

# Nanoliposomes of supercritical carbon dioxide extract of small cardamom seeds: A potent hypocholesterolemic agent



**Paramita Bhattacharjee**

Jadavpur University, India

## Biography

Paramita Bhattacharjee, [Ph.D. ICT, Mumbai, Post-Doc N.D.S.U, USA] is Associate Professor in the Department of Food Technology and Biochemical Engineering, Jadavpur University, Kolkata. She has been Lecturer at ICT for a year and Executive Scientist at Biocon Ltd, Bangalore. Her current research interests are green technologies of extraction of Ayurceuticals, development of nutraceuticals in combating metabolic disorders, edible oils and frying applications and electronic nose applications for quality assessment of food and agro-commodities. She has 75 research papers in national and international journals, 9 full length papers in conference proceedings, 35 oral presentations in conferences including 5 in international forums, 16 book chapters and one Indian patent. She has been the recipient of Selected Poster award in Food Technology in 19th World Congress of Food Science and Technology, IUFOST 2018, third position in Poster-cum-Oral presentation in East Zone Inter-University Research Convention Anveshan 2018-19 in Basic Science, 2019.



Oral administration of 1,8-cineole-rich supercritical carbon dioxide (SC-CO<sub>2</sub>) extract of small cardamom seeds in hypercholesterolemic Wistar albino rats resulted in restoring normal total cholesterol (TC) levels in the animals. These findings prompted us to encapsulate the aforesaid extract as nanoliposomes to enhance its shelf stability. Nanoliposome of the extract was characterized and its *in vivo* hypocholesterolemic efficacy was assessed in triton-X treated hypercholesterolemic rats. Atorvastatin served as the positive control in the *in vivo* study. PEGylated nanoliposomes of small cardamom seed extract (SN) were formulated using soya phosphatidylcholine and Tween 80 (composition standardized) using ultra-sonication (probe) technology. Entrapment efficiency of spherical SN (dp= 76.93 nm) was 84.20% possessing negative zeta potential value <30. The antioxidant potency and shelf stability of SN (T<sub>1/2</sub> = 192 days at 4 ± 1 °C) were appreciably higher than that of the native extract and exhibited *in vitro* sustained release of the spice extract from the same. The liposomes had thermal stabilities up to 250 °C and successful binding among their chemical constituents were confirmed by FT-IR and XRD spectra. Reduction in TC levels in rats co-administered with liposomes (550 mg/kg b.w.) and triton-X were comparable to that of atorvastatin-administered rats on day 35. Moreover, SN (550 mg/kg b.w.) exhibited inhibitory effects on HMG-CoA reductase activity in the animals. This study established nanoliposomes of small cardamom seed extract as natural alternative of statin in redressing hypercholesterolemia.

## Publications

Paul K; Chakrabarti S; Bhattacharjee P (2019) Is 1,8-Cineole-Rich Extract of Small Cardamom Seeds More Effective in Preventing Alzheimer's Disease than 1,8-Cineole Alone?. *Neuromolecular Medicine* 22:150–158.

Chakraborty S; Paul K; Mallick P; Chatterjee D; Pradhan S; Das K; Chakrabarti S; Nandi DK; Bhattacharjee P (2019) Consortia of bioactives in supercritical carbon dioxide extracts of mustard and small cardamom seeds lower serum cholesterol levels in rats: New leads for hypocholesterolemic supplements from spices. *Journal of Nutritional Science* 8:1-15.

Pal S; Bhattacharjee P (2019) Lutien-fortified potato soup and freeze-dried lutein powder designed with supercritical carbon dioxide extract of yellow corn kernels are promising nutraceutical foods. *Journal of Food Processing and Preservation*, <https://doi.org/10.1111/jfpp.14005>.

Paul K; Bhattacharjee P; Chatterjee N; Pal TK (2019) Nanoliposomes of supercritical carbon dioxide extract of small cardamom seeds redresses Type 2 diabetes and hypercholesterolemia. *Recent Patents on Biotechnology* 13:1-20.

Chakraborty S; Bhattacharjee P (2018) Design of lemon-mustard nutraceutical beverages based on synergism among antioxidants and *in vitro* antioxidative, hypoglycaemic and hypocholesterolemic activities: Characterization and shelf life studies. *Journal of Food Measurement and Characterization* 12:2110-2120.

International Conference on Natural Products and Traditional Medicine | Amsterdam, The Netherlands | July 13, 2020

**Citation:** Paramita Bhattacharjee, *Nanoliposomes of supercritical carbon dioxide extract of small cardamom seeds: A potent hypocholesterolemic agent*, Natural Products 2020, International Conference on Natural Products and Traditional Medicine, Amsterdam, The Netherlands, Webinar, 13<sup>th</sup> July, 2020, pp: 05.