Simultaneous Spectrophotometric Estimation of Haloperidol and Trihexyphenidyl in Tablets

S. P. WATE AND A. A. BORKAR*
Sharad Pawar College of Pharmacy, Wanadongri, Hingna Road, Nagpur-441 110, India

Wate and Borkar: Simultaneous Estimation of Haloperidol and Trihexyphenidyl

The combination of haloperidol and trihexyphenidyl is a dosage form to be used as antidyskinetic agent. Literature revealed that there is no single method for the simultaneous estimation of these drugs in tablet dosage form, which prompted us to develop a simple, rapid, accurate, economical and sensitive spectrophotometric method. The simultaneous estimation method is based on the principle of additivity of absorbance, for the determination of haloperidol and trihexyphenidyl in tablet formulation. The absorption maxima of the drugs were found to be at 245.0 nm and 206.0 nm respectively for haloperidol and trihexyphenidyl in methanol and 0.1N HCl (90:10). The obeyance of Beer Lambert's law was observed in the concentration range of 2.5-12.5 µg/ml for haloperidol and 1.0-5.0 µg/ml for trihexyphenidyl. The accuracy and reproducibility of the proposed method was statistically validated by recovery studies.

Key words: Haloperidol, trihexyphenidyl, simultaneous estimation, recovery study

Haloperidol (HP) is an antidyskinetic and antipsychotic drug whose IUPAC name is 4-[4-(4-chlorophenyl)-4-hydroxy-1-piperidyl]-1-(4-fluorophenyl)-butan-1-one. Trihexyphenidyl (THP) is an antidyskinetic and antiparkinson drug whose IUPAC name is 1-cyclohexyl-1-phenyl-3-(1-piperidyl)-1-propanol. HP is official in BP[1] and THP in IP[2]. BP suggests a titrimetric assay method for HP, while IP suggest a titrimetric assay method for THP. Literature survey revealed that HPLC methods[3,4] have been reported for the estimation of HP and THP individually and with other drugs in pharmaceutical dosage forms. However, no method is reported for the simultaneous estimation of these drugs in combined dosage forms. This prompted us to develop simple, rapid, accurate, economical and sensitive spectrophotometric method.

Shimadzu 1700 UV/Vis spectrophotometer with matched cuvettes was used for the experimental work. The chemicals used were of analytical grade. Commercially available tablets of HP and THP in combination were procured from the local pharmacy. Standard HP and THP were received as gift samples from Stadmed Pvt. Ltd., Kolkata.

Standard stock solutions of HP and THP were prepared separately by dissolving 25 mg each of standard HP and THP in methanol and 0.1N HCl (90:10) and making up the volume to 50 ml with same solvent. Standard solutions (25 µg/ml) HP and THP were further prepared by taking 2.5 ml of stock solution of each drug in two 50 ml volumetric flasks separately and making up the volume to the mark with same solvent.
Overlain spectra of standard solutions of HP and THP were obtained and scanned between 200-300 nm (fig. 1). HP showed absorption maxima at 245.0 nm and THP showed at 206.0 nm. Calibration curve for each drug was prepared in the concentration range of 2.5-12.5 µg/ml for HP and 1.0-5.0 µg/ml for THP at corresponding wavelengths i.e. 245.0 nm and 206.0 nm. Amount of each drug was determined using simultaneous Eqn. as \( C_x = \frac{(A_x a_y - A_y a_x)}{(a_x a_y)} \). \( C_y = \frac{(A_y a_x - A_x a_y)}{(a_y a_x)} \), where, \( C_x = \) concentration of HP in g/100 ml, \( C_y = \) concentration of THP in g/100 ml, \( a_x = \) absorbance of laboratory mixture at 245.0 nm, \( a_y = \) absorbance of laboratory mixture at 206.0 nm, \( a_x = \) absorptivity of HP at 245.0 nm, \( a_y = \) absorptivity of THP at 245.0 nm and \( a_y = \) absorptivity of THP at 206.0 nm. Percent estimation= \( \frac{(C x or y \times D \times W)}{(W m \times L)} \times 100 \), where, \( C = C_x or y \), \( D = \) dilution factor and \( W = \) weight of drug (either HP or THP) in the laboratory mixture.

Marketed tablets Halotex (Triton Health Care Pvt. Ltd., Chennai, India) were used for the simultaneous estimation of HP and THP. Twenty tablets were weighed and crushed to a fine powder. Powder equivalent to 50 mg of HP and 20 mg of THP (tablet contains 5 mg HP and 2 mg THP) was dissolved in the solvent and volume was made up to 50 ml. Insoluble excipients were separated by filtration. The filtrate was further diluted to get final concentration of both the drugs in the linearity range. Absorbance was noted at the selected wavelengths and percent label claim was determined by using the Eqn., Percent label claim= \( \frac{(C x or y \times D \times W)}{(W m \times L)} \times 100 \), where, \( C_x or y = \) concentration of HP or THP in g/100 ml, \( W = \) average weight of tablet, \( W m = \) weight of sample taken and \( L = \) label claim of sample taken.

