

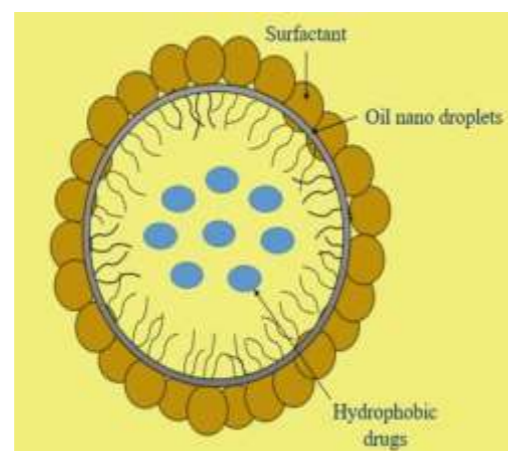
## DEVELOPMENT OF LETROZOLE LOADED MAGNETIC NANOEMULSION FOR BREAST CANCER TREATMENT

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### INTRODUCTION & AIM

1.38 Million new breast cancer cases each year  
Every four minutes, an Indian woman is diagnosed with breast cancer  
458000 deaths from breast cancer every year  
one woman dies of breast cancer, every 13 minutes in India



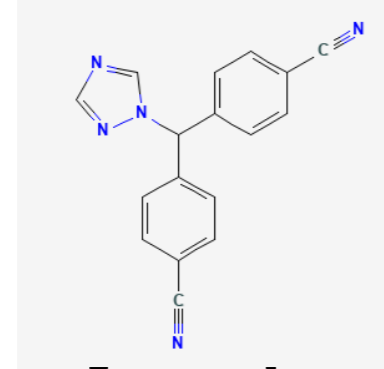
O/W nanoemulsion [Ashwini Devaraj & Gayathri Mahalingam 2020]



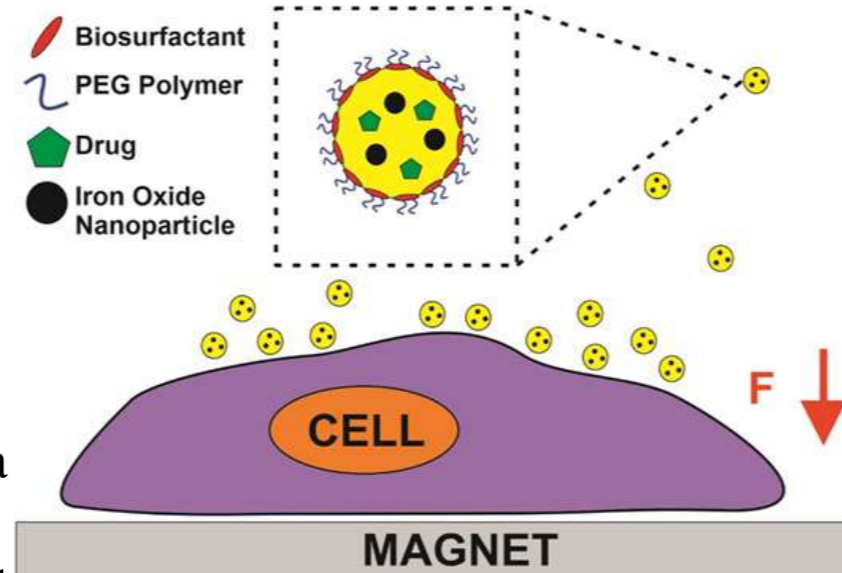
Advantages of nanoemulsion [Pranchal Rajput, et al., 2023]

Breast cancer statistics in India [Cancer Consult India]

**AIM:** To formulate letrozole loaded magnetic nanoemulsion for the targeting drug delivery system for the breast cancer.



