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# UV Spectrophotometric Methods for the Determination of Lercanidipine and Isradipine in Bulk and Pharmaceutical Formulations

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Simple and sensitive UV spectrophotometric methods have been developed for the determination of two anti-hypertensive drugs, namely, lercanidipine and isradipine in bulk and their formulations. Both the drugs were taken in methanol solution and maximum absorbance was observed at 236 nm and 327 nm respectively. Beer's law was obeyed in the concentration of 2–10 μg/mL for lercanidipine and 2–10 μg/mL for isradipine. There is no interference from any common pharmaceutical additives and diluents.

**Key Words: UV spectrophotometric methods, Lercanidipine, Isradipine.**

Lercanidipine (LRP) and isradipine (ISP) are anti-hypertensive drugs[1-3]. Chemically, LRP is 3,5-pyridine dicarboxylic acid, 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-2-[(3,3-diphenylpropyl) methylamino]-1,1-dimethylethyl methyl ester and ISP is 3,5-pyridinedicarboxylic acid-4-(4-benzofurazanyl)-1,4-dihydro-2,6-dimethyl, 1-methylethyl ester. LRP and ISP are calcium channel blockers, which reduce arterial pressure by inhibiting calcium ion influx into the vascular smooth muscle cells, which results in a decrease in smooth muscle tone and vascular resistance. Few HPLC and GC methods were reported for the estimation of ISP[4-6], and no spectrophotometric methods have been reported for these drugs. The present investigation has been undertaken to develop a UV spectrophotometric method for the determination of LRP and ISP. LRP exhibits absorption maximum at 236 nm and Beer's law is obeyed in the concentration range 2–10 μg/mL. ISP exhibits absorption maximum at 327 nm and Beer's law is obeyed in the concentration range 2–10 μg /ml.

Spectral and absorbance measurements were made on Elico SL-159 UV-Vis spectrophotometer with 10 mm matched quartz cells.

## Preparation of standard solutions

About 100 mg of LRP and ISP were accurately weighed and dissolved in 100 mL of methanol. This solution was further diluted with methanol to get working standard solution of 100 μg/mL and 100 μg/mL respectively.

### Preparation of sample solutions

20 Tablets of LRP were taken, pulverized and the weight equivalent to 100 mg was dissolved in methanol and filtered and the filtrate was diluted to 100 mL with methanol The powder of 20 ISP capsules was taken, pulverized and the weight equivalent to 100 mg was dissolved in methanol and filtered and the filtrate was diluted to 100 mL with methanol.

### Method for LRP and ISP

To a series of 10 mL volumetric flasks, aliquot samples of LRP ranging from 0.2–1 mL (1 ml containing 100 μg) or ISP ranging from 0.2–1 mL (1 mL containing 100 μg) were transferred. Then the final volume was brought to 10 mL with methanol. The absorbance was measured at 236 nm for LRP and 327 nm for ISP against methanol as blank. The amount of LRP or ISP present in the sample solution was computed from its calibration curve.

The optical characteristics such as Beer's law limits, Sandell's sensitivity, molar extinction coefficient, per cent relative standard deviation (calculated from five measurements containing 3/4th of the amount of upper Beer's law limits for all the drugs), percentage of range of error (0.05–0.01 confidence limits) were calculated and the results are summarized in Table-1.

TABLE-1
OPTICAL CHARACTERISTICS AND PRECISION OF THE PROPOSED METHODS

| Parameters | Lercanidipine | Isradipine |
|---|---|---|
| $\lambda_{max}$ (nm) | 236 | 327 |
| Beer's law limit (μg/mL) | 2–10 | 2–10 |
| Sandell's sensitivity (μg/cm$^2$/0.001 absorbance unit) | 0.0160 | 0.0164 |
| Molar extinction coefficient (L/mol/cm) | $3.954 \times 10^4$ | $2.6182 \times 10^4$ |
| % Relative standard deviation | 0.7460 | 0.5272 |
| % Range of error: | | |
| 0.05 confidence limits | 0.2900 | 0.5620 |
| 0.01 confidence limits | 0.4760 | 0.9870 |
| Correlation coefficient | 0.9999 | 0.9999 |
| Regression equation (Y*): | | |
| Slope (a) | 0.0610 | 0.0870 |
| Intercept (b) | 0.0017 | 0.0015 |

Y* = b + aC, where "C" is concentration in μg/mL and Y is absorbance unit.

Interference studies revealed that the common excipients and other additives usually present in dosage form did not interfere in the proposed methods. The methods were applied for the analysis of the drugs in their pharmaceutical formulations. To evaluate the validity and reproducibility of the methods, known

amounts of pure drug were added to the previously analyzed pharmaceutical preparations and the mixtures were analyzed by proposed methods and the results are presented in Table-2.

TABLE-2
ESTIMATION OF LRP AND ISP IN
PHARMACEUTICAL FORMULATIONS

| Sample | Labelled amount (mg) | Amount found (proposed method) (mg) | (%) Recovery |
|---|---|---|---|
| LRP tablets | | | |
| 1 | 10 | 9.96 | 99.6 |
| 2 | 10 | 9.95 | 99.5 |
| ISP capsules | | | |
| 1 | 5 | 4.96 | 99.2 |

In conclusion the proposed methods are most economic, simple, sensitive and accurate and can be used for the routine determination of LRP and ISP in bulk as well as pharmaceutical preparations.

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