REVIEW:
2. Review of Literature:
A thorough literature survey on the topic has been done and very prominent are:

Bhise S et al., (2011) was reported the result of the experiment done by him on Solubility enhancement of telmisartan drug by solid dispersion technique with the help of polymer like Gelucire, Poloxamers, HPMC E4 and PEG 6000. The solubility of drug may increased by using various methods like inclusion complex, solid dispersion, micronizations, lyophilizations, etc, here he done by using solid dispersion - fusions method and evaluated the parameter like saturation solubility studies, and also In vitro disso of pure drug, physical mixture and solid dispersion was carried out. Characterization of the drug is done by FT-IR spectroscopy, differential scanning calorimetry and X-ray diffractometry studies.

What he found the result by using these polymers was that all they are increasing the dissolution rate of drug (telmisartan) in solid dispersion comparative to that of pure drug. Basically telmisartan is insoluble in water and sparingly soluble in strong acid and it is soluble in strong base. Telmisartan is act by blocking the binding of angiotensin II with its relative receptor rather bind itself reversibly. The normal dose of telmisartan is 40mg to160mg. Intake of food reduces its bioavailability up to 6% to 20% .The usual bioavailability of drug is about 42%, therefore attempt has made here to improve its bioavailability by solid dispersion in fusion method.

This method includes heating of physical mixture of drug and hydrophilic carrier until it melts and then go for solidification by keeping it on ice bath with vigorous stirring, crush the product obtained and pulverize there after sieve it by using mesh of sieve no 60. Instantaneous solidification of a product contain drug molecule get matrix with the hydrophilic solvent molecule physical mixture. is prepared by taking drug and various polymers of three different ratios and then filter the mixture through sieve no, 60 and collect in a glass vessel then keep it in a desiccators by sealing the glass vessels. in evaluation study he done an phase solubility study to examine the effect of the solublizers
on the poorly soluble drug this phase solubility study carried out here by higuchi and conors method.

He was taken excess amount of telmisartan in an 25 ml of aqueous carrier solution at different concentration and agitated at room temperature of about 48 hrs by keeping it on rotator shaker. When it was found that the product obtained equilibrium filter it by using whatman filter paper and then made appropriate dilution of the product and absorb under UV spectrometer at 292nm. Various characteristic studies he was done. are saturation solubility studies, % practical yield, drug content, XRD, FTIR and DSC

Saturation solubility studies he was done to find the solubility of pure drug and solid dispersion, solution prepared was absorbed under UV spectroscopy at 363 nm. % practical yield is calculated by taking prepared solid dispersion and weighed to check the efficacy of the solid dispersion and this will be done by using the formulas.

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\text{Practical Mass (Solid dispersion)} = \frac{\text{PY (\%)}}{\text{Theoretical Mass (Drug + carrier)}} \times 100
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the % yield value is increased with the increased ratio of about 1:3 further increase in ratio shows decrease in % yield value. The obtained practical % yield value is about 96%. The telmisartan content of all the preparation was assayed by UV spectrometer by observing the absorbance at 292nm and the value what he found is between 96% to 98%. XRD Technique to establish batch to batch reproducibility of a crystalline form, random orientation of a crystal lattice in a powder sample causes the X- ray to scatter in a reproducible pattern of peak intensities at distinct angles relative to the incident beam each diffraction characteristic of a specific crystalline lattice for a given compound, The result obtained by the telmisartan with its polymer shows a decrease in crystallite due to the formation of complex which indicates the formation of amorphous form of solid dispersion.
In DSC measures the heat loss or gain resulting from physical or chemical changes within a sample as a function of temperature like endothermic reaction because of boiling, fusion, sublimation, vaporisation etc, and exothermic reaction is because of formation of crystallity and degradation. By the report of DSC it was found that complex formation between drug and polymer as all the peak of drugs is disappeared indicates the drug turned into amorphous from its crystallite nature.

The dissolution study of telmisartan was carried out by using 0.1N hydrochloric acid containing 1% W/V of sodium laurel sulphate as dissolution media. Obtained result of dissolution of pure drug was found to be 32.89% and that of with polymer PXM 407PM is about 73%, for Gelucire 43/01 PM is about 71.263% and for HPMC it is about 70%. Based on evaluation and characterization results he was found that their may be change in crystalinity of pure drug and complex with various polymer. and it shows increase in solubility of telmisartan drug with all the polymers used and it is more in solid dispersion fusion method than that of the physical mixture method.

**Sheetal Malke et al., (2007)** was done experiment of preparing oxcarbazepine fast dissolving tablets by using Ac-di-sol as super disintegrants with different concentration and Avicel PH 102 as diluent, Fast dissolving tablets are solid dosage forms containing medicinal substances or active ingredients, which disintegrates rapidly usually within a matter of seconds when placed upon the tongue. The oxcarbazepine is an anticonvulsant drug actually a derivative of carbamazepine. Which shows more significant effect than that of carbamazepine, which is act by limiting the frequency of firing of sodium-dependent action potentials by cultured mouse central neurons and reduce Vmax progressively in a use-dependent manner at concentrations below therapeutic plasma concentrations in OCBZ-treated patients? This suggests that blockade of voltage-sensitive sodium channels could contribute to the antiepileptic efficacy of OCBZ.

RDT is prepared by wet granulation method by taking drug of 150 mg and Ac-di-sol in different concentration ranges from (10 to 12%), diluent Avicel PH 102 (10-25%) and starch (8-10%) as binding agent and to reduce bitter taste sodium saccharin is used, the tablets made dose of 300mg. Ac-di-sol is also called croscarmellose which is cross
linking polymer of carboxy methyl cellulose which is having more absorbing capacity of water and swells, that’s why it is the best choice to prepare a rapid dissolving tablet. Evaluation parameters like hardness, friability, weight variation, wetting ability, content uniformity, assay, disintegration time and in vitro drug release are carried out. He was done the Disintegration test by taking Tablets. After placing the tablet in #10 basket, the test was carried out in 25 ml of distilled water at temperature of 37°C and agitation speed of 40 shakes per/min.

Dissolution study carried out in two different media one of which is by 0.1 N HCl v/v Tween 80 and (0.25-1% w/v) and another by taking 1% sodium lauryl sulphate (SLS) solution. The dissolution study was done for half an hour and sample were collected at regular interval of time to check the drug release by using UV/Vis spectrophotometer at wavelength of 255 nm. The drug release of the tablets was also compared with that of the marketed dispersible tablet of oxcarbazepine. Also Stability study he was conducted the result of all the pre formulation studies meets the standards i.e. of 99.8% purity.

He done the standardization using UV and HPLC analysis and according to the results it shows linearity in the range 1 to 20 mg, he tried the formulation by using other diluents like pearlitol and lactose but looking at the result From the DSC studies he found that their may be incompatibility only. Avicel PH102 was as diluent shows best result he tried around 7 formulation with different superdisintegrant and diluent with different concentration the formulation which having less concentration of diluent Avicel PH102 shows less hardness and lesser disintegration time and also he found the with these concentration they shows best compatibility with the drug. Since F-5 was found to be more friable, from formulation he prepared F1 ,F5,F7, which are having of less concentration of Avicel 102 PH as a diluent are more compatible.

From that F1 he was taken for stability study, stability indicating assay by HPLC of blank does not shows any extra peak which shows no interfere of excipients with drug. After the three months period the F1 sample shows area under peak as that found in zero which indicates formula F1 shows more stable. He Also compares the F1 with marketed
oxacarbazepine dispersible tablet for to check the drug release profile for an about half an hour and he does not found the difference in percent release. finally he concluded that fast dissolving tablet of oxacarbazepine was formulated using Ac-Di-sol (12%) as a superdisintegrant, 5% of Avicel PH 102 as diluent and 8.5% starch as binder shows good disintegration time and mechanical strength and effective.

Samal HB et al., (2012) was reported the study of enhancement of solubility of poor water soluble drug aceclofenac by Aceclofenac -β-cyclodextrin inclusion complex he was done it by using Kneading method spray drying method and physical mixture by taking of about 1:1 ratio and he found the kneading method shows best than that of the other and he further prepared inclusion complex with different ratio. He done an phase solubility study to check the effect of polymer on aqueous solubility of aceclofenac and characterization study he was done a FTIR and DSC, he done in-vitro dissolution study by taking phosphate buffer of pH 6.8 and he found that dissolution rate from the solid dispersion is more than that of Aceclofenac. An drug used as an non-steroidal anti-inflammatory drug (NSAID) also used as an analgesic drug which is act by inhibiting prostaglandin as prostaglandin inhibitor, and also COX-2 inhibitor. Aceclofenac is relatively poorly soluble in water, freely soluble in acetone, very soluble in methanol. Whose 275 nm and the dose to be given from 300mg -500mg Solubility of the drug is increased by using cyclodextrins (β-CD, HPβ-CD).

Cyclodextrins are cyclic oligosaccharides containing at least six D-glucose units attached by α glucoside bonds. The three natural cyclodextrins are α, β and γ, which differ in their ring size and solubility. They contain 6, 7 glucose units respectively. Here we are increasing the solubility of drug by complexation method were complexing the cyclodextrins with drug molecule with different ratios. Complexation may be done by three methods they are kneading method, spraydrying method, Physical Mixture method in Physical Mixture Aceclofenac with β-CD molar ratios of 1:1M, were mixed in a mortar for about one hour with constant triturating, passed through sieve No. 100 and stored in a desiccators over fused calcium chloride. Were as in Kneading Method the Aceclofenac and β-cyclodextrin in all ratios were triturated in a mortar with 10 ml of distilled water.
The thick slurry was kneaded for 45 minutes, dried at 55°C and finally sieved through mesh no 100.

The complexes obtained were stored in dessicator and inclusion complex of Aceclofenac-βCD was prepared by spray drying method. The drug and β-CD were dissolved in methanol and distilled water separately. Both the solutions were mixed together on a magnetic stirrer for 30 min. The resulting solution was fed to mini spray dryer and sprayed in the chamber from a nozzle under the required atomization pressure at a specific feed rate fixing the inlet and outlet temperatures. The vacuum in the system is produced and aspirator is done at a particular percentage. The product thus obtained is collected, packed and doubly wrapped in a aluminum foil and stored in a desiccators till further use.

The phase solubility studies of complex formation between aceclofenac and β-cyclodextrin shows increased linearity, as a function of β-cyclodextrin concentration. The phase solubility diagram can be classified as type A_L according to Higuchi and Connors. The stability constant (K_s) of aceclofenac was found to be 0.855 M⁻¹. The IR spectra of pure aceclofenac, β-Cyclodextrin, aceclofenac-β-Cyclodextrin complex prepared by kneading method were by FTIR, Distinct peaks in the region of 3400-3200 cm⁻¹ for N-H and O-H stretching, 3033-3008 cm⁻¹ aromatic stretching, 2979-2870 cm⁻¹ for C-H aliphatic stretching and 1750-1722 cm⁻¹ for C=O stretching in kneaded product was identical to that of the pure drug.

Dissolution study was done by taking complex formed by drug (Aceclofenac) and β-Cyclodextrin with different ratios in a phosphate buffer of PH 6.8 and paddle rotation speed kept around 100 rpm 5 ml of sample were withdrawn at 10 min of time interval and the dissolution of 1:1 ratio was found to show a release of 45.5 at the end of 10 min and 98.2 at the end of 60 min, as compared to the pure drug which showed a release of 9.3 at the end of 10 min and 28.5 after 60 min respectively. Furthermore increase in β-CD concentration was not acceptable due to the problem associated with the average weight of tablet. Hence 1:1 ratio shows the best result.
The DSC thermogram of aceclofenac displayed the characteristic peak at $254.4^\circ$C compare to its melting point $260^\circ$C. Similarly the $\beta$-CD thermogram showed peak at $141.46^\circ$C and $286.54^\circ$C. The complex of the drug and $\beta$-CD prepared by kneading method showed the DSC thermogram at $136.3^\circ$C, $153.7^\circ$C and $262.2^\circ$C which reveals that drug is complexed with $\beta$-CD. There is a slight shift in melting point because of moisture content.

**Wagh MP et al., (2010)** was reported the fast dissolving tablet of Aceclofenac drug which was done by direct compression method by using superdisintegrants like sodium starch glycolate, croscarmellose and crospovidon he was done a 9 formulation by using these superdisintegrant at different concentration of 15, 20 and 25mg, after evaluating all the parameter like wetting time, dispersion time drug content and in-Vitro dissolution study he found that tablet prepared by using croscarmellose shows best results compared with the other superdisintegrant. Above all the formulation F3 shows best result as less disintegration time and maximum drug release rate in a time interval of half an hour.

Aceclofenac is a drug used as an non-steroidal anti-inflammatory drug (NSAID) also used as an analgesic, as prostaglandin inhibitor, and also COX-2 inhibitor. Aceclofenac is relatively poorly soluble in water, freely soluble in acetone, very soluble in methanol. $\lambda_{\text{Max}}$ of Aceclofenac is $275$ nm and the dose to be given ranges from $100$mg - $500$mg.

Fast dissolving tablets was prepared by various method like direct compression method granulation method, sublimation method etc, using super disintegrants these super disintegrants are helps in disintegrating the drug rapidly by so many ways and one of those is by binding with the drug they increases the porosity of the molecule leads to increase the surface area of the drug and their by more contact with the water leads to rapid disintegration. He was prepared Aceclofenac fast dissolving tablet of 100mg by direct compression method, before to go compression he evaluated the powder properties like bulk density, tap density, angle of repose, % compressibility, hausener"s ratio, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation.
The density he found which is lies in the range between 0.416- 0.434 gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight kept in a equation and the result found by him was in the range of 0.481 to 0.447 gm/cm³. Angle of repose and hausners ratio is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 24- 25 Hausners ratio is carried by equation Hausner's ratio and he got the result in the range of 1.082-1.094 and % compressibility he found in the range of 7.65-10.60.

Evaluation parameter he evaluated for tablets are hardness, friability test, wetting time, disintegration time and in-vitro dissolution study, hardness test done by using fizer hardness tester and he found the hardness in the range of 3.42-3.92 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.291-0.428 %).

He found, least wetting time of crospovidone than the other two, i.e. croscarmellose and sodium starch glycolate and disintegration carried out in disintegration apparatus containing 7.4 phosphate buffer in the temperature of 37c and the less dispersion time he found by the formulation prepared by using superdisintegrant croscarmellose which is about 24sec, that is of F3 formulation. Dissolution study done by using 7.4 phosphate buffer and by maintaining rotation speed of paddle is about 100 rpm sample was withdrawn at a 5 min regular interval of time for about half an hour and the result found by him is the formula containing superdisintegrant croscarmellose shows 99.08% drug release in 30 min. by the experiment he conclude that the formulation with increased concentration of croscarmellose shows less disintegration time and more drug release rate than the tablets prepared by other superdisintegrants which are crosopovidone, sodium starch glycolate, whose increase concentration leads to slow drug release specially with the sodium starch glycolate superdisintegrant.