Letrozole



Magnetically targeted nanoemulsion [Russell J. Wilson, et al., 2023]

**OBJECTIVES:**

- To optimize the process parameter to produce a formulation with desired properties.
- To develop an ideal formulation of letrozole loaded magnetic nanoemulsion.
- To evaluate the physico-chemical parameters and *in-vitro* cytotoxicity of prepared magnetic nanoemulsion.

### METHOD

**OPTIMIZATION OF NANOEMULSION**

The composition and concentration of surfactant, co-surfactant and oil was determined using the pseudo ternary phase plot

**SYNTHESIS OF CITRIC ACID COATED MAGNETIC NANOPARTICLES**

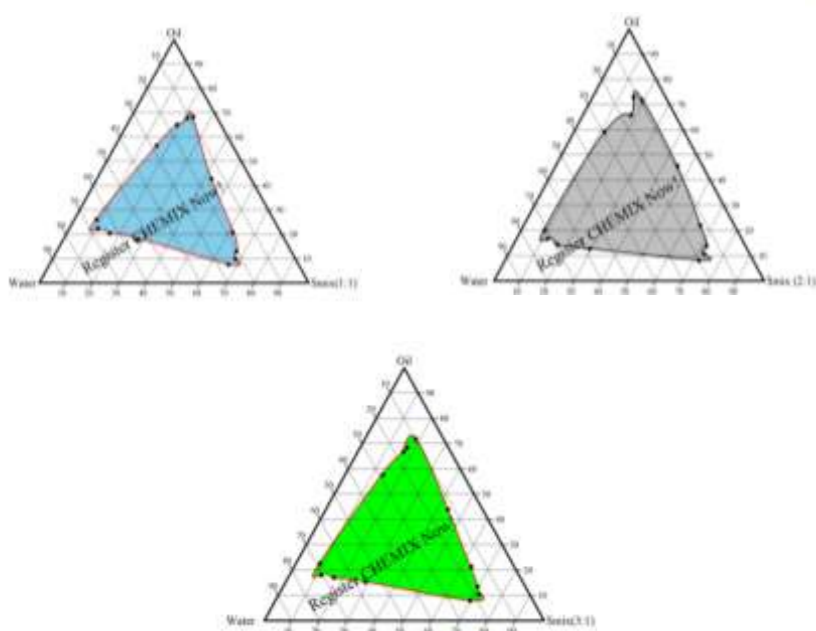
Ferrofluid was prepared via co-precipitation method [Petcharoen & Sirivat, 2012]

