Estimation of Pharmaceutical Compounds by Kinetic Method- A Laboratory Experiment

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Kinetic (reaction-rate) methods of analysis have advantages of high sensitivity, extremely low detection limit, good selectivity, rapid analysis rate and above all inexpensive instrumentation over traditional equilibrium (static) methods of analysis. The kinetic estimations are being made mostly by using calibration plots obtained between change in rate constant, time at fixed concentration(absorbance) concentration(absorbance) at fixed interval of time and also by one / two points methods. .The recent work incorporates kinetic and analytical studies of red-ox reactions of one equivalent oxidants in acid medium with Atenolol and Metaprolol which are used as β-blocker pharmaceutical compounds in the treatment of several diseases of cardiovascular system, and also hexitols ( *sorbitol and mannitol*) .

The outcome of kinetic cerimetric estimation of atenolol in simulated raw(API) samples after validation has been logically extended to develop as laboratory experiment with tablets (Aten(Zydus Cadila), Tenormin (Abbott Healthcare) and Atecard, (Dabur) **)** using “indicator reaction” represented as :

[C](http://en.wikipedia.org/wiki/Carbon)14[H](http://en.wikipedia.org/wiki/Hydrogen)22[N](http://en.wikipedia.org/wiki/Nitrogen)2[O](http://en.wikipedia.org/wiki/Oxygen)3+ 2Ce(IV) + 2H2O [C](http://en.wikipedia.org/wiki/Carbon)10[H](http://en.wikipedia.org/wiki/Hydrogen)10[O](http://en.wikipedia.org/wiki/Oxygen)5 + C4H11N + NH3 + 2Ce(III) + 2H+

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In laboratory experiments for students, twenty tablets were crushed and weighed of each brands and then from these crushed powder 660mg was weighed make up to 100ml with distilled water, 3 ml(0.9mg/ml) of this was taken in the reaction mixture as per kinetic experimental conditions of indicator reaction using fixed time and fixed absorbance methods for the estimation of atenolol in samples.

The results(Fixed time method= 100.1% Fixed absorbance method=101.3%) were found comparable with the estimations made with the methods described in Indian (99.43%) and European Pharmacopoeia(100.7%).Attempts are being made to develop laboratory experiments with other pharmaceutical products and other one equivalent oxidants used in kinetic estimation studies.

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**Thrust area :Chemical education Oral presentation**