



Figure 11: Contour plot, Predicted V/S actual plot and Three-dimensional response surface plot depicting the impact of Lipid and Surfactant on Drug release (%) respectively

CONCLUSION:

In the present work, Rivastigmine Tartrate SLN was successfully prepared by modified solvent emulsification diffusion technique. The various physicochemical properties and the *in vitro* release behavior were greatly affected and can be controlled by optimizing the compositional variables represented in the concentration of surfactant and lipid as well as the type of lipid used. The sustained release behavior of Rivastigmine Tartrate SLN with favorable physicochemical characteristics can form a foundation for further clinical studies using these nanoparticles for the transdermal delivery of Rivastigmine Tartrate.

REFERENCES:

1. Hebert LE, Scherr PA, *et al.*, Alzheimer disease in the US population: prevalence estimates using the 2000 census. *Arch. Neurol.* 2003;60:1119-22.
2. Kelley BJ, Petersen RC. Alzheimer's disease and mild cognitive impairment. *Neurol. Clin.* 2007;25:577-609.

3. Ajay KB *et al.*, A novel electronic skin patch for delivery and pharmacokinetic evaluation of donepezil following transdermal iontophoresis. *Int. J. Pharm.* 2013;453:395-99.
4. Ziwei C, Maria D *et al.*, Discovery of novel rivastigmine-hydroxycinnamic acid hybrids as multi targeted agents for Alzheimer's disease. *Eur. J. Med. Chem.* 2016. DOI: 10.1016/j.ejmech.2016.09.052.
5. Scheltens P, Blennow K *et al.*, Alzheimer's disease. *Lancet.* 2016. DOI:10.1016/S0140-6736(15)01124-1.
6. Inglis F. The tolerability and safety of cholinesterase inhibitors in the treatment of dementia. *Int. J. Clin. Pract. Suppl.* 2002:45-63.
7. Gallarate M, Trotta M *et al.*, Preparation of solid lipid nanoparticles from W/O/W emulsions: preliminary studies on insulin encapsulation. *J. Microencapsulation.* 2009;26:394-402.
8. Jennings V, Lippacher A, Gohla SH. Medium scale production of solid lipid nanoparticles (SLN) by high pressure homogenization. *J. Microencapsulation.* 2002;19:1-10.
9. Kim YT, Kim K *et al.*, Antimicrobial active packaging for food, in: J. Kerry, P. Butler (Eds.), *Smart Packaging Technologies for Fast Moving Consumer Goods.* John Wiley & Sons, Ltd., Chichester. 2008:99-110.
10. Ricardo C, Victor A, Feral T. Encapsulation of Vitamin B2 in solid lipid nanoparticles using supercritical CO₂. *J. of Supercritical Fluids.* 2016:1-11.
11. Mehnert W, Mader K. Solid lipid nanoparticles production, characterization and applications. *Adv. Drug Deliv. Rev.* 2001;47:165-96.
12. Gasco MR. Method for producing solid lipid microspheres having a narrow size distribution, US Patent 5 250 236 (1993).
13. Bunjes H, Westesen K, Koch MHJ. Crystallization tendency and polymorphic transitions in triglyceride nanoparticles. *Int. J. Pharm.* 1996;129:159-73.
14. Rohit B, Indu KP. A method to prepare solid lipid nanoparticles with improved entrapment efficiency of hydrophilic drugs. *Curr. Nanosci.* 2013;9:211-20.
15. Charcosset C, El-Harati A, Fessi H. Preparation of solid lipid nanoparticles using a membrane contactor. *J. Controlled Release.* 2005;108:112-20.
16. El-Harati A, Charcosset C, Fessi H. Influence of the formulation for solid lipid nanoparticles prepared with a membrane contactor. *Pharm. Technol.* 2006;1:153-57.
17. Rakesh KS, Navneet S, Sudha R, Shivkumar HG. Solid lipid nanoparticles as a carrier of metformin for transdermal delivery. *Int J Drug Deliv.* 2013;5:137-45.
18. Homayouni A, Sadeghi F, Nokhodchi A, Varshosaz J, Garekani HA. Preparation and characterization of celecoxib solid dispersions; comparison of poloxamer-188 and PVP-K30 as carriers. *Iran J Basic Med Sci.* 2014;17:322.
19. Bahulkar SS, Munot NM, Surwase SS. Synthesis, characterization of thiolated karaya gum and evaluation of effect of pH on its mucoadhesive and sustained release properties. *Carbohydr Polym.* 2015;130:183-90.
20. Gowrav MP, Umme H, Shivkumar HG *et al.*, Polyacrylamide grafted guar gum based glimepiride loaded pH sensitive pellets for colon specific drug delivery: fabrication and characterization. *RSC Adv.* 2015;5:80005-13.
21. Hua Y, Jianga X, Dinga Y, Zhanga L, Yanga C, Zhang J. Preparation and drug release behaviours of nimodipine-loaded poly (caprolactone)-poly(ethylene oxide)-poly(lactide) amphiphilic copolymer nanoparticles. *Biomaterials.* 2003;24(13):2395-404.
22. Omray LK. Formulation and characterization of solid lipid nanoparticles for Transdermal delivery of Testosterone. *Int J Pharm Sci Res.* 2014;15(7):323-28.