Simultaneous HPTLC Determination of Gliclazide and Rosiglitazone in Tablets

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Accepted 6 August 2003
Revised 30 May 2003
Received 29 January 2003

An HPTLC method has been developed for the simultaneous estimation of gliclazide and rosiglitazone from its combined dosage form. The method involves separation of components by TLC on a precoated silica gel 60 F 254 plate using a mixture of toluene:ethylacetate:methanol (85:5:10) as the mobile phase. Detection of the spot was carried out at 225 nm in absorbance mode. The retardation factors of gliclazide and rosiglitazone were found to be 0.36 and 0.47, respectively. The linearity range was found to be 1-3 μg/10 μl for gliclazide and 0.05-0.15 μg/10 μl for rosiglitazone.

Gliclazide, a sulphonyl urea derivative is used as an oral hypoglycemic agent. Rosiglitazone, a thiazolidine dione derivative is used as an anti-diabetic agent. Gliclazide is official in BP, but rosiglitazone is not official in any Pharmacopoeia. The methods reported for the estimation of gliclazide are HPLC (with amperometric detection[1], anion exchange resin[2], solid phase extraction[3]) and RPHPLC[4]. HPLC with fluoremetric detection[5] and ion pair LC[6] methods have been reported for the estimation of gliclazide along with some other combination. Automated HPLC[7] and RP-LC[8] methods have been reported for the determination of rosiglitazone. As the literature survey reveals that no method has been reported so far for the simultaneous estimation of these two drugs, an attempt has been made to estimate them simultaneously by HPTLC method.

Gliclazide was obtained as a gift sample from Fourrt's India Private Limited, Chennai and rosiglitazone from Dr. Reddy's Laboratories, Hyderabad. Silica gel 60 F 254 TLC plates (20x20 cm, layer thickness 0.2 mm, E. Merck, Mumbai) were used as stationary phase. Toluene, ethyl acetate and methanol (AR grade, Ranbaxy Laboratories Limited, New Delhi) were used for mobile phase preparation and as solvent. A Camag HPTLC system comprising of Camag Linomat IV sample applicator, Hamilton syringe (10 μl), Camag TLC Scanner 3 with CATS software version 4.0 and Camag twin-trough glass chamber (20x10 cm^2) was used for the study.

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The chromatographic estimations were performed using the following conditions; stationary phase, precoated silica gel 60 F 254 TLC plate (20x20 cm); mobile phase, toluene:ethylacetate:methanol (85:5:10); chamber saturation time, 30 min; diluent, mobile phase; spot band, 6 mm; distance between bands, 15 mm; solvent run up to, 120 mm; volume applied, 10 μl; scanning speed, 4 mm/sec; lamp, deuterium; wave length of detection, 225 nm.

Accurately weighed quantities of gliclazide and rosiglitazone were dissolved in mobile phase and made up to volume to get the concentration of 1000 μg/ml and 50 μg/ml, respectively. The above solutions were suitably mixed to get six mixed standards having concentrations ranging from 100 to 350 μg/ml of gliclazide and 5 to 17.5 μg/ml of rosiglitazone.

Ten microlitres of each of the above six mixed standards were spotted on the TLC plate. The mobile phase consisting of toluene:ethyl acetate:methanol (85:5:10) was taken in the developing chamber and the chamber was allowed to saturate with the vapors of mobile phase for 30 min. The TLC plate was introduced in to the chamber and allowed to travel to a distance of 120 mm. The developed plate was scanned densitometricaly at 225 nm. The R_f value of gliclazide was found to be 0.36 and that of rosiglitazone was found to be 0.47 (Fig.1). The peak area was plotted against concentration to get the calibration curve. The linearity range of gliclazide was found to lie between 1-3 μg/10 μl and that of rosiglitazone between 0.05–0.15 μg/10 μl.

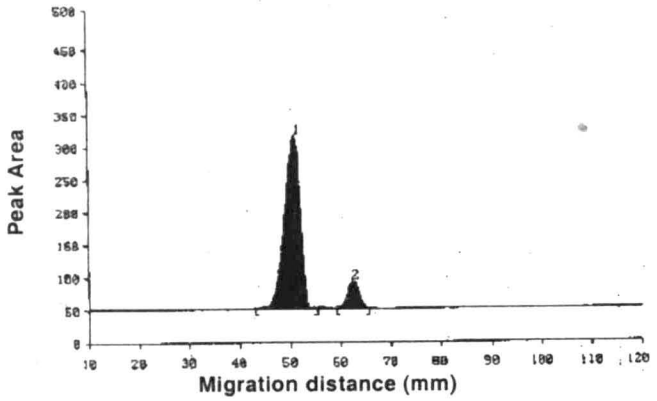

Fig.1 Chromatogram of sample containing gliclazide and rosiglitazone.

Chromatogram of sample showing resolution of gliclazide (peak 1) and rosiglitazone (peak 2) from each other. R_f of gliclazide is 0.36 and R_f of rosiglitazone is 0.47.

