alasonati[3], Paola Fisicaro[3], Enrico Bergamaschi[4], Marie Carriere[2*], and Ivana Fenoglio[1*]

[1] Dept. of Chemistry, University of Torino, 10125-Torino, Italy

[2] Univ. Grenoble Alpes, CEA, CNRS, IRIG, SyMMES, Chimie Interface Biologie pour l'Environnement, la Santé et la Toxicologie (CIBEST), F-38000 Grenoble, France;

[3] Département Biomédicale et Chimie Inorganique, Laboratoire national de métrologie et d'essais, 75724 Paris

[4] Department of Public Health and Pediatrics, University of Torino, 10126 Torino, Italy;

Supplementary materials

Table S1. Composition of simulated OGI fluids

	Simulated saliva	**Simulated gastric fluid**	**Simulated intestinal fluid**
pH	6.5 ± 0.1	1.4 ± 0.1	8.1 ± 0.1
Inorganic components (g/L)	KCl 0.90 KSCN 0.20 NaH_2PO_4 x H_2O 1.02 Na_2SO_4 0.57 NaCl 0.30	KCl 0.82 NH_4Cl 0.31 $CaCl_2$ x $2H_2O$ 0.40 NaCl 2.75 NaH_2PO_4 x H_2O 0.31	$MgCl_2$ x $6H_2O$ 0.05 KCl 0.94 KH_2PO_4 0.08 $NaHCO_3$ 9.17 NaCl 12.27 $CaCl_2$ x $2H_2O$ 0.42
Organic components (g/L)	Urea 0.20	Urea 0.09 D-Glucose 0.65 Glucuronic acid 0.02 D-Glucosamine hydrochloride 0.33	Urea 0.35
Active components (g/L)	Mucin 0.05 Uric acid 0.016 α - amylase 0.145	Mucin 3 BSA 1 Pepsin 1	Pancretin 3.00 Lipase 0.5 Bile 6.00 BSA 2.8

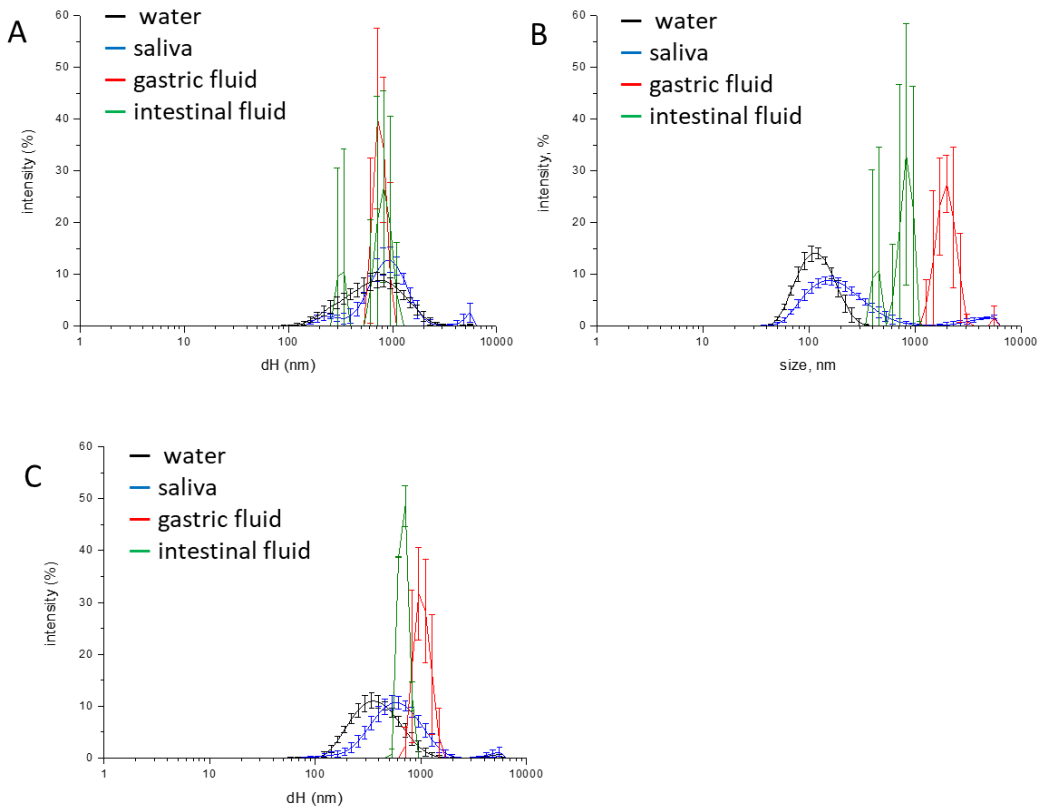

Figure S1. Size distribution monitored by DLS of A) TiO_2-NM1; B) TiO_2-NM2; C) TiO_2-FG during the digestion cascade in the absence of proteins. The hydrodynamic diameters (d_H) distribution (% intensity) is expressed as mean value of 5 measurements in three independent experiments ± SD.

