Abstract No: 780 ***Health and Hygiene***

EFFECT OF DRUG CONCENTRATION ON DROPLET SIZE IN VIRGIN COCONUT OIL BASED EMULSIONS

R.K. Suraweera*, H.G.P. Pasansi and M.H.F. Sakeena

Department of Pharmacy, Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka
**ruwanirks@gmail.com*

Emulsions are novel drug delivery systems and are widely used in pharmaceutical and cosmetic applications. The droplet size of the emulsion affects the stability, drug penetrability, spreading, ultimately bioavailability and effectiveness of the formulation and depends on concentration ratios of oil, surfactant and water. The aim of the present study was to identify the effect of drug concentration on the droplet size of virgin coconut oil (VCO) based emulsions.

Ketoprofen and Piroxicam were selected for the drug loaded preparations. The emulsions were prepared using ratios which resembled oil-in-water creamy emulsions which were selected by constructing ternary phase diagrams, investigated for stability and the optimized formula identified. Accordingly, VCO and Tween 80® were mixed with the magnetic stirrer at 600 rpm and 25^0C for 15 minutes until a clear mixture was formed. Ketoprofen and Piroxicam were added to the resulting mixture in concentrations of 0.625%, 1.25%, 2.5% and 1%, 2%, 3%, 4%, respectively, taking into account the drug concentration of the marketed product of Ketoprofen which is 2.5% and Piroxicam which is 2%. Distilled water was added to this mixture drop wise with constant stirring and was further treated with high shear homogenizer at 1200rpm for 5 minutes at 25^0C to obtain uniform and nano-sized droplets. The droplets size of all the preparations was analyzed by zetasizer.

The droplets size of drug loaded emulsions increased with increasing drug concentrations. In Ketoprofen incorporated emulsions, the 2.5% and 0.625% samples had the highest droplets size of 147.7 nm and the lowest droplets size of 101 nm, respectively. In Piroxicam incorporated samples, the 4% and 1% samples had the highest droplets size of 198.4 nm and the lowest droplets size of 119.7 nm, respectively. At drug concentrations of 1.25%, and 2.5% with Ketoprofen and 3% and 4% with Piroxicam, the droplet sizes were 145.5nm, 147.7nm and 188.3nm, and 198.4nm, respectively, showing insignificant increment.

The increment of the droplet size with the increasing drug concentration could be because of the amphiphilic nature of drugs which can affect the lipophilic core of the surfactants, thus leading to larger droplets. At a certain percentage, there is no significant increase in the droplets size. This indicates that the excess drug in the droplets lead to an increase in the concentration of undissolved drug in the globule of the emulsion system, thus limiting the further increment of droplets size. The finding of this study proves that the droplets size of VCO based emulsions increased with the increasing percentage of Ketoprofen and Piroxicam.

Financial assistance by University of Peradeniya (RG/2011/10/AHS) is acknowledged.