Reddy VK et al., (2013) was reported the result of the experiment done by him of development of domperidone mouth dissolving tablet using solid dispersion technique
solubility is improved by mixing domperidone with PEG 6000 a carrier with different ratios i.e. 1:1, 1:2, 1:3, 1:4, 1:5, the method used here are solid dispersion method, and physical mixture, solid dispersion is done by solvent evaporation method and the result found by him is drug with PEG 6000 solid dispersion shows better result and further these characterized by FTIR, for to check compatibility between drug and polymer than the complex of drug and carrier is taken for the preparation of mouth dissolving tablets. Using croscarmellose Sodium, crospovidone, sodium starch glycolate superdisintegrants in different concentration.

He was evaluated for flow properties like angle of repose, tap density, bulk density, its friability test. % compressibility, hardness, wetting time, dispersion time, in vitro drug release the solid dispersion is prepared by taking drug and carrier PEG 6000 in mortar mixed well and the solvent acetone is used and kept for evaporation in an 45oc for an 48 hrs and the obtained dry powder is passed through sieve 60. solubility test is done by taking 10ml of domperidone mixture in a distil water and in 0.1N HCL and kept for 24 hrs and the sample was absorbed in UV- spectroscopy at 284 nm.

He found, increased solubility of the mixture prepared by SDs than the pure drug, FTIR (pellet method) is done for characterization by taking 20mg of drug in 200mg of Kbr and measured in the range between 1000-4000, sharp peak of pure drug found at 1687 cm⁻¹, 2818 cm⁻¹, 1488 cm⁻¹ which is clearly found even in the mixture shows the drug and carrier compatibility. Before to go compression he evaluated the powder properties like bulk density, tap density, angle of repose, % compressibility, hausener ratio, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation.

The density he found which is lies in the range between 0.56 to 0.60gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.67- 0.73 gm/cm³. Angle of repose and hausners ratio is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation
and the result he got is in the range of 27-30 Hausner’s ratio is carried by equation Hausner’s ratio and he got the result in the range of 1.152–1.236 and % compressibility he found in the range of 14.49-19.11 hardness test done by using fizer hardness tester and he found the hardness in the range of 3.2-3.7 kg/cm².

Friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.455-0.783 %). he found Drug content is carried by taking weighed quantity of solid dispersion is dissolved methanol and and kept in 10 ml of 0.1N HCL for about 24 hrs and then absorbed under UV-spectrometer at 284nm and he found the result as all the different drug carrier ratio of solid dispersion shows 97-99%. He found the decrease in wetting time (32-27sec) with the increase in concentration of crospovidon (2-6%) and croscarmellose (2-6%) is around 39-34sec highest concentration of crospovidone shows lowest wetting time.

Disintegration is depend on the porous forming capacity of the superdisintegrant by this experiment he found the increased concentration of crospovidone shows less disintegration than that of the other two superdisintigrants which is about 39 sec. in-vitro drug release is determined by dissolution test which is carried out in 0.1N Hcl of pH 1.2 with 50 rpm rotation speed at 37°C and the solution was taken at an interval of 5,10, 20, 30, 45 min and absorbed under UV spectrometer at 284nm the result he found is a drug with 6% concentration shows 97% of drug release in 30min followed by croscarmellose with high concentration 6% shows 91% drug release drug release rate comparatively found less of sodium starchglycolate than the other two. By the result of all the evaluation parameter he concluded that the drug solubility is increased by solid dispersion of drug with PEG 6000 of 1:5% and fast dissolving tablet of domperidone solid dispersion with the use of crospovidone superdisintigrant at the concentration of about 6% shows less disintegration time and increased drug release rate than the croscarmellose and sodium starch glycolate superdisintegrants.

Shaik TH et al., (2012) was reported the result got by the experiment done on Formulation and evaluation of mouth dissolving tablet metformin HCl. He prepared
mouth dissolving tablet using three superdisintegrant they are crospovidone, croscarmellose, sodium starch glycolate, by direct compression method. He evaluated the blend for angle of repose, bulk density, tap density, % compressibility, Hausner's ratio, and prepared tablets are evaluated for their hardness, friability, wetting time, disintegration time, in-vitro drug release. Metformin HCl is an biguanide anti hyperglycemic agent which lowers both basal and postprandial plasma glucose level which is widely used treat NIDDM, Metformin HCl water solubility is lesser which is actually taken orally there for the dissolution rate of the drug is affects therefore, he was made an attempt here to improve its dissolution by preparing mouth dissolving tablet of this drug.

He was prepared tablet of 500mg containing dose of the drug is 250mg. He prepared six formulation by taking combination of superdisintegrants in F1 he used 10mg of crospovidone, and 18 mg of sodium starch glycolate, in F2 he was taken 15mg of crospovidone and 22 mg of sodium starch glycolate F3 contains 20mg of crospovidone, in F4 25 mg of croscarmellose, and 20mg of crospovidone, F5 contains 20mg of croscarmellose, and 18mg of sodium starch glycolate, and F6 contains 25mg of crospovidone and 31.5mg of sodium starch glycolate .the blend was examined for tap density bulk density, angle of repose, Hausners ratio, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation. The density he found which is lies in the range between 0.38- 0.49gm/cm³. The tapdensity is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.48 to 0.56 gm/cm³. Angle of repose and hausner's ratio is determined to know the ease of flow of powder.

He was used funnel method to determine angle of repose and the result he got is in the range of 27- 30°, % compressibility he found in the range of 16.78 to 17.54. Hausner's ratio is carried by equation Hausners ratio and he got the result in the range of 1.09-1.36, hardness test done by using pfizer hardness tester and he found the hardness in the range
of 2.6 to 3.8 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.43 to 0.52 %). Weight variation he got in the range of 4.1 to 5.5. Disintegration is done by taking tablet in disintegration apparatus containing 0.1N HCl and result found by him are in the range of 17 to 33.5secs, the formula F2 containing 15mg crospovidone and 22mg of sodium starch glycolate shows least disintegration time that is 17 sec.

Dissolution carried out in 0.1N HCl as dissolution medium by maintaining stirring speed around 50 rpm and sample were collected for 5min interval of time and observe under UV-spectrometer at 234nm. According to his results all the formulation shows significant drug release in 30min. The F2 formulation showed 66% drug release in 5min and around 99% in 30min. Finally he concluded that the metformin HCl fast dissolving tablet shows fast drug release rate in that the F2 formulation prepared by using crospovidone and sodium starch glycolate showed better result than all other formulation.

Kulakarni SV et al., (2011) was reported an results of experiment done by called fast dissolving tablet of meloxicam which he prepared by wet granulation method with use of superdisintegrants croscarmellose, crospovidone, and prepared granules are evaluated for angle of repose, %compressibility, tap density, bulkdensity, Hausner’s ratio and tablets were evaluated for hardness, wetting time, disintegration time, friability, weight variation, and in-vitro dissolution study. Meloxicam is a cox1 inhibitor which is responsible for conversion of arachidonic acid to prostaglandin H2, which plays main role for inflammation because of which the preparation need drug has to release immediately so as to reduce the inflammation. Here he first prepared meloxicam and BCD complex and then tablet of 200 mg were prepared by wet granulation method using meloxicam of very less dose of 8mg because of high bioavailability of 89%, the superdisintegrants are taken in a concentration of 14,20,25mg, micro crystalline cellulose is taken as a diluent and starch as a binding agent, sodium saccharin and vanillin is used for mask the taste , bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get. The density he found which is lies in the range between 0.487- 0.532gm/cm³.
The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep and the result found by him was in the range of 0.522 to 0.675 gm/cm³. Angle of repose is determined to know the ease of flow of powder, He was used funnel method to determine angle of repose by equation and the result he got is in the range of 24.83 to 27.82 and % compressibility he found in the range of 13.92 to 17.68, hardness test done by using Monsanto hardness tester and he found the hardness in the range of 2.6 to 3.8 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.43 to 0.52 %). Drug content determined by taking meloxicam around 20mg in 100ml of PH 7.4 buffer solution for few min and then filtered it filtration is analyzed by using UV-visible spectrometer at 273nm drug, 97 to 99.1% of drug content were recorded by his result.

Wetting time is determined by keeping tablet in a PH 7.4 buffer solution of 1 liter contains NaCl, KCl, KSCN and urea in different composition and recorded the time require for complete wetting of that tablet the obtained result by his experiment are lies in the range between 21 to 63 sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 7.4 buffer solution time taken for complete dispersion of tablet lies in the range of 32 to 67sec. Disintegration time is determined by keeping tablets in 10 ml of water at 25°C in an Petri dish and time for complete disintegration is recorded and he found the time in the range of 18 to 86 sec the F6 formulation which prepared by taking crospovidone superdisintigrant in a concentration of 25mg showed less disintegration time.

*In-vitro* dissolution study is carried in dissolution apparatus by taking tablet in PH 7.4 phosphate buffer solution as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample were withdrawn at an regular interval of time and absorbed under UV-visible spectrometer at 363nm the drug release rate he found in F6 formulation containing 25 mg crospovidone superdisintegrant 99% release recorded in 60sec. The dissolution study is carried F6 with marketed product and result found by him is F6 shows significant release rate than the marketed one.
Sandeep D et al., (2011) he reported the results obtained from his experiment of formulation and evaluation of fast dissolving tablet promethazine HCl. Which he prepared by taking drug and sublimating it with camphor of different concentration 2%.5%and 10% obtained powder by sublimation is used for fast dissolving tablets with the addition of superdisintegrants crospovidone, sodium starch glycolate, and tulsion 414. Tablets were prepared by direct compression method prepared tablets are evaluated for wetting time, disintegration time, hardness, friability, weight variation. Drug content, in-vitro dissolution study, promethazine HCl.

Drug is used as an anti emetic agent which is mainly used in motion sickness is preferably taken through orally by doing so it undergoes first pass metabolism the bioavailability is reduced to 80% to 27% to over come this problem preparation of fast dissolving tablet is shows the significant results. sublimation is done by taking camphor and drug heated in a hot air oven at 60°C for few min and obtained powder is used for tablet preparation, mannitol is used as diluent, saccharine is used as sweetening agent. Prepared tablet are evaluated for hardness hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.1±0.78 to 4.8±0.16 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.40 to 0.68%).

Drug content determined by taking promethazine HCl around 150mg in 100ml of PH 7.4 buffer solution for few min and then filtered it filtration is analyzed by using UV- visible spectrometer at 249nm drug, 97.08±99.2±0.0% of drug content were recorded by his result .wetting time is determined by keeping tablet in a PH 7.4 buffer solution of 6ml and recorded the time require for complete wetting of that tablet. The obtained result by his experiment are lies in the range between 40±2.08-82±2.61sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 7.4 buffer solution time taken for complete dispersion of tablet lies in the range of 55±2.0 -26±1.52sec. In- vitro dissolution study is carried in dissolution apparatus by taking tablet in PH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 50
rpm sample were withdrawn at an regular interval of time and absorbed under UV-visible spectrometer at 249nm the drug release rate he found in F6 formulation containing 10% sodium starch glycolate and 10% of camphor shows highest release rate of 93.01% in 10min, finally by this experiment he concluded that the promethazine HCl fast dissolving tablet shows significant bioavailability.

The F6 formula prepared by taking 10% of sodium starch glycolate and 10% of camphor shows increased drug release rate i.e of 93.01% in 10 min and showed less disintegration time of about 26 sec.

Smita D et al., (2013) were reported the results of the experiment solubility enhancement of gliclazide by solid dispersion method done by her she prepared solid dispersion by using soluplus and kollidon VA64 as a carrier and PEG 6000, sorbitol, cremphorEL as plasticizer, the prepared solid dispersion is evaluated for in-vitro dissolution, X-ray diffraction (XRD), Differential scanning calorimeter (DSC), FTIR, and tablets were prepared using this solid dispersion by direct compression method whose post and pre formulation evaluation is carried. Gliclazide is a anti hyperglycemic agent used in the treatment of Diabitus mellitus specially type 2, gliclazide is poor water soluble drug and having high protein binding capacity and poor dissolution their for she made an attempt to increase solubility by solid dispersion.

Solid dispersion is done by fusion method were plasticizer and carrier are melted and drug is allow to disperse in it by continues stirring and the melted mass is kept aside on ice bath around 15min to cool then obtained powder is passed through specific sieves, physical mixture is prepared by taking drug, plasticizer and carrier in a mortar triturated for 5min by pestle and obtained powder is passed through sieve. Here she prepared solid dispersion of 6 formulations by taking drug & soluplus 80 mg in three formulations includes one plasticizer in each formula similarly three formulation with drug & 80mg of kolloidon. Solubility study done by taking 10ml of solid dispersion in conical flask and rotated continuously for 24 hrs then filtered, filtration is absorbed in UV-Visible
spectrometer at 226 nm and she found increased solubility of $37.77\pm 0.96\mu g/ml$ than that of pure GLZ which is $0f\ 16.51\pm 16.51\mu g/ml$. FTIR is carried out by taking drug and Kbr in 1:5 ratio under resolution of 4 cm-1 from 400-4000cm-1. and by the report of FTIR she found peak at 1164cm-1 & 1350cm-1 of sulphonyl group shows increase in bond strength due to stabilizing effect of hydrogen atom of PEG by forming hydrogen bond with drug. XRD is done of drug, solid dispersion, physical mixture under scanned range of 0-50˚c the report her experiments found sharp peak of pure GLZ at 2 θ angle shows crystalline nature of the drug which were disappeared in solid dispersion and physical mixture which indicates mixture is in amorphous form.

DSC he was done for drug, solid dispersion, physical mixture sample of 2-5 mg is taken for study at 10 to 350 °c at scanning rate of 10˚ c/min under steam of nitrogen she found the result by the DSC is onset of melting observed at 137˚c and heat of fusion found at 284˚c she found deviation in DSC of physical mixture and solid dispersion which is gradually decrease indicates powder is completely melt in carrier and drug is amorphous form. in-vitro dissolution were carried in dissolution apparatus by taking pH 7.4 buffer solution as dissolution medium and paddle rotation speed kept 100 rpm dissolution of drug, physical mixture, solid dispersion is determined by taking sample at an regular interval of time (5,10,15,20,30,45,60,90,120min) at 37˚c and she absorbed dissolution rate of pure drug shows 60.83±1.92 % in 120 min where as solid dispersion of sulphasplus & PEG 4000 showed 70.58± 0.94 % in 120 min and solid dispersion of kolloidon VA64 & PEG 4000 showed 72.16± 2.01 % in 120 min.

