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Optimization of palm oil in water nano-emulsion with curcumin using microfluidizer and response surface methodology

Revathi Raviadarán, Davannendran Chandran, Liew Huey Shin, Sivakumar Manickam



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1 **Optimization of palm oil in water nano-emulsion with curcumin using microfluidizer**
2 **and response surface methodology**

3 Revathi Raviadaran^a, Davannendran Chandran^b, Liew Huey Shin^a, Sivakumar Manickam^a

4 ^aDepartment of Chemical and Environmental Engineering, University of Nottingham
5 Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor, Malaysia

6 ^bGraphene & Advanced 2D Materials Research Group (GAMRG), Sunway University, No.
7 5, Jalan Universiti, Bandar Sunway, 47500 Subang Jaya, Selangor, Malaysia

8
9 Corresponding author: Davannendran Chandran

10 Tel.: +60 374918622

11 Email add.: dchandran@sunway.edu.my

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13
14 **Abstract**

15 This study aims to produce and optimise palm oil-based nano-emulsion to encapsulate
16 curcumin using microfluidizer and Response Surface Methodology (RSM). Encapsulation of
17 curcumin is essential to overcome curcumin's poor bioavailability through the formation of
18 nano-sized droplets in order to harvest its outstanding anti-inflammatory and anti-cancer
19 medicinal properties. Among the parameters of concern are microfluidizer's pressure, number
20 of cycles and surfactant concentration (Tween 80). Optimisations were performed by
21 employing RSM. Characterisations were conducted for the droplet size, poly-dispersity index
22 (PDI), zeta potential (ZP) and viscosity. Stable palm oil-based oil in water nano-emulsion
23 encapsulating curcumin was achieved at a droplet size of 275.5 nm, PDI of 0.257, ZP of -36.2
24 and viscosity of 446 cP using microfluidizer. The optimized conditions were at 350 bar, 5
25 cycles and 1 wt.% surfactant. Optimized microfluidizer with the aid of RSM is deemed

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