

# Preparation and standardization of lipid-based nanocarriers (NLC) of *Mimosa pudica* for targeted breast cancer therapy

Harishchand Jangid, Narendra Singh and G Jayebalan

DOI: <https://www.doi.org/10.22271/phyto.2026.v15.i3a.15863>

## Abstract

Breast cancer remains a leading cause of mortality, necessitating advanced delivery systems to overcome the toxicity and poor bioavailability of conventional therapies. This study focuses on the systematic preparation and standardization of Nanostructured Lipid Carriers (NLCs) loaded with *Mimosa pudica* ethanolic extract (EPE) for targeted breast cancer treatment. The EPE-NLCs were formulated using hot homogenization and probe ultrasonication, utilizing a matrix of stearic acid and oleic acid stabilized by Poloxamer 188.

Characterization revealed spherical nanoparticles with a Z-average of 140.6 nm, a polydispersity index of 0.275, and a zeta potential of -30.7 mV, indicating excellent colloidal stability. The formulation achieved an entrapment efficiency of 72% and demonstrated a biphasic, sustained release profile over 14 hours. MTT assays on MCF-7 cells confirmed potent cytotoxic activity ( $IC_{50} = 73.52 \mu\text{g/mL}$ ), with morphological analysis showing significant apoptosis induction. These results highlight the potential of EPE-NLCs as an effective, biocompatible platform for enhancing the therapeutic efficacy of phytoconstituents in breast cancer therapy.

**Keywords:** *Mimosa pudica*, nanostructured lipid carriers (NLCs), breast cancer, MCF-7 cell line, phytotherapy, targeted drug delivery