In many cases, conventional drug delivery provides sharp increase in drug concentration often achieving toxic level and following a relatively short period at the therapeutic level of the drug concentration eventually drops off until re-administration. In order to obtain maximum therapeutic efficacy, it becomes necessary to deliver an agent to the target tissue in the optimal amount for the required period of time, thereby causing little toxicity and minimal side effects. [Robinson et al., (1978)]

There is a continuously growing interest in the pharmaceutical industry for extended release oral drug delivery systems. There is also a high interest for design of dosage formulations that allow high drug loading, particularly for actives with high water solubility. The primary benefit of extended release formulation compared to an immediate release formulation is that a more uniform maintenance of blood plasma active concentration is achieved. Thus, potentially avoiding undesirable peaks and troughs associated with multiple immediate release formulation.[Chien YW (1992)]

Extended release (ER) delivery systems for oral dosing are effective in achieving optimal therapy with drugs that have a narrow therapeutic range of blood concentration or eliminate rapidly. Extended release products are designed to bring the blood level of a drug immediately to therapeutic concentrations by means of an initial dose portion and then sustain this level for a certain predetermined time with the maintenance portion. Extended release of drugs in gastro-intestinal tract following oral administration is not affected by the absorption process. It is therefore essential in the development stages of oral extended release dosage forms to use dissolution methods that allow pharmacokinetic monitoring of the dosage forms, in particular, the prediction of the absorption rate and the bioavailability. Extended release oral dosage forms have become more important in therapy as a means of reduced dosing frequency, hence potentially improving patient compliance and consequently efficacy. The principal goal of extended release dosage forms is the improvement of drug therapy assessed by the relationship between advantages and disadvantages of the use of extended release systems. [Tiwari BS et al., (2003)]

The blood level of a drug reaches to the therapeutic concentrations as soon as possible with extended release dosage forms and then this level maintains for a certain period time. [Lakade SH et al., (2008)]
In vitro dissolution testing enables the rapid evaluation of oral extended release preparations. Dissolution testing is critical because drug release from the solid dosage form after oral administration is a prerequisite for drug absorption and bioavailability. Drug dissolution is a key property of the product for extended release formulations. Equally important is the retention of drug dissolution properties after storage is also important. Ideally, a product would retain its dissolution characteristics from the time of manufacture to its expiration date. Pharmaceutical companies typically characterise the in vitro dissolution of a reference and test product during formulation development, preclinical studies, and stability studies. The development of extended release formulations has brought about the need for appropriate quality control methods such as in vitro dissolution testing. These tests are principally designed to obtain correlation with in vivo performance of the formulation. If a good correlation can be obtained with an in vitro test, the test may serve as a routine quality control or may be useful in screening new drug formulations. Several approaches to assess in vitro and in vivo correlations, particularly for extended release dosage forms, have been used. These include plots of the mean percentage released against the mean percentage absorbed and statistical analysis based on the correlation between the mean residence time and the mean dissolution time. The acceptance criteria are defined in USP 24. [Shanthi CN et al., (2010)]

Many of the anti-hypertensive drugs currently considered useful have a short biological half life and need to be administered several times a day. The administration frequency of such anti-hypertensive drugs can be decreased; it will not only lessen the burden on patients but also enhance compliance of the patients and bring about higher treatment effects. For this end, it is necessary to control release of an anti-hypertensive drug in such a manner that an effective concentration in blood can be maintained over an extended period of time. The advantage to the patient and clinician in having consistent and uniform blood levels of medication over an extended period of time are likewise recognised. [Takka S et al., (2001)]

Development of a once daily oral extended release formulation of anti-hypertensive drug would be a significant advantage for patient compliance accompanied by minimization of the drug side effects as a result of reduction in the drug blood concentration fluctuations, especially in long-term therapy. [Takka S et al., (2001)]