**3. LITERATURE REVIEW**

**Dipali Tajane et al22;** RP-HPLC-PDA method has been developed and validated for quantitative determination of rosuvastatin and amlodipine from tablet formulations. All the parameters for the two titled drugs met the criteria of ICH guidelines for method validation. As the mobile phase is MS compatible then method can be used to determine analytes individually or in combination in biological fluids to study the pharmacokinetics and used for LC-MS system. The method is very simple, rapid and economic in nature as all peaks are well separated, which makes it especially suitable for routine quality control analysis work. Symmetrical peaks were obtained through experimental trials. Two columns were used for performance investigations, including Kromasil C18(5 micron 4.6 × 250mm) and Qualisil C8(5 micron 4.6 × 250mm), the first column was the

most suitable one since it produced symmetrical peaks with high resolution. The UV detector response of rosuvastatin and amlodipine was studied and the best wavelength was found to be 251 nm showing highest sensitivity. Several modifications in the mobile phase

composition were made in order to study the possibilities of changing the selectivity of the chromatographic system. These modifications included the change of the type and ratio of the organic modifier, pH, flow rate, temperature and stability of rosuvastatin and amlodipine were also studied in methanol and mobile phase.

**Ramu K et al23**; The HPLC method was developed by using, Zorbax SB C18 (150mmX 4.6mm id particle size 3.5μ)reverse phase packed with Octadecylsilane chemically bonded to porous silica or ceramic micro-particle with mobile phase 40:45:15 (v/v) potassium dihydrogen phosphate buffer (adjust the pH to 2.5 ±0.05 using dilute Ortho phosphoric acid),

methanol and acetonitrile. Flow rate was 1.5ml / min with UV detection at 242 nm and the injection volume was set at 10μl, with 10 min runtime.The developed method was validated by using various parameters according to ICH guidelines. It was validated for specificity, stability in analytical solution, linearity, precision, accuracy studies, LOD, LOQ, robustness and ruggedness. All the validation parameters were found to be well within the acceptance criteria. The system suitability parameters also reveals that the values within the specified limit for the proposed method. The theoretical plates for ezetamibe and rosuvastatin were found to be more than 2000 and the tailing factor is NMT 2.0.The precision of the System and Method were checked and found to be within limits. This indicates that the method is precise. From the linearity studies, the specified range for Ezetamibe was found to be 25mcg to 75mcg and for Rosuvastatin was found to be 25mcg to 75mcg. It was evaluated by the visual inspection of the plot of Peak area vs. Concentration and the correlation was found to be linear. The accuracy was found that the recovery value of pure drug and sample is in between 99.94 % to 101.1% which indicates that the method is accurate. The system suitability should passes as per the test method at variable conditions, hence it was concluded that the test method was Robust. There is a wide scope for the development of new analytical methods for the assay of the above drugs. RP-HPLC technique has been used as a tool in the present work.