Twenty tablets were weighed, finely powdered and the amount of powder equivalent to 80 mg of gliclazide was accurately weighed and transferred to a 100 ml volumetric flask. The contents were dissolved in 50 ml of the mobile phase, filtered through Whatman filter paper No.1 and the filtrate was made up to 100 ml with the mobile phase. It was further diluted to get the required concentration. About 10 μl of the resulting solution was spotted on the TLC plate, dried, developed and analyzed as described earlier. The amount of drug present in the tablet was calculated from the calibration curve.

Various solvent systems like toluene:ethylacetate, chloroform:methanol and chloroform:ethylacetate:methanol were tried to separate the spots of gliclazide and rosiglitazone, finally, a mixture of toluene:ethylacetate: methanol in the ratio 85:5:10 was found to separate the spots of gliclazide and rosiglitazone effectively with the resolution of 10.4. Also this combination offered the optimum migration (gliclazide-0.36, rosiglitazone-0.47).

Presaturation of TLC chamber for 30 min with the vapors of mobile phase assured better reproducibility and resolution. The linearity range of gliclazide was found to be 1-3 μg/10 μl with a correlation coefficient of 0.9993. Rosiglitazone was found to be linear in the range of 0.05-0.15 μg/10 μl with a correlation coefficient of 0.9999.

The regression equation obtained for gliclazide was y=32.42x+434.5 and that of rosiglitazone was y=59.014x–23.64. The limit of detection and limit of quantitation for gliclazide were found to be 0.5 μg/10 μl and 1 μg/10 μl, respectively and that of rosiglitazone were found to be 0.03 μg/10 μl and 0.05 μg/10 μl, respectively.

Accuracy of the analysis was determined by calculating recovery of gliclazide and rosiglitazone by standard addition method. The results indicated that the recovery of gliclazide ranged between 98.2 to 99.0% and rosiglitazone between 99.0 to 99.5%, ensuring that the method is accurate and reproducible. The values of standard deviation (gliclazide-0.121, rosiglitazone-0.5) and coefficient of variation (gliclazide-0.122 rosiglitazone-0.4988) indicate the precision of the method. The experiment repeated several times in different laboratory conditions and in different instruments provided the same results, showing the ruggedness of the method. Therefore, the proposed HPTLC method can be utilized for the routine simultaneous estimation of gliclazide

TABLE-1: ANALYSIS OF GLICLAZIDE AND ROSIGLITAZONE IN TABLETS.

Drug	Sample No.	Label claim (mg/tab)	Amount found* (mg/tab)	% Label claim	% Recovery**
Gliclazide	1	80	79.54	99.40	
	2	80	79.47	99.30	98.15
	3	80	79.33	99.16	99.04
Rosiglitazone	1	4	4.01	100.25	
	2	4	4.03	100.75	99.50
	3	4	3.99	99.75	99.01

The amount, percentage label claim and percentage recovery of gliclazide and rosiglitazone found by the proposed HPTLC method. *Each value is the mean of six readings. **Mean of 3 readings.

and rosiglitazone in pharmaceutical dosage form.

ACKNOWLEDGEMENTS

Authors thank M/s SPIC Pharma, Chennai for providing the instrument facility.

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Evaluation of *Leucaena leucocephala* Seed Gum as Suspending Agent in Sulphadimidine Suspensions

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Accepted 6 August 2003

Revised 2 June 2003

Received 15 April 2002

Leucaena gum derived from seeds of *Leucaena leucocephala* has been evaluated as a suspending agent. Suspensions of sulphadimidine powder were prepared with different concentrations of leucaena seed gum, and tragacanth gum, and compared. Studies indicate that this gum may be used as a pharmaceutical adjuvant and as a suspending agent depending on its suspending ability and the stability of the resulting suspension.

Gums are employed in food, pharmaceutical and cosmetic industries as binders, emulsifiers, suspending agents and disintegrating agents, and as coating materials in microencapsulation. They are also used as stabilizers, thickeners and binders, in various industries such as paper, textile, paint, ink, and petroleum products. The vast application of the plant gums in various industries is because of their low cost, ready availability and the important properties, which they confer on products[1-3]. With the increase in demand for natural gums, it has become necessary to explore the newer sources of gum to meet the industrial demands.

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While evaluating alternative sources of gum, some workers[4-6] have reported the presence of large quantity of gum in the seeds of *Leucaena leucocephala* belonging to the family *Leguminosae*. Alternatively, systematists place it in the *Mimosoideae* sub-family of the *Mimosaceae* family[4,5]. The isolated and purified leucaena seed gum is known to be non-toxic and upon oral administration have indicated a very high LD_{50} of 1.85 g/kg in mice[7]. While continuing our studies on this gum we have already reported its utility as binder[7] as well as disintegrating agent[8]. The rheological properties of the gum were also studied[9]. We now report on usefulness of the gum as a suspending agent. Suspending ability and suspension stability were used as the basis for evaluating the performance of leucaena seed gum as a suspending agent.