oral administration shows that the presence of PEG onto the silica nanoparticles did not increase the permeation behavior of insulin through the small intestinal mucosa (Andreani et al., 2014).

1.4.5. Nanotechnology and Nanoparticles

Today, a vast number of investigations have been focused on nanoparticles and their role as drug delivery vehicles. Nanoparticles were first introduced in the mid-seventies by Birrenbach and Speiser (Birrenbach & Speiser, 1976). Our work is related in general to nanotechnology, involved the fabrication of nanoparticles of insulin by utilizing one of biodegradable polymer. Nanoparticles are generally defined as particles between 10nm and 1000 nm (De Jong & Borm, 2008).

Polymeric nanoparticles have the advantages of protecting the protein and peptide drugs, such as insulin, from chemical and enzymatic degradation in the GIT, increasing their stability and absorption across the intestinal epithelium as well as controlling the drug release (Vila et al., 2002). For the conventional medicine, it is well understood the nanosize along with other characteristics does play an important role as evident from the improved bioavailability/pharmacological availability. Owing to the high surface area to volume ratio of NPs, the window of absorption is also high in comparison with microparticles; this is an added advantage in improving the bioavailability of the administered drug. One example for biodegradable polymer is called chitosan (Sung et al., 2012).