Statement of research achievements

I hereby declare that I was selected as **Zonal 1st Runner up and Semifinalist** (received a cash prize of ₹ 7,000/-) in All India 'DRPI 2021 – Online'. It is a scientific research presentation competition for young pharmaceutical researchers across academia and industry, organized by SPDS in association with AAPS and APTI.

Title of research work presented: Selection of an appropriate dissolution medium and release mechanism from lipid based nanoparticles.

Summary of the work:

The present study provides a rationale for selecting an appropriate dissolution medium for drugs like TMZ and phospholipid based nanoformulations. Solubility of TMZ in different solvents and buffers was evaluated. The stability of TMZ at different pH conditions (1.2, 4.5 and 7.4) was evaluated and the degradation rate kinetics were studied respectively. Further, TMZ loaded lipid nanoparticles were formulated. In order to select an appropriate dissolution medium, in-vitro drug release studies were conducted in three different dissolution media (0.1 N HCl, pH 4.5 acetate buffer, pH 7.4 phosphate buffer). The effect of drug loading on release rate and release mechanism of TMZ from lipid based nanoparticles was studied.

In-vitro drug release studies revealed that 100 % drug released in 2 h and remained stable thereafter in 0.1 N HCl, 100 % drug released up to 12 h in acetate buffer and in phosphate buffer the TMZ concentration increased in initial 1 h followed by decrease in concentration. Phospholipids used in the preparation of nanoparticles were sensitive to extreme pH conditions leading to disruption of particles and dissolution of drug in 2 h when 0.1 N HCl was used as the media. TMZ is not stable in pH 7.4. Extreme pH conditions provided by pH 1.2 0.1 N HCl were not suitable in dissolution medium for nanoparticles formulated using phospholipids. Hence, pH 4.5 was selected as an appropriate dissolution medium for TMZ. Faster drug release rate was observed with higher drug loading. The % drug loading is likely to affect the release rate of the drug from the nanoparticles.

Tejashree Waghule

Date: 25/08/2023