Stabilization with citric acid

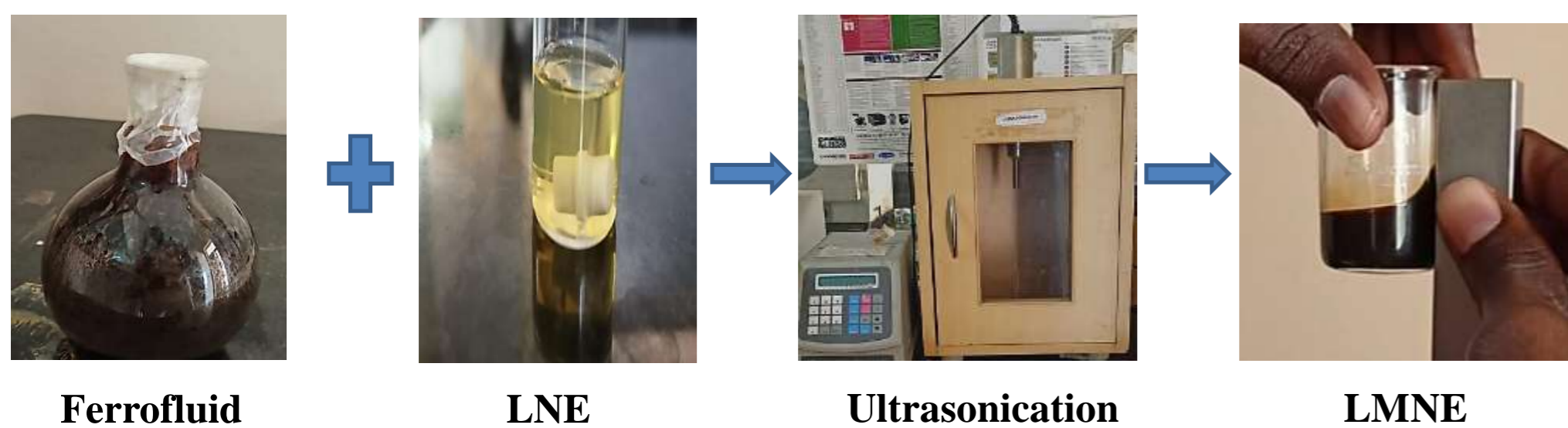
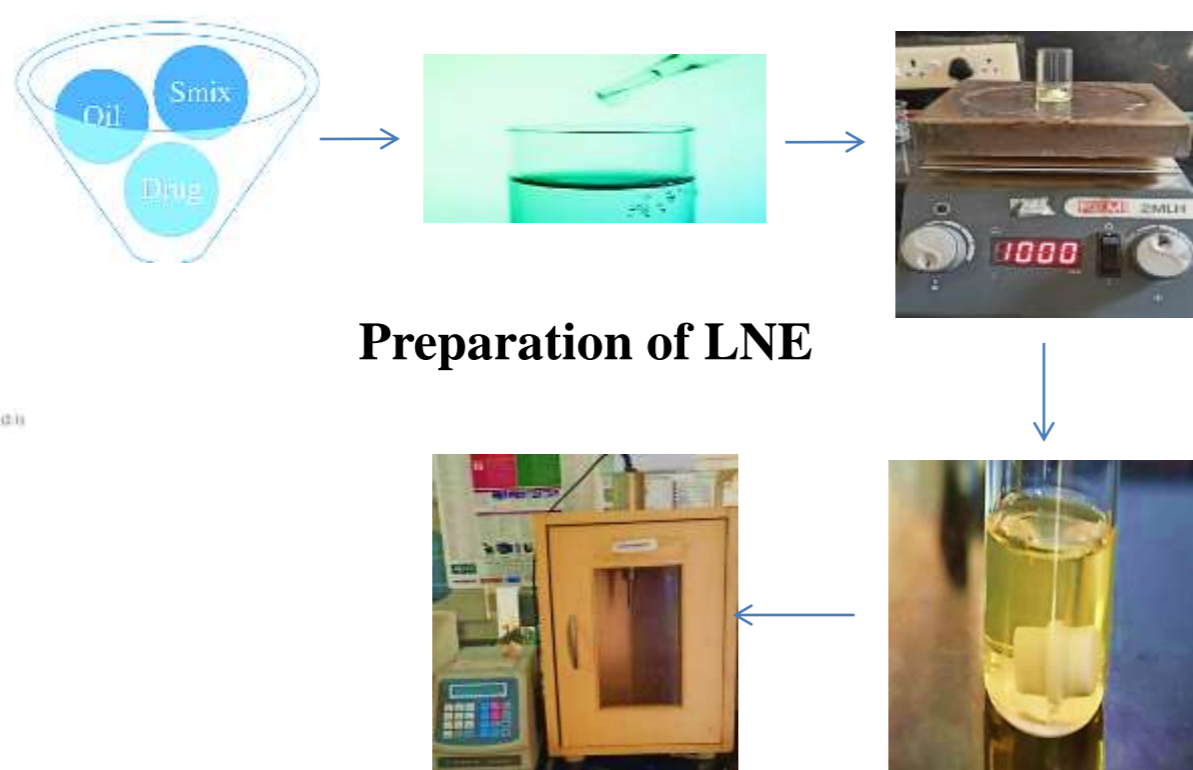
**FORMULATION OF LETROZOLE LOADED MAGNETIC NANOEMULSION**

Spontaneous emulsification technique was utilized for the preparation of magnetic loaded nanoemulsion [Sugumar, et al., 2015]

