**Oral co-polymeric nano gels for targeted** **dapagliflozin delivery against colon cancer**

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**Abstract**

Dapagliflozin (DAPA) is renowned for its poor safety profile due to its rapid body distribution and low solubility. As a result, an oral long-acting and sedimented nanogel was developed to release coated DAPA nanoparticles, which dispersed better than raw DAPA particles. To repurpose DAPA for cancer treatment, it exhibits anti-cancer and anti-inflammatory properties against colon cancer cells. DAPA nanoparticles were studied utilizing FT-IR, PXRD, SEM, the DAPA encapsulation assay, and release experiments. The targeting/sediment-forming gel that encapsulates the DAPA was improved and described. The DAPA co-polymeric nanoparticles were investigated to determine DAPA's anti-cancer and anti-inflammatory properties against colon cancer cells. Furthermore, in vivo rat absorption and biocompatibility experiments were performed on the raw DAPA, blank formula, and DAPA optimized nano gels. DAPA nanoparticles were two and ten times more soluble in 0.1N HCl and pH 6.8 than raw DAPA powder. The enhanced DAPA nanoparticles had a particle size of 200.40±18.60 nm and a zeta potential of -30.11±0.80 mV, respectively. FT-IR, PXRD, SEM, and TEM characterizations indicated a polymeric covering on DAPA particles. The study concluded that this improved controlled-release sedimented-forming gel is a viable local oral therapy to colon cancer. The repurposing of DAPA co-polymeric nanoparticles for stomach cancer and related gastritis treatment was supported based on in vivo rat absorption and biocompatibility investigations for raw DAPA, blank formula, and DAPA tailored nano gel.

**Keywords**

Targeted; colon-targeted; controlled release; colon cancer; polymeric nanoparticles; dapagliflozin.