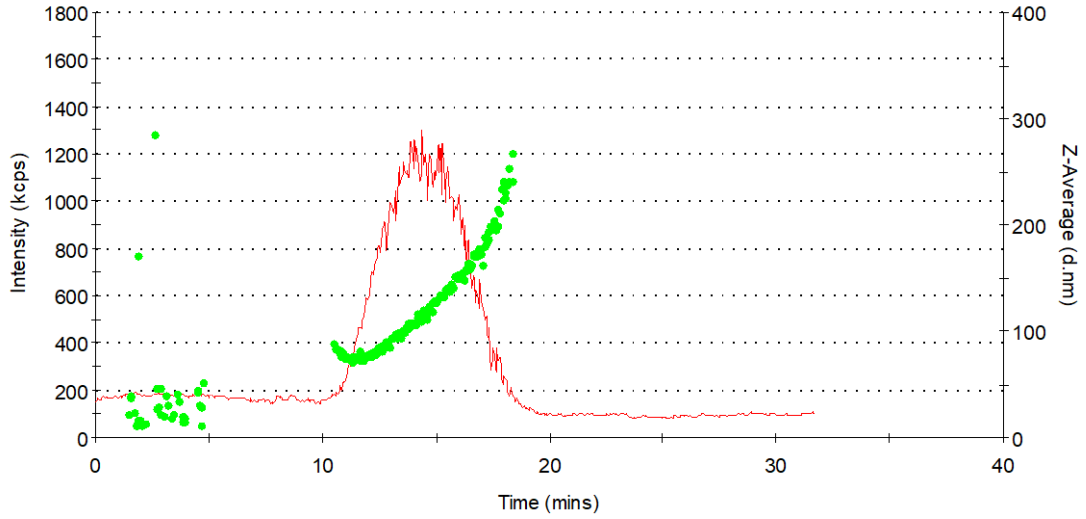

Figure S2. AF4/DLS fractogram of TiO2-S. Concentration of the injected suspension: 50 mg L^{-1}. Mean diameter: 77.3 nm.

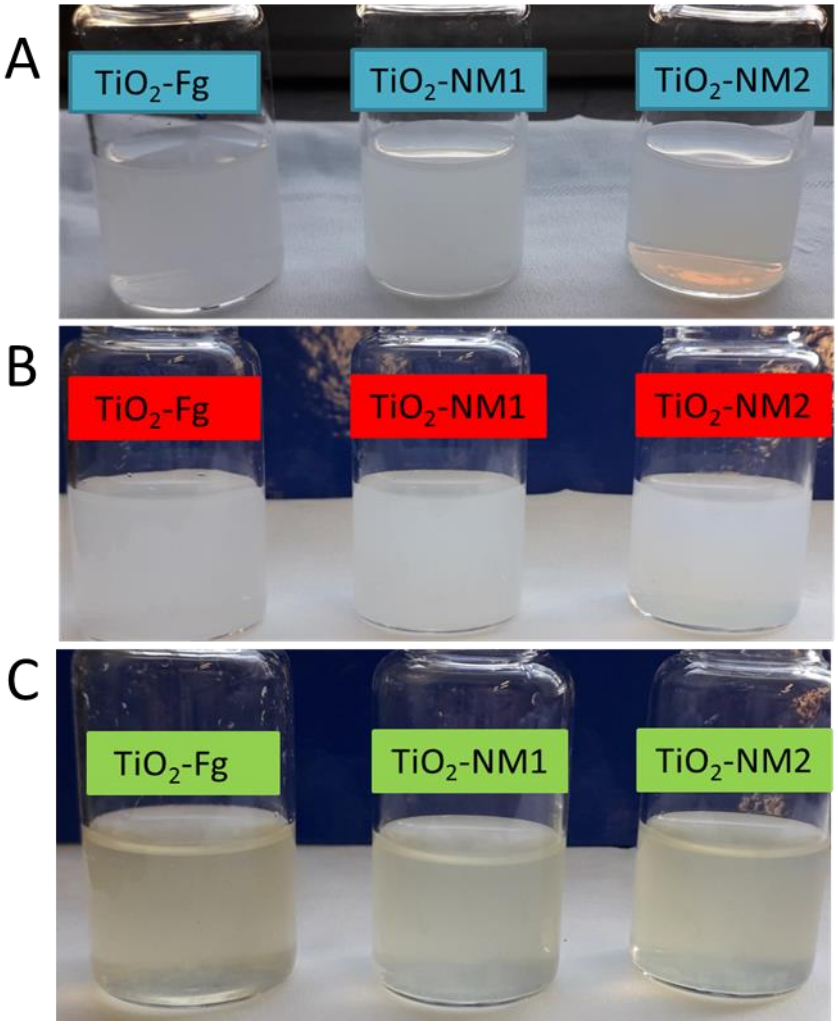

Figure S3. Appearance of the suspensions of the TiO_2 samples during the digestion cascade. A) saliva; B) gastric fluid; C) intestinal fluid.