Ternary phase diagram



Preparation of LNE



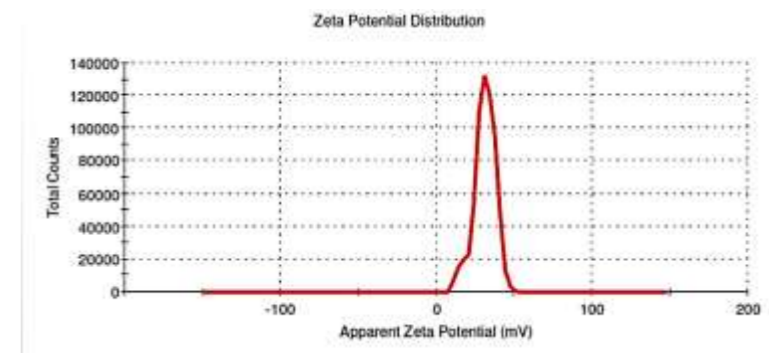
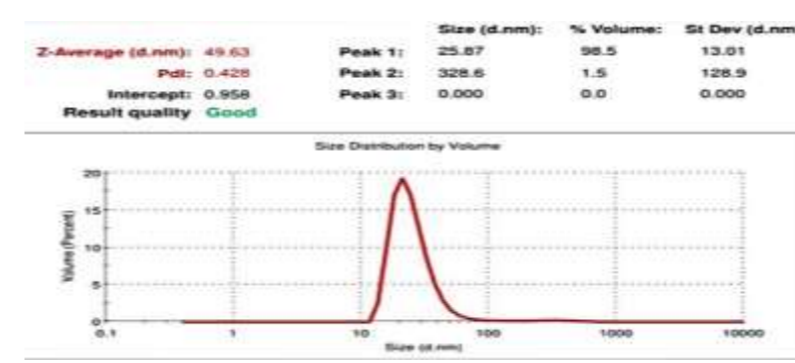
Ferrofluid

LNE

Ultrasonication

LMNE

### RESULTS & DISCUSSION



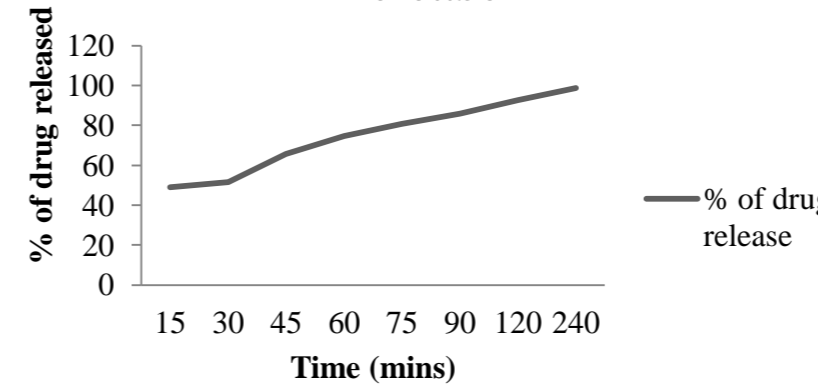
Particle size, PDI and Zeta potential value of LMNE are 49.63nm, 0.428 and 26.9mV respectively

