### 3.1.4 Linearity

Linearity is determined by calculating the regression line using a mathematical treatment of the results (i.e. least mean squares) vs. analyte concentration (Araujo 2009). The determination coefficient ($R^2$) measures the amount of variation in the response (dependent) variable explained by changes in the explanatory (independent variable). A value of 1 for $R^2$ indicates a perfect linear relation between target concentration and predicted concentration. The closer the value of $R^2$ to 1 the stronger is the linear relation. A strong regression indicates a strong dose-response relationship between predictor and outcome, which in turn supports a stronger validity for predicted concentration of the drug.

The linear regression equation was used for calculating the predicted drug concentration at the start of each validation experiment, using one unique target concentration for getting the "D area/ IS area" at each of the 3 days of validation for each drug.

The $R^2$ was a perfect dose-response relationship for candesartan at 1st day of validation. The remaining 2nd and 3rd day for candesartan validation showed an almost perfect linear relation with an $R^2$ of 0.996. All the linear regression models were statistically significant, figure 3 to 5.

Day 1 validation: table 27, which represents the standard calibration curve and intra-day accuracy data, shows an accuracy range of (90.98-106.41). Represents the standard calibration curve and intra-day accuracy data, shows an accuracy range of (90.98-106.41).

Day 2 validation: table 28, which represents the standard calibration curve and intra-day accuracy data, shows an accuracy range of (90.20-109.05).