Drug content determined by taking GLZ around 80mg in 100ml of PH 7.4 buffer solution for few min and then filtered it filtration is analyzed by using UV- visible spectrometer at 273nm drug, 97 to 99.1% of drug content were recorded by his result. Tablets prepared by solid dispersion are evaluated for hardness, weight variation, Friability, disintegration time, and drug content. in-vitro drug release, hardness were found around 5.1± 0.51-6.3±0.15, weight variation showed around 2.15 to 3.8% friability is about 0.61± 0.01-0.79± 0.03 and drug content found is 96.25± 0.14 to 98.43± 1.56 and disintegration time showed around 135 to 281 sec.
The dissolution study tablet containing kolloidon VA64 showed shows better release rate than tablet contained soluplus, which about 83% in 120min finally by the result obtained she concluded tablets prepared by solid dispersion using kolloidon as carrier and cremphor EL as plasticizer shows better drug release rate comparatively with others.

Qifang Wang Q et al., (2010) he formed complex by using co-grinding and physical mixture method by taking IBU and β- cyclodextrin in 1:1 ratio and prepared complex were analysed in X-ray diffraction, DSC and SEM for their characterization and in-vitro dissolution study were done and stabilization test is carried in a month of duration at a different temperature 25°C 40°C and 55°C. IBU is an anti-inflammatory drug which having very poor water solubility because of which less bioavailability and slow dissolution rate takes place their for to improve the solubility of drug will increases both the above parameter.

The drug of amorphous shows higher solubility than the crystalline compound, their fore the enhancement of solubility may be done by grinding the insoluble drug with the substance beneficial for increasing the solubility to avoid recrystallization of the formed amorphous drug. β- cyclodextrins are the cyclo-oligosaccharides useful in complex formation with the water insoluble drug because of its outer hydrophilic surface and inner lipophilicity nature of the cavity leads to increase in the solubility of the drug here he applied two methods for complexation i.e co-grinding and physical mixture. Co-grinding is done by taking drug and β-cyclodextrin in a vortex bottle for 5 min and grinding is done for an 30 min in high energy mill with vibrational frequency of 50HZ.

Co-precipitation is prepared by taking drug and β- cyclodextrins in common volatile solvent and let to evaporate of solvent by freeze drying to get the precipitate of amorphous substance, linear X- ray diffraction pattern are used in a scanning range around 5-45° c he found the result, XRD of pure IBU and pure β-CD showed pattern of sharp peak which are found less in physical mixture and almost clear i.e, no peaks found in co-grinded complex which completely disappear in 30 min, which indicates clear formation of amorphous powder.
The DSC reports he got represents the sharp peak of pure drug and pure β-CD at near about 78°C even physical mixture report also showed peaks at same temperature which are slightly moved and reduced with increased temperature were recorded. But almost melting peaks are disappeared in co-grinding which is completely disappeared in 30 min indicates the formation of amorphous powder of the complex. in SEM reports he found elongated prism of particle size of physical mixture and irregular and less uniform shape were found of co-grinding complex which indicates amorphous formation which benefits the solubility.

In-vitro dissolution study is carried in dissolution apparatus by taking pure IBU, physical mixture, complex by co-precipitation and co-grinding powder individually in 900ml basket containing PH 7.4 buffer solution as dissolution media. Temperature maintained 35°C with paddle rotation speed 100 rpm. Samples were withdrawn at an regular interval of time and absorbed under UV-visible spectrometer at 225 nm. The result got by dissolution study he found highest drug release rate reported in co-grinding complex which is ten times more than that of pure drug, physical mixture and co-precipitation, showed significant drug release. Increase in solubility is because of formation of amorphous powder which is found more in co-grinding type complex. Stability of co-grinding at different storing humidity by taking saturated salts of MgCl₂, Magnesium nitrate, Sodium chloride, and Potassium nitrate.

Which helps to maintain different humidity stabilization is done for a month in different temperature 25°C, 40°C and 55°C by the stability study he recognize slight variation observed in weight of co-grinding mixture at 55°C than at 25 & 45°C. Finally he conclude solubility enhancement of IBU done by co-grinding showed maximum than that by physical mixture and by co-precipitation method and slight change in weight may observed at 55°C in a duration of one month.

Venkatesh K et al., (2013) he prepare mouth dissolving tablet of baclofenac drug by using mannitol, PEG and crospovidone as a carrier crospovidone is also used as
superdisintegrant SSG(sodium starch glycolate) is also used in different ratio, solid dispersion method is used for formation of drug carrier complex which is then then evaluated for FTIR, SEM for their characteristic properties and pre-compression evaluation angle of repose, bulk density, tap density, carr’s index and post-compression evaluation hardness, friability, wetting time, weight variation, disintegration time, in-vitro dissolution study, drug content were carried by him. Baclofen is used as an muscular relaxant which is act by reducing synthesis of anxiety producing neurotransmitter, specially produced at spinal chord, which is having 80% of bioavailability and 40 % of half life period. Here he made an attempt to improve the dissolution rate by preparing mouth dissolving tablet. Which is very convenient specially for those patients who are struggling to swallow.

He prepared Baclofen mouth dissolving tablet by taking drug and mannitol in a ratio of 1:1, 1:2, 1:4, and 1:9 similarly using PEG and crospovidone were taken solid dispersion is done by solvent evaporation in which drug and carrier of known amount were taken and dissolved in a methanol and then let to evaporate by keeping in an hot air oven at 40°c for 6min. Thus obtained powder is used to form tablets, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation. The density he found which is lies in the range between 0.350 to 0.461gm and cm3. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.327 to 0.659 gm/cm³. Angle of repose is determined to know the ease of flow of powder, He was used funnel method to determine angle of repose by equation and the result he got is in the range of 20.10 to 23.24, solubility test is carried by taking formulation and add in test tube containing 0.1M HCl. 0.1N NaOH, PH7.4, PH6.8 phosphate buffer and kept for 24 hrs which is filtered and absorbed under UV-Spectroscopy at 266nm.

For its solubility which found around 99-100%, hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.0±0.78-3.5±0.16 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the
Friability loss found is around (0.42-0.77%). Drug content determined by taking baclofen around 50mg in 100ml of PH 7.4 buffer solution for few min and then filtered it filtration is analyzed by using UV-visible spectrometer at 266nm. 98.08±100.2±0.% of drug content were recorded by his result. Wetting time is determined by keeping tablet in a PH 7.4 buffer solution of 6ml and recorded.

The time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 54±2.08 to107±2.61sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 7.4 buffer solution and observe the time taken for complete dispersion of tablet, which lies in the range of 13±2.0 to 87±1.52sec. In-vitro dissolution study is carried in dissolution apparatus by taking tablet in PH 7.4 buffer solution as dissolution media, at 37°C paddle rotation, speed is kept 50 rpm, sample were withdrawn at an regular interval of one min time and absorbed under UV-visible spectrometer at 205nm. The drug release rate he found in BC7 and BC-8 formulation containing 1:4. 1:9 drug and crospovidone showed highest release rate of 99.99%.

FTIR study of the formulation is done and sharp peak of pure drug is found at 1100cm-1(due to c-cl) and 1530cm-1( due to COOH) and 1610cm-1(due to NH2) were observed which are also found in solid dispersion indicates no alteration in drug nature. SEM of the pure drug and that of the solid dispersion shows crystalline shape of the drug and ununiform shape of the solid dispersion were found, which indicates amorphous formation of the solid dispersion that’s what essential for the increase in solubility. Stability study were carried by keeping at different temperature which is at 22°C and 44° about three months and no change in drug content, wetting time, disintegration time were found of formula BC7 and BC8 . What he conclude by the experiment is, the dissolution rate is increased by forming mouth dissolving tablet of baclofen by increasing its solubility using PEG, mannitol. Crospovidone and sodium starch glycolate as a carrier and superdisintegrant at different ratios. He found decrease in disintegration time with increase in crospovidone concentration.
Whereas increase in disintegration time with increase in sodium starch glycolate concentration because of gel like formation of the surface leads to less permeability for the solvent to penetrate. Preparing a solid dispersion will enhance the solubility and increase the dissolution rate and reduces the disintegration time. By above all the formula BC7 & BC8 (1:4,1:9) showed significant results than that of the other.

**Radke RS et al., (2009)** performed experiment of formulation and evaluation of orodispersible tablet of baclofen by using crospovidone, sodium starch glycolate, Ac-di-sol as superdisintegrant at different concentration. Orodispersible tablet shows significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for paediatrics and yielder aged persons. which results in insufficient therapeutic action even because of loss of some amount by first pass metabolism, to avoid such problems oro dispersible tablets are used. Baclofen is used as an muscular relaxant which is act by reducing synthesis of anxiety producing neurotransmitter specially produced at spinal chord, which is having 80% of bioavailability and 40 % of half-life period.

Here he made an attempt to improve the dissolution rate by preparing Oro dispersible tablet and then pre-compression evaluation angle of repose, bulk density, tap density, carrs index and post-compression evaluation hardness, friability, wetting time, weight variation, disintegration time, in-vitro dissolution study, drug content were carried by him. Bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation. The density he found which is lies in the range between 0.52 to 0.59gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.57 to 0.73gm/cm³.

Angle of repose is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 23.49 to 30.45, % compressibility get in a range between11.86 to 19.18. Hardness test
done by using pfizer hardness tester and he found the hardness in the range of 3.4±0.43-3.6±0.87 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.65 to 0.80%). Drug content determined by taking baclofen around 50mg in 100ml 5ml of which is taken and by 1ml of 0.1N of 5% Ninhydrin reagent and 1ml of 0.01N NaOH boiled for 3 min cooled few min and then filtered it filtration is analysed by using UV- visible spectrometer at 403nm. The 98.91±101.2±0.% of drug content were recorded by his result. Wetting time is determined by keeping tablet in a PH 7.4 buffer solution of 6ml and recorded the time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 29.1±1.05 to 46.8±0.35sec. The dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 7.4 buffer solution.

Observe time taken for complete dispersion of tablet, which lies in the range of 28.6±1.20 to 48.4±2.42sec. In- vitro dissolution study is carried in dissolution apparatus by taking tablet in PH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 100 rpm. The 5ml of sample were withdrawn to it 1ml of 0.1N NaOH and 1ml of 5% Ninhydrin reagent are added which is boiled for 3min and cooled filtered this filtrate is observed under UV-visible spectrometer at 403 nm. The drug release rate he found 100.5± 0.30%. What he concluded by this experiment is from the 9 formulation prepared by taking 3 superdisintegrants with three different concentration (5.10.15mg) the formulation F3 contains Ac-di-sol as superdisintegrants 15mg shows less disintegration time and more drug release rate (101%) than the others, whereas increase in disintegration time with increase in sodium starch glycolate concentration because of gel like formation of the surface leads to less permeability for the solvent to penetrate.

Ragavendra Rao NG et al., (2011) was done a experiment formulation and evaluation of fast dissolving tablet of graniesetron hydrochloride by vacuum drying technique by using camphor as sublimating agent and reported the results. He prepared fast dissolving tablet by taking sodium starch glycolate, crospovidone, croscarmellose and plantago ovate as superdisintigrants FTIR is done for characterization properties and then pre-
compression evaluation angle of repose, bulk density, tap density, carr’s index hausner’s ratio and post-compression evaluation hardness, friability, wetting time, weight variation, disintegration time, in-vitro dissolution study, were carried by him. The fast dissolving tablet shows significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for paediatrics and yielder aged persons. Which results in insufficient therapeutic action even because of loss of some amount by first pass metabolism to avoid such problem fast dissolving tablets are used.

Another advantage of FDT is they are taken orally without the help of water and its rapid onset of action, increased bioavailability and increased stability will increases the popularity of fast dissolving tablet, plantego ovate were prepared by soaking seeds of it in distill water for about 48 hrs and then boiled for few minutes which squeezed for removing the mucilage by using muslin cloth and the added acetone to precipitate the mucilage and then dried the product sieved and use for tablet preparation here he done sublimation by vacuum drying using sublimating agent camphor freeze drying method was not implemented because it forms hygroscopic agent there fore by vacuum drying an porous hydrophilic matrix is formed which will readily absorb the disintegrating medium and dissolve rapidly. Tablets were prepared by direct compression method by taking three super disintegrations in different concentration (2.5, 5. 7.5, 10mg) 10mg of camphor is used as sublimating agent and micro crystalline cellulose, mannitol are used as diluents. Pre-compressional parameter were evaluated, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation. The density he found which is lies in the range between 0.40±0.01 to 0.45±0.01gm/cm³.

The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.48±0.01 to 0.52±0.01gm/cm³. Angle of repose is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 23.20±1.11 to 26.45±0.59, % compressibility get in a range between11.86 to19.18. Hardness test done by using pfizer hardness tester and he
found the hardness in the range of 2.4±0.12 to 3.0±0.01 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.43 to 0.71%). Drug content determined by taking granisetron around 1mg in 10ml 5ml of which is taken and analysed by using UV-visible spectrometer at 302nm, 98.23±1.22 to 100.44±1.52% of drug content were recorded by his result.

Wetting time is determined by keeping tablet in a PH 7.4 buffer solution of 6 ml and recorded the time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 36±1.53-50±2.12sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 7.4 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 18±1.46 to 44±1.60sec. In-vitro dissolution study is carried in dissolution apparatus by taking tablet in PH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample were withdrawn at a time interval of 1 min and observed under UV-Visible spectrometer at 302 nm the drug release rate he found 100.5±0.30%. by this experiment he concluded that the granisetron fast dissolving tablet prepared by vacuum drying method by using camphor as a sublimating agent shows better dissolution rate and lesser disintegration time. Among all the formulation tablets prepared by crospovidone and plantago ovate as a superdisintigrants in a concentration of 10 mg showed better dissolution rate and very less disintegration time which is of 18 sec.

Sunny JR et al., (2012) here he used PEG 4000 and GEL 50/13 as a carrier for solid dispersion, solid dispersion is done by melting method, prepared solid dispersion and physical mixture are evaluated for drug content, dissolution, and characterization is done by FTIR, DSC, and fast dissolving tablet is prepared by using croscarmellose, kyron and indion as superdisintigrants and tablet are evaluated for their pre-compression evaluation angle of repose, bulk density, tap density, carr’s index and post-compression evaluation hardness, friability, wetting time, weight variation, disintigration time, in-vitro dissolution study, drug content were carried by him. fast dissolving tablet shows
significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for pediatrics and yielder aged persons which result in insufficient therapeutic action even because of loss of some amount by first pass metabolism to avoid such problem fast dissolving tablet are used instead, another advantage of FDT is they are taken orally without the help of water and its rapid onset of action, increased bioavailability and increased stability will increases the popularity of fast dissolving tablet.

