

Table.2 Experimental design of prepared multiple water in oil in water (W/O/W) emulsions.

	ZN ¹ (ml)	ZCN ² (ml)	W/O Emulsion (ml)	Particle Size (nm)	Zeta Potential (-mV)
Cnt ³	-	-	100	53.8±4.3 ^e	26.9±1.1 ^g
M1-F6 ⁴	25	-	75	146.4±2.7 ^a	31.4±0.3 ^f
M2-F6	50	-	50	121.7±4.8 ^b	33.7±0.1 ^e
M3-F6	75	-	25	125.2±6.3 ^b	36.7±1.2 ^d
M4-F6	-	25	75	102.8±4.6 ^c	46.8±1.3 ^c
M5-F6	-	50	50	89.8±4.2 ^d	49.2±0.4 ^b
M6-F6	-	75	25	119.4±5.8 ^b	52.6±0.9 ^a
M1-F42	25	-	75	140.7±3.9 ^a	31.4±0.3 ^f
M2-F42	50	-	50	118.3±2.5 ^b	33.5±0.1 ^e
M3-F42	75	-	25	120.7±1.7 ^b	35.4±0.8 ^d
M4-F42	-	25	75	95.4±5.3 ^d	47.5±1.3 ^c
M5-F42	-	50	50	83.7±3.7 ^e	49.4±0.6 ^b
M6-F42	-	75	25	115.6±6.4 ^b	51.6±0.7 ^a

¹ZN: Zein Nanoparticles, ²ZCN: Zein- CMC Nanoparticles, CMC: Carboxymethyl cellulose, ³Cnt: Control water in oil (W/O) emulsion without any ZN or ZCN, ⁴ M1-F6: Multiple (M) W/O/W emulsion containing F6 ZN, and the data were presented as Mean±SD and the different superscripts indicates significant differences at 5% Duncan's test.

Table.3 Particle size and encapsulation stability (ES%) of rutin loaded water in oil in water (W/O/W) emulsions at different pH value

	Particle Size (nm)			ES%		
	pH					
Emulsion/Da	1.2	6.8	7.4	1.2	6.8	7.4
*Cnt/1	65.6±7.36 ^f	59.6±8.83 ^f	60.6±6.16 ^f	89.23±5.27 ^a b	90.17±4.66 ^a b	92.29±4.66 ^a b
Cnt/15	185.6±8.6 ^b	128.3±7.86 ^d	108.3±7.06 ^e	74.64±6.16 ^b	81.24±5.34 ^b	83.53±6.1 ^{ab}
Cnt/30	238.3±10.12 ^a	168.4±9.57 ^b	143.63±7.13 ^c	63.74±8.32 ^c	69.52±7.2 ^c	68.02±6.04 ^c
**M5-F6/1	83.6±7.73 ^e	91.7±5.68 ^e	86.18±7.08 ^e	96.24±6.18 ^a	97.57±2.1 ^a	95.86±3.9 ^a
M5-F6/15	98.6±6.29 ^e	97.9±8.42 ^e	92.09±6.74 ^e	90.25±6.83 ^a b	94.6±3.03 ^a	94.08±5.3 ^a
M5-F6/30	118.6±9.3 ^d	96.26±7.41 ^e	97.6±9.38 ^e	86.63±6.19 ^a b	91.54±3.89 ^a b	97.13±2.39 ^a

*Cnt: Control water in oil (W/O) emulsion without any zein nanoparticles or zein-carboxymethyl cellulose nanoparticles (ZCN), **M5-F6: multiple (M) W/O/W emulsion containing with F6 ZCN, and the data were presented as Mean±SD, and the different superscripts indicates significant differences at 5% Duncan's test.