

Acknowledgement

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Abstract

Simple, precise and rapid isocratic HPLC-UV method for simultaneous determination of five multi component drugs was developed and validated. The first drug contained valsartan and hydrochlorothiazide, the separation was achieved using phenyl hexyl column (150 × 4.6 mm, 3 μm particle size), both components were determined at 275nm, simple isocratic elution was selected, the optimized mobile phase was composed of methanol and 1% formic acid solution at 75: 25 ratio, with flow rate of 0.8 ml/min, injection volume was 20μl, and the separation was performed at ambient temperature. Linearity of this method was checked using concentration range of 2.5μg/ml –10μg/ml for hydrochlorothiazide and 5μg/ml –20μg/ml for valsartan; very good linearity correlation, ($R^2 = 1$), for both components. The second, contained amlodipine and losartan, the separation was achieved using phenyl hexyl column (150 × 4.6 mm, 3μm), both components were determined at 260nm, simple isocratic elution was selected, the optimized mobile phase was composed of acetonitrile and 1% formic acid solution at 60: 40 ratio, with flow rate of 0.8ml/min, injection volume was 20μl, and the separation was performed at ambient temperature. Linearity was checked using the concentration range 8μg/ml–32μg/ml for amlodipine and 80μg/ml–320μg/ml for losartan potassium. The linearity correlation, ($R^2 = 1$), for both components. The third, contained amlodipine and atorvastatin calcium, the separation was achieved using Neucleodur polaratic colum (50mmx2mm, 1.8 μm), both components were determined at 240nm, simple isocratic elution was selected, the optimized mobile phase was composed of methanol and 1% formic acid solution at 60: 40 ratio, with flow rate of 0.3 ml/min, injection volume was 20μl, and the separation performed at ambient temperature. Linearity was checked using the concentration range of 8ng–32ng for both amlodipine and atorvastatin, $R^2 = 0.999$ and 1.000 for Amlodipine besylate and atorvastatin calcium, respectively. The fourth, contained amlodipine besylate, hydrochlorothiazide and losartan potassium, The separation was achieved using Phenyl hexyle column (150mm×4.6mm,3μm), the components were determined at 260nm, simple isocratic elution was selected, the optimized mobile phase was composed of acetonitril and 1% formic acid solution at 1:1 ratio, with flow rate of 0.8ml/min, injection volume was 20μl, and the separation was performed at ambient temperature. Linearity was checked using concentrations range 4μg/ml-16μg/ml, 10μg/ml–40μg/ml and 40μg/ml -160μg/ml, for amlodipine besylate, hydrochlorothiazide and losartan potassium, respectively. Linearity

correlation (R^2) was found to be 1.000 for each of the three components. The fifth, contained amlodipine besylate, hydrochlorothiazide and valsartan, The separation was achieved using Phenyl hexyl column (150mm×4.6mm,3 μ m), the three components were determined at 254nm, simple isocratic elution was selected, the optimized mobile phase was composed of acetonitril and 1% formic acid solution at 1:1 ratio, with flow rate of 0.8ml/min, injection volume was 20 μ l, and the separation performed at ambient temperature. Linearity was checked using concentration range of 4 μ g/ml-14 μ g/ml , 5 μ g/ml–20 μ g/ml and 64 μ g/ml -256 μ g/ml, for amlodipine besylate, hydrochlorothiazide and valsartan, respectively, the linearity correlation (R^2) was found to be 1.000 for each of the three components.