Solid dispersion is prepared by taking indomethacin(IND) and PEG, in a different ratio (1:1,1:2:1:4,1:7) Similarly by using GEL 50/13 were taken and melted at above their melting point for about 5 min and then filtered through 0.2mm filter paper obtained product are kept for cool around 24 hrs and then the obtained powder is sieved under # 60. This powder was used for tablet preparation by direct compression method indomethacin is an poor water soluble drug used as an anti inflammatory agent which having an 100% bioavailability and half life of 4.5 hrs. Here he made an attempt to improve its solubility and dissolution rate by solid dispersion method. Solubility test were carried out by taking 50 mg of drug in an phosphate buffer of pH 6.8 and polymer of PEG 4000 and GEL 50/13 were taken in a different ratio (1:1,1:2:1:4,1:7) kept on water bath shaker for an 24 hrs at 37°C and filtered by taking 0.22m membrane filter paper. The filtrate is observed under UV visible spectrometer at 320nm. Drug content were calculated of solid dispersion by the same way as that of solubility. He found the result in the range of 89.62 ±1.01 to 100.23± 0.20%. Dissolution of solid dispersion was carried by taking 50 mg of drug in container of 900ml containing pH 6.8 phosphate buffer solution paddle rotation is kept around 75 rpm at 37°C and 5ml of sample were withdrawn and observe under UV-Visible spectrometer at 320nm. DSC (Differential scanning calorimeter) of solid dispersion by taking sample of 2 to 4 mg of pure IND, PEG4000and GEL50/13 and scanned in a range of 10 to 300°C in a range of 10°C/min and the DSC report showed change in their peaks of solid dispersion than pure compound indicating complete mixing of drug and carrier and their amorphous formation which is essential to enhance the solubility. FTIR of drug, carrier and solid dispersion was taken by scanned in the range 0f
4000-400cm-1 and in FTIR report, he found the sharp peaks are observed of the drug even in solid dispersion indicates, their may not change in chemical nature of drug means it is compatible with polymers used.

Pre-compressional parameter were evaluated, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight density is get by putting in a equation. The density he found which is lies in the range between 0.551±0.005 to 0.591±0.005gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.58±0.015 to 0.63±0.014gm/cm³. Angle of repose is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 28°-32°, % compressibility get in a range between11.86-19.18. hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.47±0.332-3.98±0.12 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.51-0.75%).

Wetting time is determined by keeping tablet in a 6 ml of 1% methylene blue and recorded the time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 34.66±1.53 to 46.66±2.12sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of PH 6.8 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 18±1.46 to 44±1.60sec. In- vitro dissolution study is carried in dissolution apparatus, by taking tablet in PH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample were withdrawn at a time interval of 1 min and observed under UV-Visible spectrometer at 302 nm the drug release rate he found 100.5± 0.30%. by his experiment what he concluded is the preparation of solid dispersion by using PEG showed better release rate about 84% and the tablets prepared by using croscarmellose as superdisintegration
showed less disintegration time of about 23 sec, than the indion and kryon superdisintigrants.

**Brunella C et al., (2006)** was reported the result of experiment Cyclodextrin-containing poly (ethyleneoxides) tablets for the delivery of poorly soluble drugs: Potential as buccal delivery system here he prepared buccal adhesive tablet of carvedilol (CAR) by taking PEO (poly ethylene oxide) as a base and HPBCD is used to increase drug release rate. CAR/HPBCD inclusion complex were prepared and examined the dissolution parameter of PEO tablets contains CAR alone and PEO tablets containing complex of CAR/HPBCD. The HPBCD effect on release rate was evaluated by testing the physical changes that is erosion and swelling of the tablet .drug dissolution and drug counter-diffusion. Buccul drug delivery system is increased its attention now a days in case of tablets prepared for sustain release, because of direct enter to systemic circulation the bio availability will increases and act in a less concentration , another advantage of buccul drug delivery system is which avoid first fast metabolism in GIT tract.

Carvidilol is antihypertensive drug which act as adrenergic blocking agent especially alpha 1 blocking activity. This is poorly soluble in water and having very less bioavailability. Therefore here he made an attempt to increase its solubility by using HPBCD and to improve the drug release rate. Quantitative analysis of CAR is done for study its dissolution rate by using HPLC by taking mobile phase a mixture of actronitrile/phosphate buffer of pH 4.5 in 60:40 v/v ratio and sample observed in UV-Visible spectrometer at 243nm. HPBCD was quantified by taking HPBCD in phenolaphaline alkaline solution. in 1:1 molar ratio the colure shade of the mixture is depend on concentration of added cyclodextrins ,stock solution of phenolphaline 3mM in methanol was diluted 1:100 in pH 10.5 buffer solution which is added in sample containing HPBCD and observed under UV spectrometer at 553nm he found maximum absorption in the sample to reagent of 1:3 ratio. Erosion of the PEO tablets was calculated by keeping weighed tablets in phosphate buffer solution at 37˚c and the kept for
mentioned time then the media was withdrawn and weight of the tablet were measured the weight loss is calculated using the equation.

\[ \text{WL} = \frac{W_i - W_f}{W_i} \]

Dissolution of CAR from CAR/HPBCD mixture is done by taking sample in phosphate buffer of \( \text{pH} 6.8 \) at 37°C, paddle rotation is kept around 30 rpm and dissolved CAR fraction was calculated by taking ratio of dissolved CAR to the total amount of CAR used. Release of CAR and HPBCD is calculated by taking tablet and immersed in 400ml of phosphate buffer at 37°C by keeping paddle rotation around 30 rpm and fractional release is calculated by withdrawn sample every 3min by taking ratio of amount of CAR released to total amount present in the tablet. To study the effect of HPBCD on CAR permeability is calculated by using franz type diffusion cell which contain donor and receiver chamber in donor chamber 1ml of saturated CAR is taken in phosphate buffer containing 8% w/v of HPBCD. For permeability study CAR concentration about 18 to 70 mg/ml is added in different ratio of HPBCD (1:2. 1:5. 1:10), CAR permeation from PEO tablets measured by taking PEO tablet at donor chamber and at receiver ethanol/phosphate buffer of \( \text{pH} 6.8 \) were taken in 1:3 v/v ratio.

Paddle speed kept around 30 rpm at 37°C and 2ml of receiver medium was collected at regular time interval and observe the release rate of CAR by the above all study what he concluded is the prepared binary system of CAR and CAR/HPBCD complex by frezz drying and by physical mixture and which is then incorporated in PEO tablets showed increased release rate of the CAR/HPBCD mixture then the CAR alone in fact by the time of 10hr CAR alone shows 40% release where as CAR/HPBCD by physical mixture showed 60% release and by freezedrying method almost CAR released is recorded. Hence solubility and dissolution rate of CAR is increased by using HPBCD as a carrier.

Saleem MA et al., (2010) was reported the experiment he done, he done the solid dispersion by kneading method using cyclodextrin (BCD, HPBCD). PVP and urea at different ratio and characterization is studied by FTIR. DSC.
The dissolution, solubility, Permeability of this complex may evaluated, this complex is used for preparing gels using 1% cabapol and evaluated for pH. Drug content, viscosity, in-vitro permeability using rat skin. Meloxicam is usually anti-inflammatory drug which act as cyclooxygenase 2 inhibitor, this drug is poorly water soluble and produce so many side effects like gastric irritation by taking it orally. Most of the inflammation will occur on the surface therefore preparation meant for application on surface will show 100% effect and avoid so many side effects even less amount is required then the oral dose because of no first pass metabolism occurs. He prepared solid dispersion complexation by kneading method using different ratios of drug and cyclodextrins (BCD,HPBCD) that is 1:1, 1:2. in a water : methanol 1:1 v/v . and by using PVP (poly vinyl pyrolidin) in 1:1. 1:3. 1:5 with small amount methylene chloride and by urea in a same ratio that is 1:1. 1:3. 1:5 using mixture of ethanol/chloroform as solvent the slurry is prepared by kneading and kept for drying for few min and than the obtained dry powder is sieved.

Characterization is done by FTIR and DSC by taking samples of all three polymers. FTIR was done in a range of 4000- 450 cm-1 and Kbr method is adopted the report of the FTIR slight change in peaks because of some physical entrapment by DSC is done by taking sample of 5mg in a range of 300-30°C at 10°/min DSC report showed melted mass of meloxicam have trace of crystalline nature. Solubility study was done by sonicating for about 72 hr at 37°C of solid dispersion present in 3ml of phosphate buffer of pH 7.4 and observed in UV-visible spectrometer at 324 nm, the result he found is increase in solubility with BCD whereas with HPBCD 1:2 and with PVP and urea in a ratio of 1:5 showed decreased in its solubility because of increased viscosity. in-vitro dissolution study is carried out by taking solid dispersion in phosphate buffer pH 7.4 as dissolution medium and paddle rotation kept around 50 rpm at 37°C and sample 5ml were withdrawn at regular interval and observed under UV-Visible spectroscopy at 362nm.

The dissolution result found by him showed was rate of dissolution is more with complex than that of a pure drug which about 60% in a time of 120 min. he found highest dissolution rate of the complex prepared by cyclodextrins than the PVP and Urea among all HPBCD showed highest 90% drug release rate, permeability is tested by taking rat
abdominal skin kept in between diffusion chamber put the three ml of pure drug and solid dispersion in donor camber containing phosphate buffer P\(^H\) 7.4 for about 6 hrs. 5ml of sample were withdrawn and observed in UV-Visible spectrometer at 362nm. The results, he found, was increased in diffusion with solid dispersion by all three polymer than with the pure drug and highest diffusion he found of the solid dispersion complex of 1:1 ratio of meloxicam and HPBCD. Gel is prepared by soaking 1% carbopol 940 in required amount of water and the solid dispersion is added in that which is then neutralized by triethanolamine same will done by using pure drug. The pH of gel is determined by dispersing 1gm of gel in 10 ml of water and pH is determined by using digital pH meter and he found it above 6.0. Drug content he found between 91.4 % to 99.24 with gel prepared by solid dispersion. He was found increased Viscosity with increase in polymer concentration. In-vitro gel permeation is determined by same as done for solid dispersion by taking gel of 3.3mg meloxicam in a donor chamber and by the result he found that gel prepared using HPBCD gives maximum permeability increased in concentration of polymer leads to increase in viscosity which reduces the rate of permeation. He conclude that preparation of gel by solid dispersion using cyclodextrins (BCD, HPBCD), PVP and urea as polymer showed increased solubility, diffusion rate and permeability and above all formulation gel prepared using HPBCD as polymer showed significant results than the other.

**Shirse P et al., (2012)** was reported the result on the basis of his experiment. He prepared inclusion complex of glimipride by using cyclodextrins (BCD, HPBCD) by Kneading, physical mixture and co-precipitation method and characterization of which is done by FTIR and DSC. The prepared inclusion complex was used for preparing fast dissolving tablet using crospovidone, croscarmellose and sodium starch glycolate as superdisintigrant agent. Which are evaluated for their pre and post compression parameters viz, angle of repose, bulk density, tap density, carr’s index. The post-compression evaluation hardness, friability, wetting time, weight variation, dissintigration time, in-vitro dissolution study, drug content were carried by him. Glimipride is third generation of sulfonylurea group used for the treatment of type 2 diabetes which is act by
increasing the insulin secretion by β-cell of pancreas by blocking k⁺ channel and depolarising the cell membrane.

Glimipride is poor water soluble compound by taking orally bioavailability will reduces and even dissolution also, therefore making fast dissolving tablet of this drug will increase both. fast dissolving tablet shows significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for pediatrics and yielded aged persons which result in insufficient therapeutic action even because of loss of some amount by first pass metabolism to avoid such problem fast dissolving tablets are used instead, another advantage of FDT is they are taken orally without the help of water and its rapid onset of action, increased bioavailability and stability. Inclusion complex by kneading method is done by taking drug-BCD 1:1, 1:2M and 1:1 M ratio of drug and HPBCD were triturated in a mortar with 10 ml of distilled water. The thick slurry was kneaded for 45 minutes, dried at 55°C and finally sieved through mesh no 100. The complexes obtained were stored in desiccator. In physical mixture drug and BCD in a ratio 1:1, 1:2 M and with HPBCD 1:1 M was taken in a mortar and triturated till a homogeneous compound may form. In co-precipitation method the drug and above cyclodextrin with the same as above ratio are separated in ethanol and mixed both by continues stirring then kept for evaporation the obtained product is dried and sieved to get an homogeneous powder.

He done phase solubility study by taking inclusion complex of both BCD and HPBCD in different ratio in distil water and kept for 72 hrs which is then filtered and observed under UV-Visible spectroscopy at 232 nm phase solubility study showed increase in solubility by taking 1:1 ratio of BCD and HPBCD but more with HPBCD which is around 42.57M⁻¹ was reported. FTIR is done by KBr pellet method sharp peaks of pure glimepiride found in the range of 709, 1082, 1444, 1674, 1705, 2360 and 3369cm⁻¹ and in inclusion complex with CD little change were observed. By the DSC study he was found that formation of complex because the endothermic peak of pure glimepiride observed at 214°C whereas of the complex it observed at237°C. In- vitro dissolution study is carried out for inclusion complex in dissolution apparatus by taking inclusion complex by BCD
and HPBCD individually in PH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample of 5ml were withdrawn at a definite interval of time and observed under UV-Visible spectrometer at 228nm.

He was found increase in dissolution with the inclusion complex than the pure drug which is even more in complex formed using HPBCD. Fast dissolving tablet of glimepiride with cyclodextrins inclusion complex were prepared by direct compression method by using crospovidone, croscarmellose and sodium starch glycolate as a superdisintegrating agents in a concentration of 15 mg each. Which contain 10 mg of glimepiride Pre-compressional parameter were evaluated, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight, density is get by putting in a equation. The density he found which is lies in the range between 0.551±0.005 - 0.591±0.005gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.58±0.015 to 0.63±0.014gm/cm³. Angle of repose is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 28˚-32˚c, % compressibility get in a range between 11.86-19.18.

Hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.9 to 4.3 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.39-0.54%).

Wetting time is determined by keeping tablet in a 6ml simulated saliva or in a buffer of pH 6.8 and recorded the time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 19-28sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of pH 6.8 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 16 to 23sec. *In-vitro* dissolution study is carried in dissolution apparatus by taking tablet in pH 7.4 buffer solution as dissolution media at 37°C paddle rotation, speed is kept 50 rpm, sample of 5ml were withdrawn at a regular time interval observed.
under UV-Visible spectrometer at 228 nm. The drug release he found was in the range 97 to 99.91%, by the time of 5min around 27% drug release was recorded and complete dissolution about 99.91% was released in 60min of the tablet prepared by using crospovidone as superdisintigrating agent which is the best among the other two superdisintigrants.

Drug content were determined by taking tablet in an 10ml of methanol from that 1ml is taken and analyzed in UV-Visible spectrooscope at 228nm and obtained drug content may lie in the range of 97.99-99.54%. The fast dissolving tablet prepared by crospovidone was taken for stability study which was done in a period of 2 months at 40°c /75% RH and their may no significant change he found conclusion from his experiment was fast dissolving tablet of glimepiride whose inclusion complex done by keading method using HPBCD in 1:1 ratio and tablet prepared by using crospovidone as superdisintigrant showed increased dissolution rate and more stability than the others.