**Murthy TGK et al24;** A simple, precise, rapid, selective, and economic reversed phase [high-performance liquid chromatography](https://www.omicsonline.org/scholarly/hplc-journals-articles-ppts-list.php) (RPHPLC) method has been established for simultaneous analysis of [Metformin hydrochloride](https://www.rroij.com/open-access/mechanical-and-thermal-kinetic-parameters-of-metformin-hydrochloride-crystals.php?aid=34849) and Rosuvastatin in bulk powder and In-House Formulation on a Phenomenex C18 (250×4.6 mm i.d) chromatographic column equilibrated with mobile phase containing Acetonitrile/0.02 M Sodium dihydrogen o-phosphate. Experimental conditions such as pH of mobile phase, ratio of organic phase, flow rate, wavelength, etc. were critically studied and the optimum conditions were selected. Efficient [chromatographic separation](https://www.omicsonline.org/chromatography-separation-techniques.php) was achieved with mobile phase containing combination of Phosphate buffer pH 2.8 and Acetonitrile in ratio of 65:35(v/v) adjusted to pH 3.8 at flow rate of 1.0 ml/min and eluents were monitored at 252 nm. 20 μl of sample was injected into chromatographic system and the total run time was 10 min. The retention time for Metformin and Rosuvastatin were 2.147 min and 3.80 min respectively. The method was linear in the range of 5μg mL-1to 30μg mL-1and 0.4 μg mL-1to2.4μg mL-1for Metformin and Rosuvastatin respectively. The proposed method was successfully applied to the analysis of Metformin and Rosuvastatin in bulk and in-house formulation without interference from other additives. The developed method was validated according to ICH guidelines. Linearity, regression value, recovery and % RSD of intra and interday precision values were found within the limits and the method was found to be satisfactory. This [validated](https://www.omicsonline.org/open-access/application-of-a-validated-stabilityindicating-hptlc-method-forsimultaneous-estimation-of-paracetamol-and-aceclofenac-and-theirimp-2157-7064-1000324.php?aid=74891) [HPLC](https://www.omicsonline.org/scholarly/hplc-journals-articles-ppts-list.php) procedure is economic, sensitive, user-friendly and less time consuming than other chromatographic procedures.

**Sahu PK et al25;** A simple, accurate, precise and robust reverse phase high performance [**liquid chromatographic**](https://www.omicsonline.org/open-access/validated-liquid-chromatographic-method-for-simultaneous-determinationof-metformin-pioglitazone-sitagliptin-repaglinide-glibenclam-2155-9872-S13-007.php?aid=65018) method has been developed and subsequently validated for the simultaneous estimation of atorvastatin (AT), ezetimibe (EZ) and fenofibrate (FE) in commercial formulation. The method has shown an adequate separation for AT, EZ and FE. The drugs were resolved on an enable C-18 Column (25 mm x 4.6 mm i.d, 5 μm particle size) using Shimadzu SPD-20A prominence UV-Visible detector with the mobile phase composed of [**acetonitrile**](https://www.omicsonline.org/open-access/further-studies-on-relaxed-and-unrelaxed-exciplexes-in-pyrenenndimethylanilinesystem-in-benzeneacetonitrile-binary-solvents-2161-0398-1000194.php?aid=64549) and phosphate buffer (pH 3.3) in the ratio of 90:10% V/V as mobile phase at a flow rate of 1 mL/min and the detection was carried out at 254 nm. The retention time of AT, EZ and FE were found to be 3.155, 5.299 and 6.215 min respectively. The linearity of the proposed method was investigated in the range of 10-100 μg/mL, 10-100 μg/mL, and 160-1600 μg/mL for AT, EZ and FE, respectively. The limit of detection (LOD) was 2.18, 0.87, and 20.9 for AT, EZ and FE, respectively. The limit of quantification (LOQ) was 6.8, 2.6 and 63.6 for AT, EZ and FE, respectively. The % RSD from the precision and [**accuracy studies**](https://www.omicsonline.org/open-access/metaanalysis-of-test-accuracy-studies-with-multiple-and-missing-thresholds-a-multivariate-normal-model-2155-6180.1000196.php?aid=27783) was found to be below 2%. The proposed method was statistically evaluated and can be applied in regular quality control of AT, EZ and FE in [**pharmaceutical dosage forms**](https://www.omicsonline.org/open-access/novel-statistically-designed-qbd-methodology-for-quantitative-analysisof-nisoldipine-in-pharmaceutical-dosage-forms-2153-2435-1000489.php?aid=76679)**.**

**N. Jain et al26;** A reverse phase high performance liquid chromatographic method was developed for the simultaneous estimation of atorvastatin calcium and fenofibrate in tablet formulation. The separation was achieved by Luna C18 column and methanol:acetate buffer pH 3.7 (82:18 v/v) as mobile phase, at a flow rate of 1.5 ml/min. Detection was carried out at 248 nm. Retention time of atorvastatin calcium and fenofibrate was found to be 3.02+0.1 and 9.05+0.2 min, respectively. The method has been validated for linearity, accuracy and precision. Linearity for atorvastatin calcium and Fenofibrate were in the range of 1-5 μg/ml and 16-80 μg/ml, respectively. The mean recoveries obtained for Atorvastatin calcium and fenofibrate were 101.76% and 100.06%, respectively. Developed method was found to be accurate, precise, selective and rapid for simultaneous estimation of atorvastatin calcium and fenofibrate in tablets.