**Dilution test**

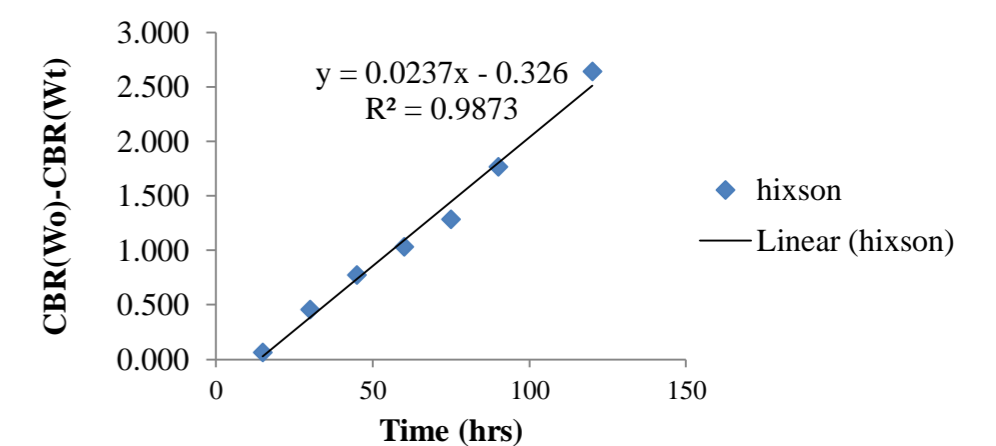


**VISCOSITY & pH:** The viscosity value was found to be 3.35 which is determined by using oswald viscometer & the pH value was found to be 7.53.