**Sawarikar PP et al., (2010)** was reported the result on the basis of his experiment. He prepared inclusion complex of Isoxsuprine Hydrochloride using β-cyclodextrin by Kneading and co-precipitation method and characterization of which is done by FTIR and DSC. The prepared inclusion complex was used for fast dissolving tablet formulation using crospovidone, Ac-di-sol and sodium starch glycolate as superdisintigrant agent which are evaluated. For uniformity of weight, content uniformity, hardness, friability, in vitro disintegration and in vitro drug release. Solubility is most important factor for pharmacodynamics and pharmacostatic property of drug, poor water soluble drug will dissolve and disintegrate slowly, leads to less bioavailability which intern reduces the onset of action, therefore enhancing solubility of drug is very essential and the best way is formation of inclusion complex with cyclodextrins, because of hydrophilic nature at surface and lyophilic nature inside the cavity it will easily entrap the drug and help to soluble in water.

Fast dissolving tablet shows significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for pediatrics and yielder aged persons
which result insufficient therapeutic action even because of loss of some amount by first pass metabolism to avoid such problem fast dissolving tablet are used instead, another advantage of FDT is they are taken orally without the help of water and its rapid onset of action, increased bioavailability and stability. Isoxsuprine is antihypertensive drug which act as vasodilator by stimulating β- adrenergic receptor, which mainly act as skeletal muscle relaxant. Isoxsuprine is poorly soluble in water therefore here he made an attempt to improve its solubility by forming inclusion complex and improving its dissolution and disintegration rat by preparing fast dissolving tablet of it. Inclusion complex by kneading method is done by taking Isoxsuprine HCl-BCD 1:1, 1:2 M ratios were triturated in a mortar with 10 ml of distilled water. The thick slurry was kneaded for 45 minutes, dried at 40°C and finally sieved through mesh no 100. The complexes obtained were stored in desiccator. In co-precipitation method the drug taken in methanol and aqueous BCD are mixed by continues stirring then kept for evaporation the obtained product which is dried and sieved to get an homogeneous powder.

He carried phase solubility study by taking Isoxsuprine HCl in conical flask which contain BCD in different ratio (0.2. 2M/lit) and kept for 48 hrs which is then filtered and filtrate was assayed by taking absorbance at 268nm under UV-Visible spectroscopy, phase solubility study showed value of 848.33M⁻¹ which indicates formed complex is stable. DSC were carried out to no the interaction between drug and polymer the sample of a drug, BCD and complex was analyzed by heating in a range of 50-300°C and the report he found was the melted peak of pure drug was found at 214.3°C.

Drug content were determined of complex by taking sample of inclusion complex having different concentration in a phosphate buffer pH 7.4 diluted with suitable solvent which were analyzed by finding absorbance at 268.5nm in UV-Visible spectroscopy and by his report drug content were found around 82-91%. Tablet were prepared by direct compression method using 1:2 complex of isoxsuprine HCl and BCD of 168.7 mg, and superdisintigrants are used in three different concentration (3%. 4%. 5%). Tablets were evaluated for hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.16-3.41 kg/cm², friability test done by using friabilator with the rotation
around 25 rpm per 4 min and the friability loss found is around (0.15-0.52%). Dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of pH 7.4 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 8–52 sec.

In- vitro dissolution study is carried in dissolution apparatus by taking tablet in pH 7.4 buffer solution as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample of 5ml were withdrawn at a regular time interval of 1 min observed for absorbance under UV-Visible spectrometer at 268.5 nm and the drug release he found was 90% in the time duration of 6 min. Among all the formulation tablet prepared by Ac-di-sol in a concentration of 5% showed highest dissolution rate about 90% in 6 min and lesser disintegration time of 8 sec.

**Iyer SR et al, (2013)** was reported the result of his experiment formulation and evaluation of fast dissolving tablet of resperidone solid dispersion he prepared solid dispersion by solvent evaporation method by taking BCD as polymer with different ratio and characterization of solid dispersion may done by FTIR, SEM and DSC and fast dissolving tablet were prepared of this solid dispersion using croscarmellose and crospovidone Doshion P544 resin was used as taste masking agent. Solubility is most important factor for pharmacodynamics and pharmacostatic property of drug, poor water soluble drug will dissolve and disintegrate slowly, leads to less bioavailability which intern reduces the onset of action, therefore enhancing solubility of drug is very essential and the best way is formation of inclusion complex with cyclodextrins, because of hydrophilic nature at surface and lyophilic nature inside. The cavity it will easily entrap the drug and help to soluble in water. Fast dissolving tablet shows significant effect in case when the patient feel inconvenience in swallowing tablets or hard capsules specially for pediatrics and yielder aged persons which result insufficient therapeutic action even because of loss of some amount by first pass metabolism to avoid such problem fast dissolving tablet are used instead, another advantage of FDT is they are taken orally without the help of water and its rapid onset of action, increased bioavailability and stability.
Risperidone is a drug used for the treatment of schizophrenia and other mental disorder which is poorly soluble in water and having 70% bioavailability. Therefore here he made an attempt to improve its solubility by forming inclusion complex and improving its dissolution and disintegration rat by preparing fast dissolving tablet of it. He prepared solvent evaporation by taking 1:1, 1:3, 1:5 and 1:7 ratio’s of risperidone and BCD both are taken separately in methanol which was kept for evaporation by heating at 50°C and obtained dry powder was sieved using sieve #120. FTIR was done to check the interaction between risperidone and BCD by KBr pellet method scanned in a range of 500 to 4000cm⁻¹ report showed no interaction was formed between drug and polymer, which indicates the prepared solid dispersion is in stable form. DSC of pure resperidone, BCD and solid dispersion were taken, melted peak of BCD were observe at 116°C and that of resperidone observed near at 217°C and both the peaks are observed in DSC of solid dispersion indicates its mixed form of both.

SEM of BCD showed irregular form of crystals and resperidone showed regular arranged crystal lattices which were turned irregular in solid dispersion indicated that it turns slightly amorphous form which is necessary for its increased solubility. drug content were determined of solid dispersion by dissolving it in 0.1N HCl sample and diluted in suitable concentration which were analyzed by finding absorbance at 239 nm in UV-Visible spectroscopy.

By this report drug content were found around 90.1-99.8%. In- vitro dissolution study is carried out for solid dispersion in dissolution apparatus containing 4 mg of risperidone in H 6.6 buffer solution as dissolution media at 37°C paddle rotation speed is kept 75 rpm sample of 5ml were withdrawn at a definite interval of time and observed under UV-Visible spectrometer at 277nm. He was found increase in dissolution that is of 85% in 30 min with the 1:3 ratios of risperidone and BCD solid dispersion. Fast dissolving tablets of 4 formulations were prepared by direct compression method using 1:3 solid dispersion and crospovidone, Ac-di-sol as superdisintigrants. Pre-compressional parameter were evaluated, bulk density is done by taking all the powder ingredients blend in a measuring
cylinder and measured volume and weight, density is get by putting in a equation. The density he found which is lies in the range between 0.40 to 0.45gm and cm^3. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.58 to 0.66gm/cm^3. Angle of repose is determined to know the ease of flow of powder.

He was used funnel method to determine angle of repose by equation and the result he got is in the range of 49°c to 54°c, Hausners ratio is carried by equation and he got the result in the range of 1.35 to 1.66 hardness test done by using pfizer hardness tester and he found the hardness in the range of 2.13-2.56 kg/cm^2, friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.18 to 0.34%). Wetting time is determined by keeping tablet in 6 ml simulated saliva or in a buffer of pH 6.8 and recorded. The time required for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 19-90sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of pH 6.8 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 61 to 88sec.

Drug content were determined of solid dispersion by dissolving it in 0.1N HCl sample and diluted in suitable concentration which were analyzed by finding absorbance at 277nm in UV-Visible spectroscopy and by his report drug content were found around 94.0-101.5%. in-vitro dissolution study is carried in dissolution apparatus by taking tablet in pH 6.8 buffer solution as dissolution media at 37°c paddle rotation speed is kept 50 rpm sample of 5ml were withdrawn at a regular time interval, observed under UV-Visible spectrometer at 277 nm and the drug release he found was in the range 60-80% in 60min by all the evaluated parameter he concluded that preparation of fast dissolving tablet of risperidone by preparing solid dispersion of 1:3 ratio with drug and BCD by using crospovidone as superdisintigrant agent showed increased dissolution rate and decreased disintegration time.
Sangram KA et al., (2011) given a review of solubility enhancement technique for hydrophobic drugs according to his review most of the novel drug about 40% are lipophilic because of there poor water solubility, required therapeutic action will not produce because of lack of bioavailability. There for here he explained about some newly developed technique to increase there solubility which further leads increased bioavailability and optimum therapeutic action, those technique are Solid dispersion, Micronization, Salt formation these technique have limited advantages even new methods are developed like Nano-suspension, Supercritical processing, Cryogenic technology. To overcome this problem methods are developed by considering the nature of drug ingredients used in composition and the dose required among these method, size reduction is one of them by reducing the particle size, it will increase surface area which intern increases, the contact to the solvent leads to increase in there solubility.

Size reduction may done by so many methods like combination and spray drying method by commination and spray drying disaggregation of powder will takes place which intern reduces the mechanical strength which may minutely reduce its biological activity as well. For very insoluble drugs (<0.1mg/mL) this method is not effective one. Micronization is another suitable way to reduce the size of the drug by doing so surface area increases leads to increase solubility and dissolution rate. Another method called solid dispersion which intern most popular method for solubility enhancement which may done by mixing hydrophobic drug in hydrophilic mixture the most frequent used carrier for this method are polyvinylpyrrolidone, polyethylene glycols, Plasdone-S630 some surfactants are also used like Tween-80, Docusate sodium, Myrj-52, Pluronic-F68 and Sodium Lauryl Sulphate solid dispersion may done. By so many methods Fusion method is one of them were drug and carrier mixture are melted, cooled, dried, pulverized and sieved difficulty in this method is thermal sensitive drugs may not be solid dispersed by this method.

For such kind of method solvent evaporation is the best choice were drug and water soluble carrier are taken in a specific solvent and kept for evaporation to obtain a dried powder matrix the problem in this method. He found is complete evaporation of solvent
may not take place, in some cases which may alters the stability of the drug. Hot melt extruder is the other method in solid dispersion which is done same as that of fusion method, except here a extruder is used to mix the drug and polymer for homogeneous mixing of compound which may be a problem in fusion method. Nano suspension is a another way to enhance the solubility which is suitable for those drugs which are having poor soluble in both water and oil, here solubility may done by suspended or stabilized. The drug particle with surfactants and the size of particle may range from 200 to 600 nm. Media Milling High Pressure Homogenization in water, High Pressure Homogenization in non-aqueous media and combination of Precipitation and High-Pressure Homogenization (Nanoedge all these are the methods used for to produce nano suspension.

Precipitation technique in which the drug is dissolved in solvent completely which is than added in a non solvent by this crystal may formed care should be taken here is micro particle may not produce in crystals, the drug which is poorly soluble in both aqueous and non aqueous solvent are not applicable for this method. Media milling method in which drug and water are taken in mill and rotated with definite shear rate by adding stabilizer in it glass and highly cross- linked polymer resin is used in media which helps in breaking the drug into nanoparticle which helps in solubilizing the drug and increases the bioavailability for effective therapeutic action. By homogenizing the drug by applying high pressure to produce nano particles of drug by producing homogenizing cavity is another method for increasing the solubility. Supercritical Fluid (scf) Process, is the process were the drug molecules are allowed at higher temperature and pressure than that of their respective critical temperature and pressure by doing so pressure exerted may change its phase leads to break down into nano sized particle which may upto 5000nm. By this way poor water soluble drug are get solubilize easily.

By cryogenic technique were drug is placed at a very low temperature to produce an Nano sized particle with high porosity by so many freezing method and also by adding cryogenic liquids like hydrofluoroalkanes, N2, Ar, O2, organic solvents solubility and dissolution of drug may increased.
Most used method to increase the solubility is the inclusion complex method in which entrapment of non-polar agent in polar cavity the most used polymer here in this method is cyclodextrins which are enzymatic degrade of starch and no reducing oligosaccharides available in three different form alpha. Beta, gama cyclodextrins. By review, his study kneading method were impregnate of cyclodextrin with water may done to form paste like mass were drug may added and triturred for specified time and kept for drying which is then sieved. Used by kneading method rate of dissolution may increased. According to him one more efficient method to increase solubility was lyophilization / freez drying method.

Were solvent may evaporated from solution by reducing the temperature and then stabilized by applying pressure by doing so interaction between drug and cyclodextrin may takes place which intern leads to formation of highly porous amorphous substance which may readily under go solubiliazation. Super critical technique is one more technique were carbon dioxide is used as anti solvent media this carbon dioxide is anti solvent for a solute but not for a solvent used its works by diffusing into solvent because of its low critical temperature and low critical pressure which immediately precipitate the drug molecule by this way its very conventional method for increasing bioavailability this method is used in forming inclusion complex with cyclodextrins its showed much benefits because of improved mass transfer property and also for its increased solvating power along with this it is less toxicity, easy for implement. Floating granulation is another method he found for increase its dissolution inside the stomach by preparing granules which float in stomach PH this method is suitable for drugs which remain unionized form in stomach though it permeable to stomach membrane because of its lesser solubility it not enter systemic circulation so this method is useful for such kind of drug. By his study above all the novel methods are applied to increase solubility for hydrophobic drugs.

Mahalingan K et al., was reported his experiment were he prepared inclusion complex of drug Repaglinide by using beta cyclodextrin in a different ratios of 1:1, 1:3 and 1:5 by solvent evaporation method whose characterization is done by FTIR, XRD, SEM and
DSC. The prepared inclusion complex was used for preparing fast dissolving tablet by
direct compression method using crospovidone, croscarmellose and sodium starch
glycolate as superdisintigrant agent.

Which are evaluated for their pre and post compression parameters viz, angle of repose,
bulk density, tap density, carr’s index and post-compression evaluation hardness,
friability, wetting time, weight variation, disintegration time, in-vitro dissolution study,
drug content were carried. Rapaglinide is a anti diabetic drug used to treat class 2
diabetes, which is poorly water soluble drug with higher permeability this drug having an
very less bioavailability of 60% and less half-life which is lesser than a hour. Therefore,
here he made an attempt that increases its solubility and dissolution rate by inclusion
complex with BCD and making fast dissolving tablets of this drug will increase both.
Diabetes is a chronic disorder produced because of hyper glycaemia due to lack of insulin
secretion from pancreas which is responsible for reducing the increased glucose level,
Repaglinide will act by increasing the secretion of insulin, BCD (beta cyclodextrin) is a
oligosaccharide which having hydrophilic outer surface and lipophilic inner cavity by
entrapping the hydrophobic drug inside the cavity, leads may solubilize the drug along
with itself.

