In-vitro green tea polyphenols (GTP) release profile from BGN and BCGN nanospheres:

The release of GTP from BGN and BCGN was observed to biphasic as initial burst phase followed by slower diffusion controlled release of GTP (Fig. 1a). This phenomenon is commonly seen in drug release from nanoparticles.[1]

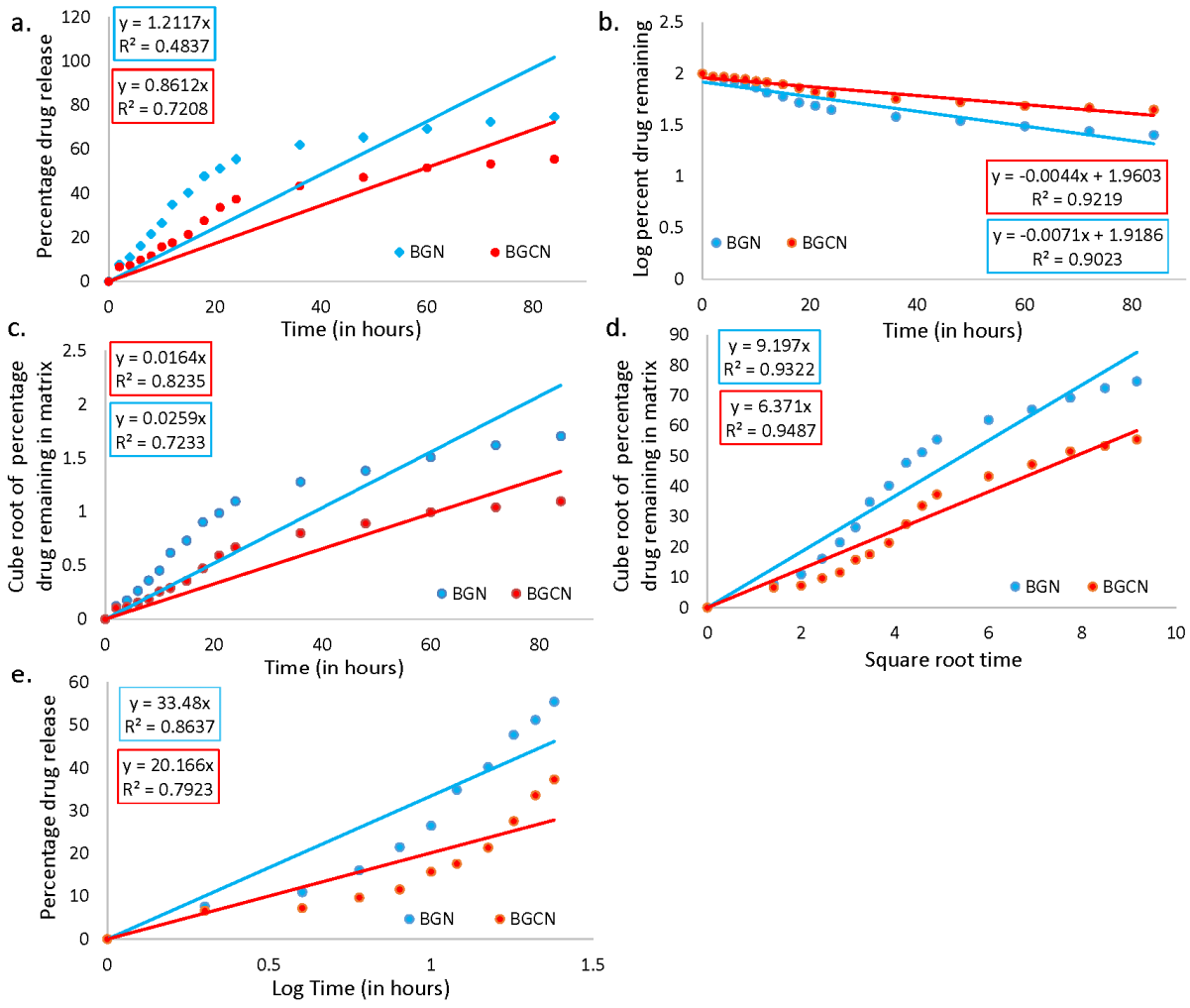

Fig. 1: *In-vitro* GTP release profile from BGN and BGCN were plotted on (a) zero-order, (b) first-order, (c) Higuchi, (d) Hixson-Crowell, and (e) Korsmeyer-Peppas kinetic models plot.

To study the kinetics of drug release from nanoparticles, cumulative drug release data was fitted on zero-order, first-order, Higuchi, Hixson-Crowell, and Korsmeyer-Peppas reaction kinetic models.[2] The zero-order describe the release rate of the drug is independent of its concentration. The first order describes the drug release rate from the matrix is dependent of its concentration. Higuchi's model describes the drug release from insoluble complex is based on Fickian diffusion process. Hixson-Crowell cube root law model describe the drug release rate is dependent on dissolution rate. Korsmeyer-Peppas model is based on the release of drug from polymeric system and valid up to 60% drug release. The *in-vitro* GTP release from BGN was found to best describe by Higuchi model as the plots showed the best linearity (R^2=0.9263) followed by first-order ($R^{2=}$0.9219), Korsmeyer-Peppas (R^2=0.8637), Hixson-Crowell (R^2=0.7233), and zero-order (R^2=0.4837). The present result indicates the GTP release from BGN follows the anomalous transport or fickian diffusion kinetics. The in-vitro GTP release from BGCN was also found to best describe by Higuchi model as the plots showed the best linearity (R^2=0.9487) followed by first-order ($R^{2=}$0.9023), Hixson-Crowell (R^2=0.8235), Korsmeyer-Peppas (R^2=0.7923), and zero-order (R^2=0.7208). The present result indicates the GTP release from BGCN follow the anomalous transport or fickian diffusion kinetics and not due to any other process such as particle erosion or dissolution process.[2]

References:

1. Fu, Y.; Kao, W. J. Drug Release Kinetics and Transport Mechanisms of Non-degradable and Degradable Polymeric Delivery Systems. Expert Opin. Drug Delivery. **2010**, *7*, 429–444.

2. Chavda, H. V.; Patel, C. N. Preparation and In Vitro Evaluation of a Stomach Specific Drug Delivery System based on Superporous Hydrogel Composite. Indian J. Pharm. Sci. **2011**, *73*, 30–37.