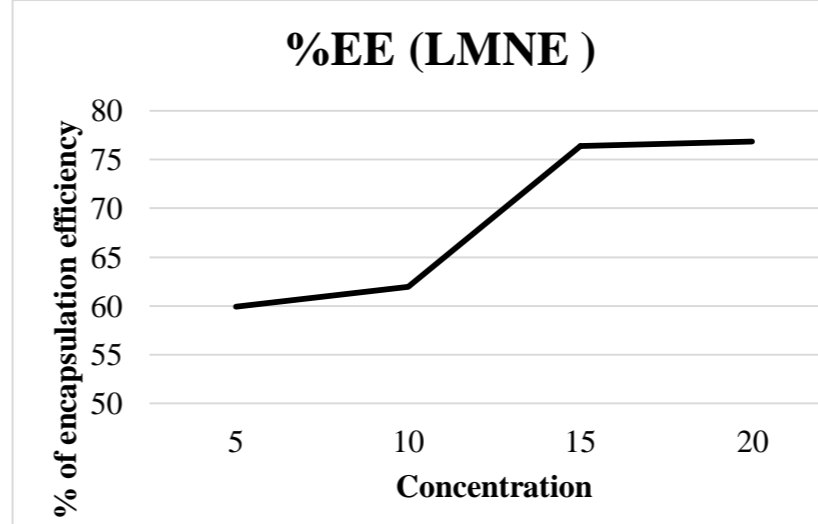
**Time (mins) Vs % of drug release**



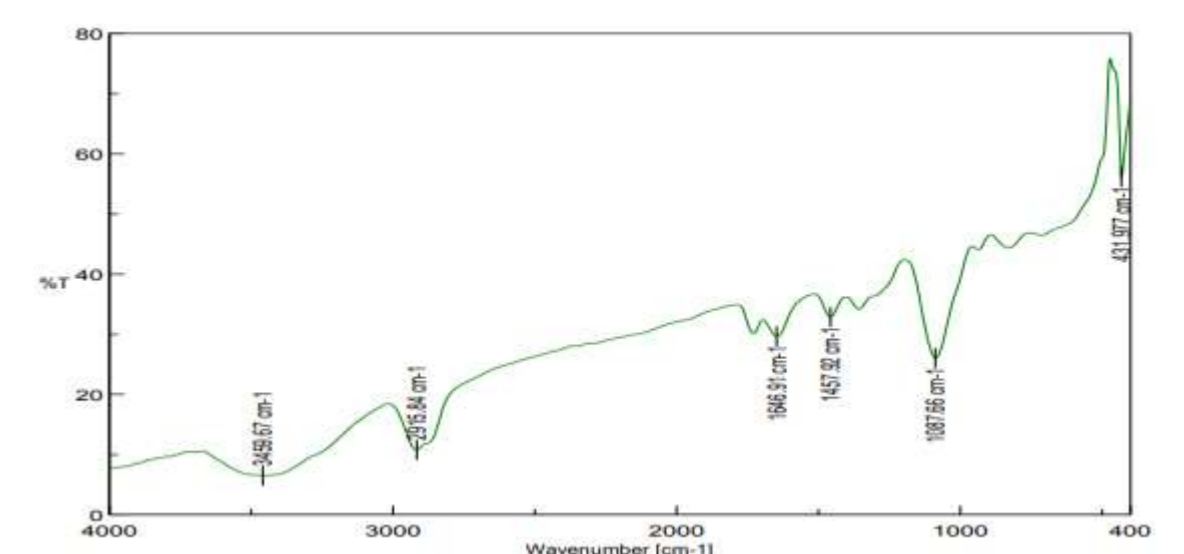
**Hixson crowell model**



**%EE (LMNE)**



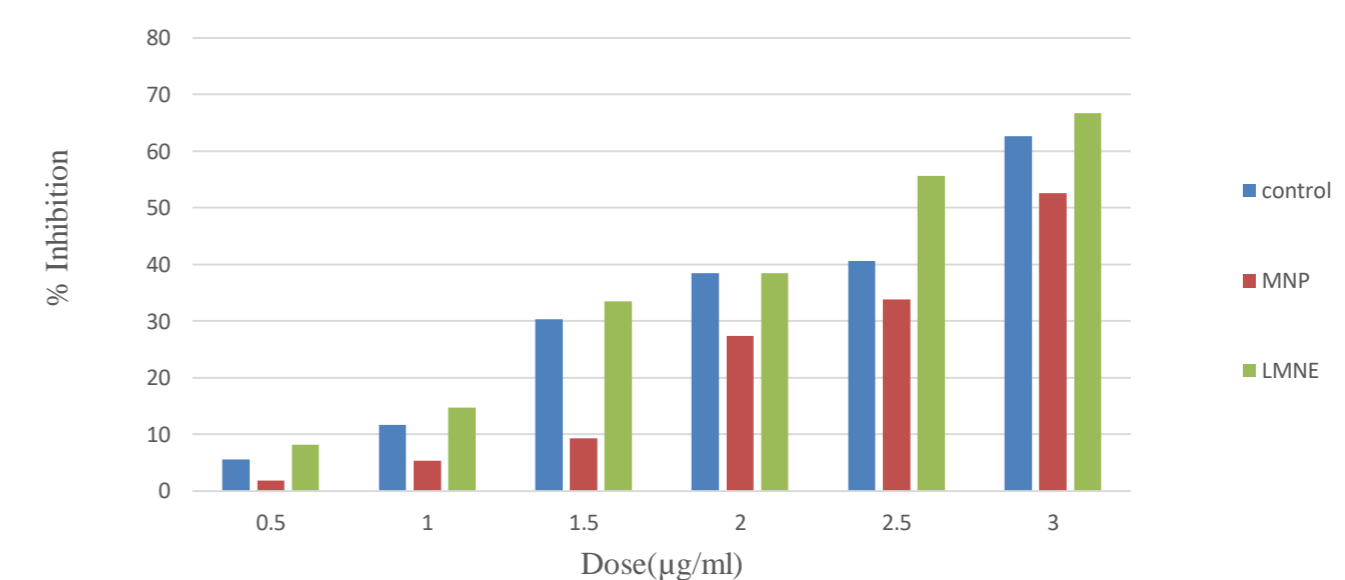
**FTIR spectrum of LMNE**



**Thermodynamic stability test**



**MTT assay(MCF-7breast cancer cells)**



### CONCLUSION

The recipe and process parameters for the LMNE has been optimized by pseudo ternary phase diagram. From the results it can be concluded that the developed Letrozole magnetic nanoemulsion is a suitable module for controlled and targeted drug delivery for combating breast cancer.

### FUTURE WORK

*In-vivo* studies will be performed in future to assess the activity of the letrozole magnetic nanoemulsion.