Fast dissolving tablet shows significant effect in case when the patient feel inconvenience
in swallowing tablets or hard capsules specially for pediatrics and yielder aged persons
which result in insufficient therapeutic action even because of loss of some amount by
first pass metabolism to avoid such problem fast dissolving tablet are used instead,
another advantage of FDT is they are taken orally without the help of water and its rapid
onset of action, increased bioavailability and stability. Inclusion complex by solvent
evaporation method may done by taking drug and cyclodextrin with different ratios (1:1,
1:3 and 1:5) in suitable solvent here he used methanol as a solvent and then kept for
evaporation at a specified temperature at particular period of time which is then
pulverized, dried and sieved. Here he prepared fast dissolving tablet with this inclusion
complex by direct compression method using croscarmellose, crospovidone and sodium
starch glycolate as superdisintegrating agents.
He done phase solubility study by taking saturated drug of 12mg in a 0.1N HCl containing BCD which is shaken and allow to stand for 6 days until get equilibrium which is then filtered using 0.45m membrane filter and then analyzed by recording the absorbance under UV-Visible spectrocope he found result as increase in concentration of drug with increase in BCD concentration, stability constant was calculated by and result shows which lies 1857M⁻¹.

By the result he confirmed that formed inclusion complex is in stable form. FTIR was done of the inclusion complex formed by spray drying method by taking 1:1 ratio to check the interaction between Repaglinide and BCD by potassium bromide pellet method scanned in a range of 4000cm⁻¹ to 400cm⁻¹ report showed no interaction was formed between drug and polymer which indicates there is no incompatibility exist between Repaglinide and BCD which is in stable form. XRD was done of the inclusion complex formed by spray drying method by taking 1:1 ratio of drug and BCD showed the complex formation which is in amorphous nature.

DSC inclusion complex by taking drug and BCD in a ratio 1:1 prepares by spray drying method was shown melted peak at 134.5°C indicates its mixed form of both. In the SEM report he found that in inclusion complex has spherical particle shape. Drug content were determined of inclusion complex by dissolving it in 0.1N HCl sample and diluted in suitable concentration which were analyzed by finding absorbance at 240 nm in UV-Visible spectroscopy and by his report drug content were found around 89.38 ±1.23 to 93.51 ± 0.72. In- vitro dissolution study was carried out for inclusion complex by solvent evaporation method, spray drying method and of physical mixture of different ratio of 1:1, 1:3, 1:5 and 1:7 in dissolution apparatus containing 20 mg of repaglinide in pH 1.2 0.1N HCl as dissolution media at 37°C paddle rotation speed is kept 50 rpm sample of 5ml were withdrawn at a definite interval of time and observed under UV-Visible spectrometer at 240nm, physical mixture of 1:1 showed a dissolution rate of 76% in 45 min, were as by solvent evaporation method it is about 81 % and by spray drying method
90% by the dissolution study he conclude that among all the complex form inclusion prepared by spray dried method showed a better dissolution rate.

Pre-compressional parameter were evaluated, bulk density is done by taking all the powder ingredients blend in a measuring cylinder and measured volume and weight, density is get by putting in a equation. The density he found which is lies in the range between 0.50 to 0.55 gm/cm³. The tap density is measured by tapping blend of known amount to a certain no, then measure the volume and weight keep in a equation and the result found by him was in the range of 0.63 to 0.67gm/cm³. Angle of repose is determined to know the ease of flow of powder. He was used funnel method to determine angle of repose by equation and the result he got is in the range of 28.04˚c- 35.36˚c.

Hausner’s ratio is carried by equation Hausner’s ratio and he got the result in the range of 1.18-1.34 hardness test done by using pfizer hardness tester and he found the hardness in the range of 3.88-4.2 kg/cm², friability test done by using friabilator with the rotation around 25 rpm per 4 min and the friability loss found is around (0.48-0.67%). Wetting time is determined by keeping tablet in a 6ml of 0.1N HCl of pH 1.2 and recorded the time require for complete wetting of that tablet the obtained result by his experiment wetting time lies in the range between 21-55sec, dispersion time is found by keeping prepared tablet in 10ml of measuring cylinder containing 6ml of pH 1.2 buffer solution and observe time taken for complete dispersion of tablet, which lies in the range of 55 to 79sec. Drug content were determined of solid dispersion by dissolving it in 0.1N HCl sample and diluted in suitable concentration which were analyzed by finding absorbance at 240 nm in UV-Visible spectroscopy.

By this report drug content were found around 89.38 to 93.51%. In-vitro dissolution study is carried in dissolution apparatus by taking tablet in pH 1.2 of 0.1N HCl as dissolution media at 37˚c paddle rotation speed was kept 50 rpm. The sample of 5ml were withdrawn at a regular time interval observed under UV-Visible spectrometer at 240 nm and the drug release he found was in the range 98 in 10 min by all the evaluated Parameter he concluded that preparation of fast dissolving tablet of Ripaglinide by preparing inclusion complex by spray drying method of 1:1 ratio with drug and BCD by
using crospovidone as superdisintigrant agent showed increased dissolution rate and decreased disintegration time. While increased concentration of croscarmellose and sodium starch glycolate will increases disintegration time because gel like formation surrounding the drug leads to lesser contact with a solvent.

**Reddy et al., (2004),** carried out the studies about the effects of beta-CD on the solubility of Celecoxib in aqueous solution and dissolution rates of the same drug. The approaches of molecular modelings and structural designings were adopted to assess the chance of molecular-rearrangement of inclusion complexes. By freeze-drying, method of evaporations and method of kneading were used of the Complexes of solids. Studies on Phase solubility revealed that the aqueous solubility of drug was considerably improved with the addition of beta-CD and was classified as AL- form, signifying that, inclusion complexes in 1:1 ratio. With regard to the pure drug, complexations with β-CD increased the solubility and rate of dissolution of Celecoxib as demonstrated by *In vitro* evaluations.

**Sanoferjan et al., (2000),** reported the beta CD-Tenoxicam inclusion complexes with the intention of enhancing the solubility characteristics. Solubility study were adopted to determine the stoichiometric and complex stabilities. The complex formations were illustrated by Infra-Red spectra and X-Ray Diffraction reports. The complexes prepared in 1:1M ratio by various techniques was evaluated for its dissolution profile, thermal stability, photo stability. The complex prepared by neutralization technique was observed of a higher practicability and very dependable effects more than the common solvent and kneading method.

**Parikh et al., (2000),** reported Nimesulide- β-CD inclusion complex by kneading methods and evaporation methods through salt formation technique for enhancing the dissolution rate. Out of various attempts made for dissolution enhancement, Nimesulide: lysine salt in the ratios of 1:1.5 showed highest drug dissolution.
Tenjara et al., (2000), prepared the Miconazole inclusion-complexes by methods of freeze-drying and kneading methods using different CD’s for improved oral and topical delivery. The results showed that the rates of dissolutions of Miconazole increases by the folds of 28-225 and the Miconazole solubility increases to the folds of 9-55. Complexation with HP-βCD increases the bioavailability in rats by a 2.3 folds. Finally it was concludes the inclusion complexes formulated by freeze drying technique showed higher the dissolution rate and solubility compared with kneading method.

Shyale et al., (2005), developed colon targeted Albendazole matrix-tablets by using rate retarding materials like guar-gum. The development of inclusion complex of Albendazoles with CD was considered for the improvement of its bioavailability Various propositions; 20% to 40% of guar gum was used for the formulation of matrix tablet of Albendazole- beta-CD by wet granulation method. The study showed that the discharge of Albendazole in colon physiological surroundings is because of the derivative transformation of guar gum coated tablets in presence of rats fecal matters and presence of microbes.

Chowdary et al., (2003), investigated the mucoadhesive tablets of nifedipine alone and its inclusion-complexes with beta-CD. Formulation of Nifedipine- β-CD inclusion-complex with a stability content of 121M⁻¹ was signified by the studies phase-solubility. Zero order reaction kinetics obeyed for the release of drugs from the tablet formulations till 85-95% release, and the release was identified as diffusion controlled. Better controlled-release of two layer tablet formulation of Nifedipine, which satisfies the hypothetical sustain-release necessities based on its pharmacokinetic parameters.

Chowdary et al., (2006), investigated Celecoxib complexation formulations with HP-beta-CD using and devoid of 3 hydro-philic polymers such as P.V.P., H.P.M.C. and P.E.G. with a purpose of estimating the effects of the hydro-philic excipients on the complexations and the solubilization effects of HP-βCD and on the rate of dissolutions of Celecoxib from the HP- β-CD complex forms. The results of this studies revealed that inclusion of hydro-philic polymer substances significantly improved the complexations and solubilization effectiveness of HP- β-CD. Rates of dissolution of Celecoxib from
HP-β-CD complexes were improved by the dissolution of hydrophilic polymers.

**Morten et al., (1999),** reported the precipitation of β-cyclodextrins (β-CD) inclusion complexes of the antimicotics such as miconazole and econazole. The temperature, buffer strength, and the effect of the addition of hydrotropic agents on CD solubility diagrams for the antimicotics were estimated. The toxicity on TR146 oral cell layers was measured. Lowering the temperature meant that both complexes precipitated at lower CD concentration. Addition of hydrotropic agents and variation of the buffer strength affected the solubility diagrams. Separation of authentic CD complexes of Miconazole and Econazole was facilitated by lowering of temperatures. The miconazole supersaturation is likely to be the section for the better anti-micotic actions of the complexes. The complex and physical mixture had about the same toxicity on TR146 cell layers.

**Vavia et al., (1999),** reported the complexations of Nimesulide with β-CD) and HP β-CD. The freeze drying methods were uses for the formulations of complexes. The rates of disso of the drug alone were slowers than the disso rate of drug–HP β-CD complex, when the in-vitro dissolution rates were compared.

**Choi et al., (2001),** attempted for the enhancement the anti-histaminic activities of Terfenadine in presence of inclusion complex of cyclodextrin in the ratio of 1:2. The complexes were obtained by the method of neutralization. The solubility of the inclusion complexes and the study of dissolution were carried out, and evaluation of its anti-histaminic activity was performed and then comparison studies with pure Terfenadine by the method of passive subcutaneous anaphylaxis using rats were also performed. The solubility about 200 folds and the rate of dissolution about 5 folds was improved by this complexation. It also presented a low level of histamine at 30 minutes, pursued by a low controlled level until 60 minutes, while Terfenadine concentrate presented a low level of histamine at 60 minutes, indicating that it showed a rapid and much efficient anti-histaminic action than that of Terfenadine concentrate in rats because of faster dissolution and absorption of Terfenadine.
Veiga et al., (1996), reported phase solubility methods and spectral shift methods for the formation of solubility complexes between Tolbutamide and beta-CD in aqueous solutions. Ks, stability constant was found to be 195.7 and 236.5 M$^{-1}$, correspondingly. TBM and beta-CD solid inclusion complexes were obtained at 1:2 molar ratios by the methods of kneading, method of co precipitation, freeze drying, spray drying and the physical mixture techniques was also prepared additionally. TBM: β-CD inclusion complex was characterized by the techniques of Differential Scanning Caloriemetry, Raman spectrophotometry, and X-ray diffraction analysis. The entire inclusion complex schemes were examined, guided to a considerable enhancement in the dissolution in excess of free TBM.

Jichao et al., (2002), reported the enhancement of solubilization of camptothecin (CPT), by the utility of different concentrations of cyclodextrins (α-CD, β-CD, γ-CD; hydroxyl-propyl-βCD, HP-β-CD; and arbitrarily replaced dimethyl-β-CD, RDM-βCD, and dimethyl-γ-CD, RDM-γ-CD) in 0.02 N HCl solution at 25°C. The outcomes demonstrated a linear raise in the solubilization of Camptothesin with increases concentrations of Cyclodextrins. In conclusion, the results showed that CDs, in general, and RDM-β-CD, in particular, are effective complexing agents and can be used to enhance the solubilization and stability of Camptothesin. The increase in cytotoxicity of CPT in the presence of CD is likely due to an increase in its stability.

Esclusa-Diaz et al., (1996), reported the influence of βCD and 2-hydroxypropyl-βCD on the solubilization of ketoconazole in diverse medium. Preparations of Inclusions complex were obtained by process of spray drying and kneading techniques. It was observed that the spray drying techniques can be successfully used for the preparation of the amorphous condition of drugs. The solubility complexes of ketoconazole prepared by spray-drying process showed faster dissolution rates than that of pure drug alone. The enhanced disso rates of spray dried formulations may be credited to the reduced particle-sizes, the high energy level amorphous condition and development of inclusion complexes.

Mario et al., (2004), investigated the in solution and in the solid status interactions of Piroxicam and hydroxyl-propyl beta cyclo-dextrin (HPβ-CD). Equimolecular PX- HPβ-
CD solid arrangements were synthesized and described by Differential Scanning Calorimetry, F TIR and X-Ray Diffraction studies. The results of in vitro releases confirmed the releases of Piroxicam from formulations containing the physical mixture or free drug were slower than the matrix- tablet formulations containing the Piroxicam–HPβ-CD solid state complexes. Dissimilarity in rates of release of Piroxicam from the tablets is chiefly due to the existence of the polymers and complexation with cyclodextrin.

**Bilenso et al., (2007)**, prepared the inclusion complex of the poorly water soluble Tamoxifen citrate with beta-CD and 2,3-di Ortho hexanoyl beta-CD which are naturals amphiphilics cyclodextrin, correspondingly using the methods of co-lyophilization. The complexes were characterized DSC, FTIR and X-RD. It was observed that the incorporation of Tamoxifen citrate in the cavities for β-CD. The next compound with two hydro-phobic locations for insertion of water insoluble drug demonstrated significant elevated anti-cancer effectiveness as a result.

**Pitha et al., (1992)**, investigated the interactions of hydroxyl-propyl- β-CD and Polyvinyl Pyrrolidone-K30 with a synthesized derivative of isoxazolynaphthoquinones, which confirmed to demonstrate significant biological action in opposition to *S. aureus* and *T. cruzi*. The constant difference plots for 1:1 HPβ –Cyclodextrin system illustrated a 1:1 stoichiometric order for the complexes. UV- absorptions spectrophotometric studies specify that the incorporation of isoxazoles component in the cavity of structure-I is most favored possibility. Outcomes of these techniques propose that interaction of drug with polymers probably happen by means of inter-molecular hydrogen bonding between the carbonyl groups polymers and hydroxyl groups of drug.

**Bandiet et al., (2004)**, studied the inclusion complexes of Indomethacin and Budesonide with hydroxypropyl-β-cyclodextrin (HPβ-CD) using a supercritical fluid process (SCFP). SEM study shows no evident drug crystals upon substantial incorporation through or devoid of Super Critical Fluid processing. Consequently, budesonide and indomethacin in
together with HPB-CD and HPB-CD complexes be able to be obtained by means of a one step, organic solvent-free SC CO2 process with improved rate of dissolution.