**N. Khaleel et al27;** The main aim of the present research work was to develop a new simple, precise, selective, accurate and rapid reverse phase high performance liquid chromatographic stability indicating method had been developed and validated for simultaneous quantitative determination of Atorvastatin, Fenofibrate and Folic acid in bulk and pharmaceutical dosage form. The chromatographic separation was achieved with Agilent XDB C18 150×4.6 mm, 5μ m particle size column. The optimized mobile phase consisting of pH 3.3 Phosphate buffer: Acetonitrile (30:70 %v/v). The flow rate was 1.0mL/min and eluents were detected at 280 nm using PDA detector. The retention time of Folic acid,Atorvastatin, Fenofibrate were found tobe 2.507, 3.202 and 6.005 respectively. The percentage recoveries for Folic acid, Atorvastatin, Fenofibrate were found to be in the range of 100.26 -100.69 %, 100.01 – 100.81 % and 100.05 – 100.97 %. The calibration curve was constructed between peak area vs concentration and demonstrated good linear in the range of 5 -30 μg/ml for Atorvastatin, 80-480 μg/ml for Fenofibrate and 2.5-15 μg/ml for Folic acid. Degradation studies were studied for Atorvastatin, Fenofibrate and Folic acid under various stress conditions such as acid hydrolysis, base hydrolysis, oxidation, thermal, photochemical and UV. All the degradation peaks were resolved effectively using developed method with different retention times. The developed method was validated according to ICH guidelines. As the method could effectively separates the degradation products from active ingredient, it can be used for routine analysis of drug both in bulk and pharmaceutical dosage form.

**Jajam thriveni et al28;** A simple, specific and accurate reverse phase liquid chromatographic method was developed for the estimation of Rosuvastatin Calcium (ROS) and Fenofibrate (FEN) in combination. The separation of two drugs in reverse phase mode using C18 column (Agilent ODS UG 5 COLUMN 250X4.5mm Dimensions) with mobile phase containing acetonitrile: methanol: water (40:40:20) was used at isocratic mode and eluents were monitored at 252nm. The retention times of ROS and FEN were 2.3 and 5.0 min respectively and both the drugs showed good linearity in the concentration of 1-5μg/ml and 8-40μg/ml with a correlation coefficient (R) of 0.99968 and 0.99969 respectively. The proposed methods have been successfully applied to pharmaceutical formulation and were validated according to ICH guidelines and method showed good precision with percent relative standard deviation less than 2%. The percentage assay values of ROS and FEN were found to be 100.06 and 99.59 respectively and recovery values are within the limits of 98-102% indicating the proposed method was accurate and precise for the simultaneous estimation of ROS and FEN in bulk and pharmaceutical dosage forms.

**R.R. Sevda et al29;** Rosuvastatin - Fenofibrate combination is widely used in the treatment of hyperchloestrolemia and hypertriglyceridemia. A new, simple and sensitive spectrophotometric method in ultra violet region has been developed for the determination of Rosuvastatin calcium and Fenofibrate in bulk and in pharmaceutical formulations. The drug obeyed the Beers law ( for Rosuvastatin concentration range 1-10 μg/ml and for Fenofibrate concentration range 2-20 μg/ml) and showed good correlation . the result of analysis was validated by recovery studies. The method was found to be simple, accurate. Precise, economical and robust. In this method there is no interference from any common pharmaceutical additives and diluents.