Reproducibility, repeatability and accuracy of the proposed method were found to be satisfactory which is evident from the low values of standard deviation (SD), percent relative standard deviation (RSD) and standard error (SE) (Table 1). The accuracy and reproducibility of the proposed method was confirmed by recovery experiment, performed by adding known amount of the drugs to the preanalyzed formulations and reanalyzing the mixture by proposed method (Table 2). Percent recovery obtained indicates non–interference from the excipients used in the formulation. Thus, the method developed in the present investigation is found to be simple, sensitive, accurate and precise and can be successfully applied for the simultaneous estimation of haloperidol and trihexyphenidyl in tablets.

**ACKNOWLEDGEMENTS**

The authors wish to thank Principal Dr. K. P. Bhusari, Sharad Pawar College of Pharmacy, Nagpur for providing necessary facilities. Also, thanks to Stadmed Pvt. Ltd., Kolkata for providing the authentic sample of drugs.

**Table 1: Results of Statistical Data of Markete Formulation**

<table>
<thead>
<tr>
<th>Tablet brand</th>
<th>Tablet component</th>
<th>Label claim (mg/tab)</th>
<th>SD</th>
<th>% RSD</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halotex</td>
<td>Haloperidol</td>
<td>5</td>
<td>0.2484</td>
<td>0.2523</td>
<td>0.1110</td>
</tr>
<tr>
<td></td>
<td>Trihexyphenidyl</td>
<td>2</td>
<td>0.2694</td>
<td>0.2662</td>
<td>0.1204</td>
</tr>
</tbody>
</table>

**Table 2: Results of Drug Recovery Study**

<table>
<thead>
<tr>
<th>Tablet brand</th>
<th>Amount of pure drug added (µg/ml)</th>
<th>% Recovery</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP</td>
<td>THP</td>
<td>HP</td>
</tr>
<tr>
<td>Halotex</td>
<td>2</td>
<td>2</td>
<td>100.28</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>100.22</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>100.18</td>
</tr>
</tbody>
</table>

Fig. 1: Overlain spectra of haloperidol and trihexyphenidyl

Overlain spectra of haloperidol and trihexyphenidyl, solvent: methanol and 0.1 N HCL (90:10). \( \lambda_{max} \) of HP 245.0 nm, \( \lambda_{max} \) of THP 206.0 nm.
REFERENCES


In vitro Antioxidant Potential of Different Parts of Oroxylum indicum: A Comparative Study

S. L. MISHRA, P. K. SINHAMAHAPATRA, A. NAYAK1, R. DAS1 AND S. SANNIGRAHI2*

Institute of Pharmacy and Technology, Salipur, Cuttack, Orissa-754 202, India, 1Institute of Materials and Minerals Technology, Bhubaneswar, Orissa-751 013, India, 2St. Peter’s Institute of Pharmaceutical Sciences, Hanamkonada, Warangal-506 001, India

Mishra, et al.: Antioxidant Potential of Different Parts of *O. indicum*

The present study evaluated the in vitro antioxidant potential of different parts of *Oroxylum indicum*. 2,2-diphelyl 1-picrylhydrazyl (DPPH), nitric oxide, superoxide anion and hydroxyl radical scavenging potential and reductive ability assay of methanol extract of different parts i.e. root, root bark, stem, stem bark, leaves and fruits were performed. Leaves and bark extracts exhibits highest free radical scavenging activity than bark, stem and fruit extract. Leaves extract showed maximum reductive ability and found to contain maximum amount of polyphenolic compounds. The highest free radical activity may be due to presence of polyphenolic compounds.

Key words: Free radical scavenging, *Oroxylum indicum*, different parts, polyphenolic compounds

Antioxidants are now standing on the mainstay of the treatment and prevention of several diseases[1-3]. Current research is directed towards finding naturally occurring antioxidants particularly of plant origin. *Oroxylum indicum* Vent. (Bignoniaceae), a rare endangered and threatened medicinal plant widely used traditionally for treating several disorders[4]. The root-bark is used as an astringent and tonic and also in diarrhoea and dysentery. The stem bark is used in acute rheumatism. In the form of an infusion, it is used as a diaphoretic. The fruits are used as carminative and stomachic, while the seeds are used as purgative. The roots are used in dropsy and the leaves are reputed as an emollient. Tender fruits are described as carminative and stomachic[5]. The root of this plant is also one of the important ingredients in most commonly used ayurvedic formulations like dantyadyarista, brahma rasayana, dasamula, amartarista, dhanawantara ghrita, narayana taila[6]. The anti cancer potential of different parts of the plant has already been reported[7,8]. The present study describes a comparative evaluation of different parts of *Oroxylum indicum* for their in vitro antioxidant activity.

The different parts of the plant i.e. root, root bark, stem, stem bark, leaves and fruits were collected from the forest region of Orissa and identified at the Institute of Materials and Minerals Technology, Bhubaneswar, Orissa. All the plant materials were shade dried, powdered, sieved and successively extracted with petroleum ether and methanol to obtain the extracts. The each of these extracts was concentrated in a rotary evaporator under reduced pressure, giving individual extracts. Ten milligrams of methanol extract of different parts was dissolved in methanol (1 ml) and solution was serially diluted for antioxidant studies.

Total polyphenolic compounds of different extracts were performed according to the method of Slinkard and Singleton[9]. DPPH radical scavenging activity[10], nitric oxide scavenging assay[11], superoxide