Jambhekaret al., (2004), studied the complexes of indomethacin with various CD’s. Study on solubilities showed an increase in Indomethacin solubility with complexation, and the hydroxyl-ethyl- and hydroxyl-propyl-β-CD complexes showed better solubility than the β-CD complexes in 0.1Normal Hydrochloric acid and distilled water. It was concluded that, inclusion complexation with only β-CD improved the bioavailability of Indomethacin.

Diaz et al., (1999), studied the interactions between Fenoprofen calcium and α-, β-, γ-and hydroxyl-propyl- β-CD in aqueous solutions by employing UltraViolet-Visible and fluorometric direct spectroscopic studies and mono-dimensional (1-D) 1 H-Nuclear Magnetic Resonance. Different Ultra Violet-Visible and fluorescence emission spectrums were acquired for the study to describe the most suitable CD for the formations of the IC with the proof of evident binding constants (K). β-Cyclodextrin and HP- β-CD clearly fix the degree of data of stability constant for the complexes to obtain into description the pharmaceutical technology concern.

Veiga et al., (2001), studied the Tolbutamide inclusion complexes with βCD and HP-βCD using various methods such as process of kneading method, technique of co precipitation and freeze drying methods. The rate of disso of Tolbutamide-CD complexes were examined and evaluated in comparison with those of the physical combinations and pure drugs. The rate of dissolution Tolbutamide from the inclusion complexes was a lot faster than Tolbutamide in single.

Maestrelliet al., (2002), reported the complexes of number of sulfonamide derivatives which contain strong enzyme carbonic anhydrases which inhibites characters with beta-CD and hydroxyl-propyl-β-CD. The complexes were topicaly non efficient as intra-ocular pressure relieving substances in normo-tensive and hypertensive rabbits, because
of the extremely little water solubility. On the opposite, the CD– sulfonamides complex demonstrated to be efficient and long acting.

Tayede et al., (2006), studied the inclusion performance characteristics so as to obtain a novel dosage formulation for oral route, through improved rate dissolution and bio-availability, and for the study of oral pharmaco-kinetics in humans, subsequent complexation of cyclodextrin hydroxypropyl beta-CD and natural beta-CD toward Ketoprofen,. Drug-CD solid systems were obtained by scheme of kneading, process of co-evaporation, and technique of freeze-drying. The maximal plasma concentration of Ketoprofen increased about 1.5 fold after administering inclusion complexes to human volunteers orally.

Ann et al., (2004), designed and evaluated the hydroxy propyl β-cyclodextrin with Camptothecin inclusion complexes for increasing the solubilization and rate of dissolution. The solubilization of Camptothecin observed to enhance the rate of dissolution and solubilization with an increase the concentration of hydroxy propyl β-cyclodextrein and finally it was concluded that these complexation products prepared with the HP beta -cyclodextrines were stable.

Rawat et al., (2004), attempted to develop the celecoxib complex by the kneading techniques using different molar a ratio of βCD in order to increases the solubilization and rate of disso. Improvement of rate of dissolution with rising concentration of βCD in the complex was noted. It was also indicated that these complex formulations show elevated rates of dissolution than the standard bulk drug and its physical mixture.

Jun et al., (2007), have prepared the inclusion complexes with HP-βCD obtained by the use of SAS procedure and carried out the studies for enhancement of the aqueous solubilization and the rate of dissolution of low soluble drugs, consequent improvement of its bio-availability. The phase-solubility diagrams, Differential Scanning Caloriemetry, XRD, FT-IR and SEM analytical techniques were employed for the characterization and evaluation of these inclusion complexes. Aqueous solubility and
dissolution study results specified that the extent of solubilization and rates of
dissolution were outstandingly improved in comparison with physical mixtures and
single drug.

**Patel et al., (2011),** have investigated inclusion complexes of Albendazole(AZ) with
cyclodextrine by different techniques like, physical-mixtures, co-grinding, process of
kneading, solvent evaporation etc. The physical properties of the prepared solid-mass of
AZ was characterized by in-vitro dissolution study, UV-Visible spectroscopy, Fourior
transforms infrared spectrophotometry, differential scannings calorimetry(DSC) and
XRD powder spectroscopy. The results of FTIR spectroscopy shows the compatibility
of drug with complexing agent, while DSC and PXRD spectroscopy showed the
confirmation of complexation of cyclodextrin with Albendazole.

**Sapkali et al., (2007),** developed strong inclusion complex system of β-cyclodextrin and
gliclazide in solution form and in solid condition by physical mixing, kneading methods
and coprecipitation methods, both on small and large scales. This study was started for
determination the appropriate process for the study of inclusion complex formation of
gliclazide with beta-Cyclodextrin including evaluation of certain parameters like, the
efficiency of complexation with the drug. Effect of parameters like kneading time and
temperature on complexation was studied. The fixing of parameters and description studies
were done by the use of IR spectrophotometry, XRD, FTIR, and studies on rates of
dissolution. The release studies for the drug disso release were performs using ph buffer
of pH 6.8.

**Loftsonnet et al., (2007),** reviewed about cyclodextrins and their usefulness as functional
excipients. The mechanism of complexation for the formation of non-covalent dynamic
inclusion complexes of the cyclodextrins also been covered. The statistics of cyclodextrins
based on the formulations encompassing the market supported on their ability to form
obscure unwanted physic-chemical properties. This evaluation established to be having
broad conditions about the use of cyclodextrin in the form of solubilizing agent as well as
emphasize kinetic and thermodynamic utensils in pharmaceutical formulations and
conditions helpful for the study of solubilization of drugs studied by cyclodextrins complexation.

Radha et al., (2010), have reported to enhance the rate of solubilization of the Zafirlukast by complexing with \( \beta \)-cyclodextrin. The drug excipient interaction was studied through FT-IR studies and DSC. This study clearly demonstrates that the rate of dissolution of zafirlukast may be improved by solid dispersion method using the kneading method.

Patel et al., (2009), have reported the glipizide with beta-CD inclusion complexes. He was prepared the inclusion complexes by different ratios like of 1:1 (glipizide: beta-CD) and 1:2 Molar ratios by complexing with drug and solubilizing agent in different methods like physical addition method, in physical method he was prepared the inclusion complexes by 1:1M and 1:2M ratios. The kneading, and co-precipitation method also, he was prepared the inclusion complexes by 1:1M and 1:2M ratios. The categorization of prepared inclusion complexes was carried out by using IR spectrophotometry, in this study comparing the peaks of pure drug of glipizide with complexes prepared by the above methods. X-ray powder diffraction study indicated that the presence of sharp, intense peaks, which determines the nature of inclusion complexes, whether the drug is completely complexes with the solubilizing agent or not. The drug content study was carried out in each of the formulation prepared by these above methods. Dissolution release studies carried out using the disso medium of phosphate buffer at pH of 7.4, By the disso release data it was found that the release of drug was more in the 1:2 ratio because the concentration of solubilizing agent in this formulation was more. The release data was more in the complexes prepared by the co-precipitation technique compared physical and kneading technique. Each of technique of physical, kneading and process of co-precipitation in molar ratios 1:2.

Were found to be uniformly efficient for the improvement of the solubility of glipizide. Inclusion complex formation was apparent of these products, as revealed by the drug content studies. The drug content was more accurate in the formulations prepared by the co-precipitations methods of 1:1 ratios. The Infra-Red spectroscopy and X-Ray Diffraction studies revealed that there is complete complaxations prepared by the co-precipitation
technique compared with physical and kneading technique. The dissolution study *in vitro* information point out that complexes obtained by the process of kneading and co-precipitation methods in the 1:2 molar ratios were appropriate to increase the solubility of glipizide drug. So, finally it was shown the complexes formulated with those techniques was good, which enhances the solubility of poorly soluble drug of glipizide.

**Swami et al., (2010)**, have reported the improvement of the solubilization and rate of dissolution of Domperidone by complexation with beta-CD and hydroxyl-propyl cellulose by the method of kneading. Characterization and evaluation studies were performed for the recognition of physio-chemical interactions between Domperidone with its carrier and its consequence on dissolution behavior the complexes by Infrared (IR) spectrophotometry and DSC. The morphology of the drug with complexing agent was studied by means of SEM). The relative assessment of the rates of dissolutions of Domperidone with complex of beta-CD and dispersion complex of hydroxyl-propyl cellulose. By comparison with the physical mixtures and standard drug, techniques of dispersion complex, solid dispersion by kneading methods were effectively employed for the enhancement of rate of dissolution of Domperidone.

**Chowdary et al., (2000)**, accounted the of complexes formation of Nimesulide with β-CD both in solutions and in solid condition. The solid inclusions complex of BCD were formulated by the process of kneading techniques of co-evaporation. The development of solid inclusions complex of Nimesulide with B-CD at molar ratio of 1:2 in mutual methods were signified by Differential scanning caloriemetry investigations. Solid complexes of Nimesulide with b-cyclodextrins of the ratios of 1:1 and 1:2 Molar ratios demonstrated elevated rates of dissolution and dissolution effectiveness than the matching physical mixtures and standard drug. Complexes prepared by the technique of Kneading complexes showed the elevated rates dissolution than those obtained with prepared by the process of co-evaporation.

**Yadav et al., (2008)**, investigated that the formations of solid complexations of mesalamine with β-CD as water-soluble solubilizing agent, was used to enhance the
Physico-chemical characters like solubilization, dissolution properties and stability in the presence of polyvinyl pyrrolidone, Poly ethylene Glycol. The dispersion of Mesalamine in solid state is prepared by the process of kneading by the use of ratios of drug with 1:2 and 1:3 to polymers poly vinyl pyrrolidone, Polyethylene Glycol and β-CD. FTIR and XRD stud were employed for the characterization of Mesalamine in solid-dispersion formulations. The prepared solid-dispersion demonstrated a noticeable enhancement of the solid dispersed solubilization and dissolution rate of complexed drug compared with that of drug alone. The solid-dispersion of drug with β-CD of 1:3 ratio demonstrated faster rate dissolution as compared to the other dispersions prepared.

Setty et al., (2008), developed and reported and the consequence of functionality of super-disintegrating agents like sodium salt of cross carmellose, cross povidone and sodium starch glycolate on time of wetting, time of disintegration and drug content release on fast dispersible Aceclofenac tablets prepared by the process of direct compression. All the parameters were faster in formulations prepared with cross povidone compared with other two super-disintegrating agents.

Gupta et al., (2000), prepared fast dissolving tablets of diclofenac sodium using sugars, i.e. (sorbitol, mannitol) and polymers (HPMC, PVP) by direct compression techniques. FDT were prepared by solid dispersion of drug with β-CD. It was concludes the solid dispersion techniques resulting in enhanced dissolutions rate.

Lalla et al., (2007), formulated fast dissolving tablets by making inclusion-complexes of Non Steroidal Anti Inflammatory Drug rofecoxib, with beta-Cyclodextrin using ball mill technique. A variety of complexes with the ratios of 1:1, 2:3, 1:2 of drug:beta-Cyclodextrin were obtained and tablets of rofecoxib-beta-Cyclodextrin complexes were arranged by the process of wet granulation using the ball-milled dried up powder. The complexes prepared by mill technique in a 1:1 ratio are proven to be the optimum ratios of formulation of fast dissolving tablets by wet granulation technique.
Gonnissen et al., (2007), investigated the consequence of maltodextrin and super-disintegrating agent on properties of tablets by directly compressible powders co-processed through the technique of spray-drying. Mixtures of powders consisting acetaminophen, mannitol, erythritol and different malto-dextrin types were obtained through the process of co-spray drying and physical mixtures using a variety of grades of cross povidone in order to assess their result on time for tablets disintegration. Formulations prepared by co-spray drying showed faster disintegration time compred with physical mixture.

Patel et al., (2004), formulated and designed rapid-releasing tablets of oxcarbazepine by the process of melt-granulation. A significant improvement of rate drug dissolution of granules when compared with physical mixtures and standard drug was observed, however no important distinctions were noted among the profiles of dissolution rates of the granules consisting of lactose or starch.

Sheetal et al., (2007), formulated and evaluated oxcarbazepine fast dissolve tablets by wet granulation method, using a diluent like Avicel-PH 102 and a super-disintegrating agent like Ac-di-sol. The products composed of 12% Ac-Di-sol and 25% Avicel PH 102 and binder was 8.5% starch observed to contain a good hardness of 4 to4.5 kg per cm², time of disintegration 28±5 s and discharge of drug. The releases of drug were found to be higher than the dispersible commercial tablets.

Mulla et al., (2008), have prepared rapidly dissolving tablets formulations of Promethazine hydrochloride using various super disintegrating agents like Ac-di-Sol, polyplasdone along with additional excipients. The tablets were formulated by directly compressing the granules and the time for disintegration and release of drugs was observed to be higher in occurrence of super-disintegrant like Ac-di-Sol.

Gohel et al., (2004), prepared Nimesulide mouth-dissolving tablet formulations by means of process of vacuum drying. A wet granulations technique was applied for the production of the granules consisting of Nimesulide, camphor, crosspovidone and lactose.
On the other hand tablets were subjected to exposure to vacuum after the preparation. It was reported that crospovidone gives better compressibility compared to other superdisintegrants and has an elevated capillary action with noticeable hydration capability and modest inclination for the formation of gels.

**Patel et al., (2004),** have prepared the screening of three superdisintegrants in the formulation of orodispersible tablets of rofecoxib. Mannitol was used as a diluent to improve the palatability. CRP was found to be most effective giving lowest disintegration and wetting time.

**Abdelbary et al., (2004),** have attempted to decreases the disintegration times of paracetamol tablets that having sufficient hardness formulated by melt granulation method using Ac-Di-Sol, croscarmellose sodium as disintegrants, mannitol as excipient. The disintegration time was found to decrease with formulation containing Ac-Di-Sol.

**Massimo et al., (2003),** formulated spirinolactone tablets to study the effect of the granulate properties and tablet compression force on disintegration. The effect of manufacturing processes such as compression force on tablet properties was quantified by the parameter of disintegration force kinetics.

**Khan et al., (2007),** formulated and evaluated ondansetronHCl tablets with the intention of increasing the disintegration process and also to mask the bitter taste using polymer carrier system. Mannitol and MCC in the ratio of 1:1 and 7% polyplasdone shows rapid disintegration time within few seconds. Polyplasdone was selected in this study at optimum concentration to produce result with minimal disintegration time. The study also predicted that lactose or mannitol will increase the flowability of the granules with increased concentration. High amount of mannitol showed increase in wetting and disintegration.

**Naiet al., (2008),** formulated and evaluated the FDT of glipizide by using various superdisintegrants. The results indicated that fast dissolving tablets prepared with
crosppovidone having better disintegration time, wetting time and good physical integrity compared to other super disintegrants.

**Ishikawa et al., (1999),** formulated and assessed rapidly disintegrating tablets by compression. The drug used for this research purpose was pirenzipineHCl. The formulations found to rapidly disintegrate in the saliva.

