***Cite this as*:** Kabiru DAUDA, Zulaikha BUSARI, Olajumoke MORENIKEJI, Funmilayo AFOLAYAN Oyetunde OYEYEMI, Jairam MEENA, Debasis SAHU, Amulya PANDA, 2017. Poly(D,L-lactic-co-glycolic acid)-based artesunate nanoparticles: formulation, antimalarial and toxicity assessments. *Journal of Zhejiang University-Science B (Biomedicine & Biotechnology)*, 18(11):977-985. http://dx.doi.org/10.1631/jzus.B1600389

Poly(D,L-lactic-co-glycolic acid)-based artesunate nanoparticles: formulation, antimalarial and toxicity assessments

Key words: Poly(D,L-lactic-co-glycolic acid) (PLGA), Artesunate-PLGA delivery system, Antiplasmodial, Toxicity

JZUS-B

Introduction

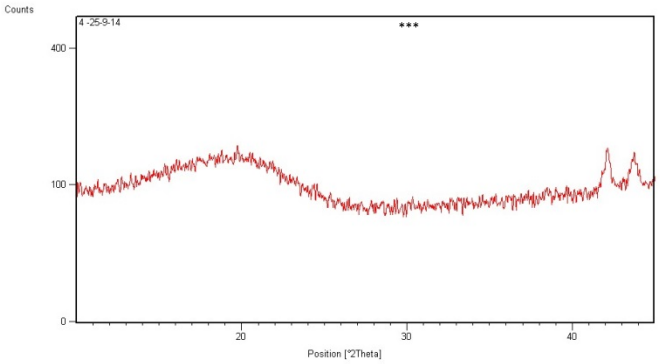
- Malaria is a life threatening disease
- Toxicity and poor bio-distribution of many malaria drugs necessitate the need for new drugs
- Artesunate has short half-life and shows low bioavailability
- Development of a carrier that can maintain a sustained release profile and avoid rapid degradation of the drug is essential for its effective therapeutic usage.

Methods

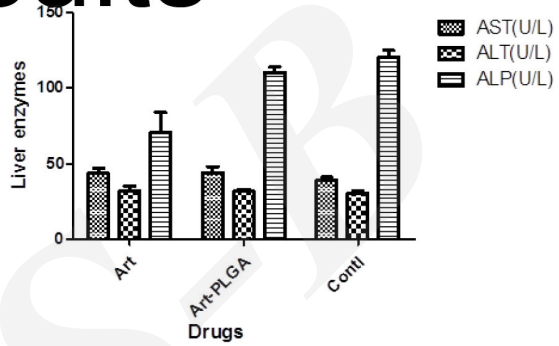
- Preparation of nanoparticles
- Measurement of particle size and zeta potential
- X-ray diffraction (XRD) analysis and differential scanning calorimetry (DSC)
- Drug entrapment and encapsulation efficiency
- Antiplasmodial evaluation using the Peters' 4-day suppressive test

JZUS-B

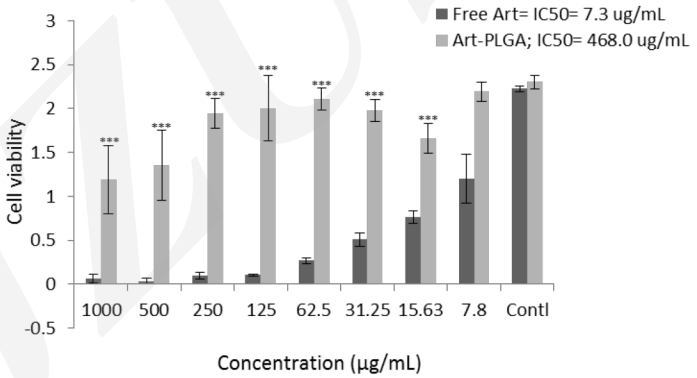
Results



XRD spectra of formulated polymeric nanoparticles



Hepatic toxicity assessment of free and nanoparticulate artesunate



Cell viability and inhibitory concentrations in free and entrapped drug

Conclusions

- Artesunate nanoparticle is amorphous in nature
- Absence of a decomposition exotherm indicates the increased physical stability of drug
- There was no sign of hepatic and haematological toxicity following use of the tested drugs
- Artesunate nanoparticle was less cytotoxic than free artesunate in RAW 264.7 cell