

## ABSTRACT

Diabetes mellitus is a metabolic disorder causing a great economic burden globally. It is extremely important to construct an inexpensive and reliable treatment having rare side effects. This study demonstrates the use of *Aegle marmelos* fruit extract as herbal medicine, Magnesium oxide nanoparticle, Copper nanoparticle and DNA-loaded chitosan nanoparticle as nanomedicine, individually as well as combined anti-hyperglycemic effect. All treatments were compared with commercially available medicine. Maximum reduction in blood glucose levels (BGLs) was shown by 5mg/kg DNA-loaded chitosan nanoparticles ( $74.2\pm 0.95$ ) and their combination with *Aegle marmelos* fruit extract (500mg/kg) ( $60\pm 2.72$ ) as compared to the standard drug - Glucophage (500mg/kg) ( $43.6\pm 1.28$ ). Body weight analysis was also observed in experimental mice. Maximum decrease of body weight observed was of 3.95g by DNA-loaded chitosan nanoparticle (5mg/kg) while increase in body weight was observed in positive control. The results suggest that (5mg/kg) DNA-loaded chitosan nanoparticles and their combination with *Aegle marmelos* fruit extract could be a potent anti-diabetic agent.