**Swamy et al., (2007),** formulated orally dispersible tablet formulations of Meloxicam by means of disintegrate combination for enhanced effectiveness. Various combinations of superdisintegrants such as SSG, CCS and CRP employed with direct compressed Mannitol for the improved feeling in mouth. The formulation produced by compressing directly with superdisintegrants SSG, CRP and CCS was found to be a higher in formulations compared with other superdisintegrants.

**Koizumi et al., (1997),** have prepared, rapidly soluble compressed tablets of meclizine which are solubilized in saliva, using subliming agents like mannitol. These tablets found to have rapidly dissolved in saliva and elevated porosity.

**Madgulgar et al., (2008),** have formulated and optimized oral disintegration tablets of fexofenadine hydrochloride. The results indicated that the prepared fast dissolving tablets having better disintegration time, wetting time and good physical integrity. The formulation prepared with crosppovidone was found to be fast disintegrations time and good release profile comparing to other super disintegrants.

**Salem et al., (1995),** have reported acetaminophen tablets having minimum amounts of excipients and changeable amount of crosslinked poly-vinyl pyroolidine. The time of disintegration, rate of dissolution, force of crushing, friability in addition to effect of temperature and moisture on these characteristics throughout storage was evaluated. They concluded that rising magnitude of the cross-linked polymer (1-10%) has no control on crushing or friability, but extensively reduced the time of disintegration and rate of dissolution.
Goel et al., (2008), have formulated and optimized fast disintegrating tablets of ondansetron HCl using amino acetic acid, crosscarmellose and sodium alginate with sufficient mechanicals strength. The formulation containing carmellose and sodium salt of alginic acid was found to have faster disintegration time and good dissolution profile.

Sharma et al., (2008), have developed rapidly dissolving tablet formulations of Promethazine salt of theoclate by a technique of direct-compression after inclusion of super-disintegrating agents such as Ac-Di-Sol, sodium starch salt of glycolic acid and cross-povidone in various amounts. The products prepared with the Ac-Di-Sol, and crospovidone showed fast time of disintegration and good release profile for drugs employed.

Singh et al., (2008), have reported formulation and optimization of orodispersible tablets of Indomethacin by the use of a collective idea of sublimation agent and super-disintegrating agent. The tablet formulations were prepared by method of non aqueous wet-granulation. Experimentally it was concluded that the higher the level of camphor and mannitol resulting the higher the disintegration time.
3.1 DRUG REVIEW:

Rosuvastatin Calcium:

CAS Registry number: 147098-20-2.

Molecular weight: 1001.14 daltons.

Molecular formula: [C22H27FN3O6S]2Ca.

Structure:

![Structure of Rosuvastatin Calcium](image)

**Appearance:** white amorphous powder.

**Melting point:** 122 °C.

**Solubility:** The rosuvastatin calcium drug is sparingly soluble in the water and freely soluble in the ethanol and methanol.

**Pharmacodynamics.**

**Mechanisms of action:**

RC is a competitive inhibitors of enzyme HMG-CoA reductases enzyme. RC acts initially in the liver. RC decreases hepatic cholesterol concentration and stimulates the up regulations of LDL (hepatic) receptor which is increases the LDL (hepatic). RC also inhibit synthesis of VLDL in hepatic system.

**Pharmacokinetics:**

**Absorption:**

In the clinical pharmacological study, the peak plasma concentration in man, The RC were reached plasma concentration 3 to 5 hours the oral dosee. The AUC and C_{max} increases in normal dose of RC. The bioavailability of Rosuvastatin calcium is approx. 20%.
Distribution:
The mean volumes of distribution in a steady state of RC is approx at 134 litters. RC is bound to plasma proteins at 88%, to the albumin. This binding is reversible to the plasma concentrations.

Metabolism:
RC is not metabolized extensively in the liver, approx 10% of a radio labeled doses is recover as metabolites. The major metabolites is N dimethyl RC.

Excretion:
The oral administration of RC, its metabolite is initially excreted in the form of faces (90%). The elimination t1/2 of RC is approx 19 hours. After the administrations of an iv. dose, the total body clearances approx 28% of was excreted via the 72% by the hepatic route and renal route.

Therapeutic use:
It is used as a hypolipidemic agent.

Drug interaction:
1) Cyclosporines: The cyclosporine was significantly increased RC exposure.
2) Gemfibrozil: The emfibrozil significantly increased RC exposure.

Dosage form: Tablets (film coated): 5 to 40 mg
Packaging and storage: 20–25°C, protect from moisture [Drug bank .com].
Atorvastatin Calcium:

Chemical Formula: \( \text{C}_{33}\text{H}_{35}\text{FN}_{2}\text{O}_{5} \)

Descriptions:
Atorvastatin Calcium is a class of statins. It uses in reduces the cholesterol level in the body. Atorvastatin is competitive inhibitors of HMG-CoA reductase enzyme.

Categories
1) Anticholesteremic agents. 2) Lipid lowering agents.

Structure

Pharmacology:

Mechanism of action:
AC is a competitively and selectively inhibited the hepatic enzyme HMG-CoA reductases. This enzyme is responsible for the conversion of mevalonic acid to HMG-CoA to in the cholesterol biosynthesis pathways.

Absorption:
AC is most quickly absorbs after oral administrations with the maximums plasma concentration achieves within 1 to 2 hour and the bioavailability of AC is approx 14% and systemic bioavailability is approx 30%.

Food Interaction:
Avoid the alcohol drinking and avoid the change in dietary habits, taking grapefruit for complete period of treatment. Eating of grapesfruit can increases serum level of this product. Presence of Food may decreases plasma level and AUC.

Route of elimination:
Primarily this drug is eliminated in biles after hepatic metabolism and LT 2% of administered oral dose is recovered in urine.
Drug Interactions

**Indinavir**: It may increases the serums concentrations of atorvastatin.

**Itraconazole**: Increases risk of myopathy.

**Dosage form**: Tablets (film coated): 10 to 80 mg

**Packaging and storage**: 20–25°C, protect from moisture.

3.3 polymer and Excipients Review

**β-Cyclodextrin**.

**Synonyms**: Beta-cycloamylose;
betadex;
beta-dextrin;
cyclohepta amylase;
cycloheptaglucan;
cyclomaltoheptose;
kleptose.

**Functional category**: Solubilizing agent and the stabilizing agent.

**Empirical Formula**: C_{42} H_{70} O_{35}

**Molecular Weight**: 1135 g/Moles.

**Structure**:

![Structure of Cyclodextrin](image-url)
**Description:** White, practically odorless, amorphous powder, having a slightly sweet taste.

**Solubility:** It is soluble in 1 parts in 200 part of propylene glycol, in water 1 in 50 parts at 20°C

**Storage condition:**
Stable in the form of solid state and stored in a tightly sealed well closed container.

**Safety:** Used in oral pharmaceutical formulations such as the tablets [Nash (2005)].

**Hydroxypropyl β-Cyclodextrin:**

**Synonyms:** 2-hydroxypropyl β-Cyclodextrin.

**Functional category:** Solubilizing and the stabilizing agents.

**Molecular weight:** 1548 g/Moles.

**Structure:**

![Structure of Hydroxypropyl β-Cyclodextrin](image)

**Description:** It is a white powder which is crystalline in nature.

**Solubility:**
The solubility is more in 1 parts in 2 part of water at 25°C.

**Storage conditions:**
Stable in the form of solid state and kept in a closed, sealed containers in a cooled place.
Incompatibility:
Some antimicrobial preservatives activity can be reduced in presence of aqueous solutions of HPβ-CD [Nash (2005)].

3.3.1 Microcrystalline Cellulose (Avicel PH 102):
Nonproprietary Names: NF: Microcrystalline cellulose (MC).
USP: MC.
Synonym: Cellulose gel:
Crystalline, cellulose:
Avicel PH101,102.
Chemical names: Cellulose.
CAS Registry Number: 9004-34-6.
Empirical formula: (C₆H₁₀O₅)n n=220.
Molecular weight: 36,000(approx) Daltons.
Structure:

![Cellulose molecular structure]

Functional Category:
It is a tablet and capsules diluent, disintegrating agent, suspending agent.
Description:
It is a white, purified and crystalline powder comprised of porous particle and partially depolymerized cellulose.

Typical Properties:
Density: Apparent density: 0.28g/cm³ and Tap density: 0.43g/cm³
Solubility:
It is slightly soluble in 5% w/v NaOH solutions and insoluble in water and dilute acids.

Safety: Generally regarded as safe.

Application in Pharmaceutical Formulations:
It is used for tablet binder/diluent for the wet and dry granulation[Rowe et.al., (1986)].

3.3.2 LACTOSE:
Functional category: It is used for tablet and capsule diluent.

Chemical name: 4-O- β-D galactopyranosyl-α-D-glucopyranose, 4-( β-D galactosido)-
D-glucose.

Empirical formula: C22H22O11.

Description:
It is a off white crystalline powder and slightly sweet.

Typical properties:

Solubility:
Solubility is more water and ether, chloroform and ethanols it is insoluble.

Storage conditions:
Under the humid conditions (80%RH and above) mold growth may be occurs, kept in a closed, sealed containers in a cooled place.

Incompatibility:
A Millard type condensation reaction is occur between the lactose and compound having the primary amino group to forms brown coloured product.

Application in pharmaceutical formulations:
It is used as a filler or diluent (wet granulation and direct compression), capsules, in the lyophilized products and infant fed formulations [Rowe et.al., (1986)].

3.3.3 CROSPOIDONE:

Nonproprietary Names: BP: Cospovidone
USPNF: Cospovidonum.

CAS Registry Number: [9003-39-8]
Empirical Formula: (C6H9NO)n.
Molecular Weight: >1 000 000 daltons.
Functional Category: Used as tablet disintegrating agent.
Description:
It is white creamy, small particles, practically it is odorless, tasteless, free-flowing hygroscopic powder.

Structural Formula

Typical properties:
Solubility: Insoluble in organic solvents and water.

Storage Condition:
It is hygroscopic in nature, it should be kept in a closed, sealed containers in a cooled place.
Safety: Generally it is a nontoxic and nonirritant material.

Application in pharmaceuticals formulations:
It is a water-insoluble, disintegrating and dissolutions agents [Rowe et.al., (1986)].

3.3.4 CROSCARMELLOSE SODIUM (Ac-di-sol, Cellosol):
Names: BP: Crosscarmellose sodium,
USPNF: Crosscarmellose sodium.
Synonym: Ac-Di-Sol.
Chemical Name: Carboxymethyl ether, CAS
Registry Number: [74811-65-7] Molecular
Weight: 90 000 to 700 000 daltons.
Functional Category:
It is a tablet and capsule disintegrating agent.

Description:
Crosscarmellose is odorless, grayish-white powder.

Solubility:
It is insoluble in water and crosscarmellose sodium quickly swell to 4 to 8 times its pure volume in contacts with water and it is insoluble in acetone, ethanol and toluene practically.

Storage Conditions:
It is stable to the state of hygroscopics material form. It is formulated with crosscarmellose sodium as a disintegrants, even after storage at 30°C for 14 months there is significant difference was observed.

Incompatibility:
The efficiency of disintegrating agent, like crosscarmellose, may be reduced slightly in the tablets formulation formulated by wet or dry granulation methods.

Safety:
The laxative effect was observed in oral administrations of large amounts of crosscarmellose sodium.

Applications:
It is employed in oral pharmaceuticals formulation as disintegrating agent for capsule and tablets [Rowe et.al., (1986)].

3.3.5 SODIUM STARCH GYLCOLATE:
Non proprietary names: NF:BP: Sodium Starch Glycolate.
BP: Sodium Starch Glycollate.

Synonyms: Sodium starch carboxy- methyl starch.

Chemical names: starch carboxymethyl ether, sodium salt.
Structural Formula:  

![Structural Formula Image]

**Functional Category:** It acts as a tablet and capsule disintegrating agent.

**Description:**
Sodium starch glycolate is white, free flowing powder.

**Typical Properties: Density:** 1.5 g/cm3.

**Solubility:**
In 2% w/v, it dissolved in cold water and settles as saturated layer and insoluble in organic solvents.

**Storage Conditions:**
It is stable when kept in a closed container and protect from humidity and temperatures conditions.

**Safety:**
It is generally as a nonirritant, nontoxic material. In case of oral ingestion, the large quantity may be harmful.

**Application in Pharmaceutical Formulations:**
It is a disintegrating agent (wet granulation or direct compression) with concentration range 2-10% [Rowe et al., (1986)].

### 3.3.9 TALC:

**Non-proprietary Name:** USP: Talc. BP/EP: Purified talc.

**Synonyms:** French chalk:
  - purified chalk:
talcum: soapstone:
    steatite.

**Chemical names:** Hydrous magnesium silicate.

**CAS Registry number:** 14807-96-6.

**Empirical formula:** Mg6 (Si2O5)4(OH)4.

**Functional category:**
It is a tablet and capsule lubricating agent, glidant, talc dusting powder and anti-adhesives properties.

**Description:**
It is more fine, white to greyish white and odorless crystalline powder,

**Density:**
Loose,  CTFA-C8-1 : 19-24 lb/ft³
Tapped, CTFA-C7-1 : 48-62.5 lb/ft³

**Solubility:**
It is insoluble in water, organic solvents, cold acids and dilute alkalies.

**Storage Conditions:**
It is very stable and preserve in closed containers.

**Incompatibility:**
Quaternary ammonium compounds.

**Applications:**
It is used as a lubricant agent in tablet capsules 1to 4% Filler for tablets- 5 to 30% for the capsules.

**Safety:**
It should not be applied to open wounds or used on surgical gloves. Prolonged and intense exposure to talc may produce pneumoconiosis [Rowe et.al., (1986)].

**3.3.10 Magnesium Stearate:**

**Names:** BP: Magnesium stearate.

Synonyms: Magnesium octadecanoate,
Chemical Name: Octadecanoic acid magnesium salt.
CAS Registry Number: [557-04-0]
Empiricel Formulas: C36H70MgO4
Moleculars Weight: 591.34
Structural Formulas.

\[
\begin{align*}
\text{CH}_3(\text{CH}_2)_{18}\text{COO} \\
\text{Mg} \\
\text{CH}_3(\text{CH}_2)_{18}\text{COO}
\end{align*}
\]

Category:
Used for the tablet lubricating agent and as a capsule lubricating agent.

Description:
It is a very fine, white, characteristics tastes of precipitated powders of low bulk density.

Typical Properties:
Solubility:
Solubility is more in warm benzene and (95%) ethanol and insoluble practically in 95% of ethanol and water.

Storage Conditions:
It is very stable and preserved in tightly closed containers.

Incompatibility:
With the strong acids, iron salts and alkalis. Avoids mixing with strong oxidizings materials.

Safety:
Dust clouds of magnesium stearate may be explosive. However, orally consumptions of
large quantity may result in some laxative effects.

**Applications in Pharmaceutical Formulation or Technology:**

- Tablet and capsule lubricant,
- Glidant.
- Anti-adherent in the concentration range of 0.25 to 2.0% [Rowe et.al., (1986)].