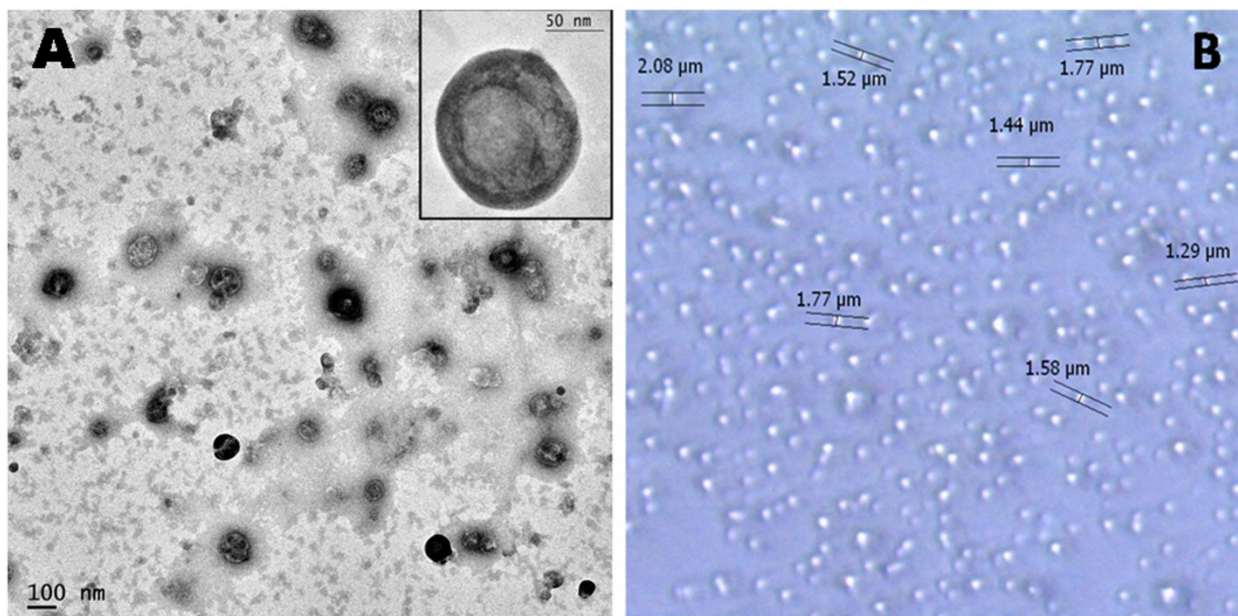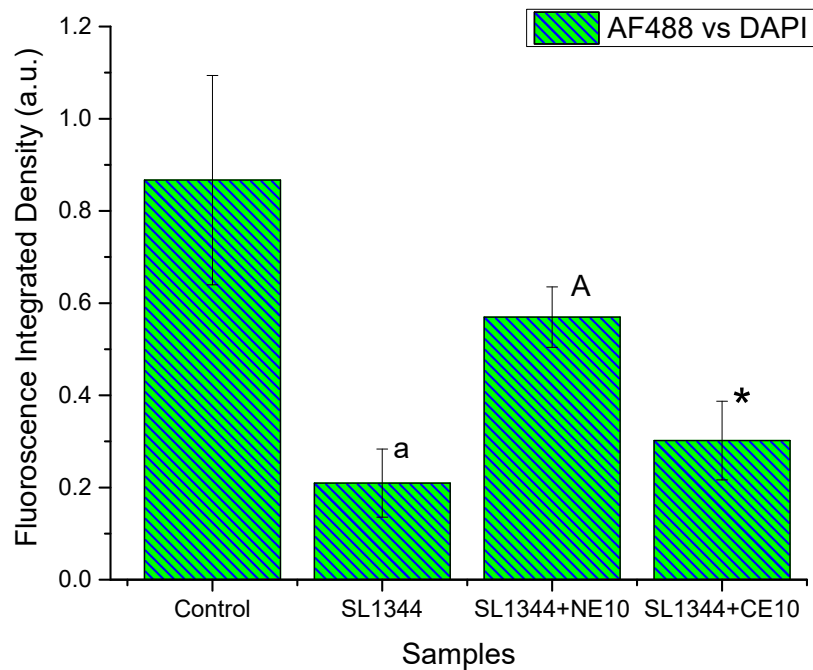**Supplementary figure:**

Supplementary figure 1: Microscopic analysis of the emulsion droplets. (**A**) Transmission electron Micrograph of the nanoemulsion droplets 40,000× magnification by JEM 1010, JEOL, Tokyo, Japan. Inset showing a single emulsion droplet. (**B**) Conventional emulsion droplets under 400X magnification by Leica DM750 optical microscope with ICC50 imaging system, equipped with Leica Las EZ software package (Leica Microsystems, Germany).

Supplementary figure 2: The fluorescence integrated density mapping of alexa fluor, normalized against the DAPI signals had shown the significant reinforcement of the tight junction protein ZO-1 expression. Infected and treated group means were compared with the control and the significance differences [$p<0.05$] were indicated by alphabetic superscripts and * implies the significant difference between the nanoemulsion and convention emulsion treated groups [n=3; $p<0.05$].

Supplementary table 1: The concentration of the components in the formulation. The nano and conventional emulsion only differed in terms of particle size reported in table 1. Also, the fatty acid composition of the fish oil used to formulated the nano and conventional emulsion formulation.

Formulation composition (/100 ml emulsion)	
Fish oil	1.5 gm
Tween 20	0.5 gm
Span 80	0.5 gm
Fatty acid composition of the fish oil	
Fatty acid	**Concentration (%)**
Myristic acid (14:0)	9.131±0.02
Palmitic acid (16:0)	19.467±0.04
Palmitoleic acid (16:1)	12.105±0.02
Stearic acid (18:0)	3.141±0.01
Oleic acid (18:1)	15.426±0.01
Linoleic acid (18:2)	1.355±0.04
Linolenic acid (18:3)	3.891±0.05
Eicosapentaenoic acid (20:5)	22.444±0.02
Docosahexaenoic acid (22:6)	13.041±0.05