مستخلص البحث

في هذه الدراسة تم استحداث طريقة سهلة، دقيقة وسريعة وأحادية الطور المتحرك لتحليل خمس مخاليط ادويه عديدة العقاقير باستخدام كروماتوغرافيا السائل عالية الضغط مع مكشاف الاشعة فوق البنفسجية. يحتوي الاول على عقار الفالسارتان وعقار هيدروكلوريد السيذيد، وقد تم الفصل باستخدام عمود الفينيل الهكسيل ذي الابعاد (150 ملم*4.6 ملم* 3مايكروميتر). تم تقدير العقارين عند طول موجي 275 نانوميتر، ونسبةً لسهولة الازاحة احادية الطور المتحرك فقد تم استخدامها للفصل، وقد تم اختيار طور متحرك مناسب وهو يتكون من الميثانول ومحلول حمض الخل (1%) بنسبة 25:75 وقد كان معدل سريان الطور المتحرك 0.8 مل لكل دقيقة، تم حقن العينة بحجم 20 ميكروليتر. تمت دراسة خطية علاقه لعقار هيدروكلوريد السيذيد في مدى التراكيز 2.5 ميكروجم/مل- 10 ميكروجم/مل، ولعقار الفالسارتان في مدى التراكيز 5ميكروجم/مل- 20 ميكروجم/مل، فكان معامل الخطية يساوي 1.000 للعقارين. يحتوي الثاني على عقار لوسارتان وعقار الامليديبين، وقد تم الفصل باستخدام عمود الفينيل الهكسيل ذي الابعاد (150 ملم*4.6 ملم* 3مايكروميتر). تم تقدير العقارين عند طول موجي 260 نانوميتر، وقد تم استخدام، ونسبةً لسهولة الازاحة احادية الطور المتحرك فقد تم استخدامها للفصل، وقد تم اختيار طور متحرك مناسب وهو يتكون من الاسيتونتريل ومحلول حمض الخل (1%) بنسبة 40:60، على التوالي. وقد كان معدل سريان الطور المتحرك 0.8 مل لكل دقيقة، تم حقن العينة بحجم 20 ميكروليتر. تمت دراسة خطية علاقه لعقار لوسارتان في مدى التراكيز 80ميكروجم/مل- 320 ميكروجم/مل، ولعقار املوديبين في مدى التراكيز 8ميكروجم/مل- 32 ميكروجم/مل، فكان معامل الخطية يساوي 1.000 للعقارين. يحتوي الثالث على عقار املوديبين اتورفاستاتين، وقد تم الفصل باستخدام عمود نيوكليودور ذي الابعاد (150 ملم*2 ملم* 1.8مايكروميتر). تم تقدير العقارين عند طول موجي 275 نانوميتر، وقد تم استخدام، ونسبةً لسهولة الازاحة احادية الطور المتحرك فقد تم استخدامها للفصل، وقد تم اختيار طور متحرك مناسب وهو يتكون من الميثانول ومحلول حمض الخل (1%) بنسبة 40:60 على التوالي. وقد كان معدل سريان الطور المتحرك 0.3 مل لكل دقيقة، تم حقن العينة بحجم 20 ميكروليتر. تمت دراسة خطية علاقه لكلا العقارين في مدى التراكيز 8نانوجم/مل- 32 نانوجم/مل، فكان معامل الخطية يساوي 1.000 لكلا العقارين. يحتوي الرابع على عقار لوسارتان، عقار املوديبين وعقار هيدروكلوريد سيذيد، وقد تم الفصل باستخدام عمود الفينيل الهكسيل ذي الابعاد (150 ملم*4.6 ملم* 3مايكروميتر). تم تقدير العقارات الثلاثة عند طول موجي 260 نانوميتر، وقد تم استخدام، ونسبةً لسهولة الازاحة احادية الطور المتحرك فقد تم استخدامها للفصل، و تم اختيار طور متحرك مناسب وهو يتكون من اسيتونتريل ومحلول حمض الخل (1%) بنسبة 1:1 وأختير معدل سريان الطور المتحرك ليكون 0.8 مل لكل دقيقة، تم حقن العينة بحجم 20 ميكروليتر. وتمت دراسة خطية العلاقه لعقار املوديبين، عقار هيدروكلوريد سيذيد و عقار لوسارتان في مدى التراكيز 4 ميكروجم/مل - 16 ميكروجم/مل، 10ميكروجم/مل - 40 ميكروجم/مل و 40ميكروجم/مل - 160 ميكروجم/مل، على التوالي. وكان معامل الخطية يساوي 1.000 للعقارات الثلاثة. يحتوي الخامس على عقار املوديبين، عقار هيدروكلوريد سيذيد و عقار فالسارتان، وقد تم الفصل باستخدام عمود الفينيل الهكسيل ذي الابعاد (150 ملم*4.6 ملم* 3مايكروميتر). تم تقدير العقارات الثلاثة عند طول موجي 254 نانوميتر، وقد تم استخدام، ونسبةً لسهولة الازاحة احادية الطور المتحرك فقد تم استخدامها للفصل، و تم اختيار طور متحرك مناسب وهو يتكون من اسيتونتريل ومحلول حمض الخل (1%) بنسبة 1:1 وأختير معدل سريان الطور المتحرك ليكون 0.8 مل لكل دقيقة، تم حقن العينة بحجم 20

ميكروليتر. وتمت دراسة خطية العلاقة لعقار املوديبيين , عقار هيدروكلوريد سيذيد و عقار لوسارتان فى مدى التراكيز 4 ميكروجم/مل- 14 ميكروجم/مل , 5ميكروجم/مل- 20 ميكروجم/مل و 64ميكروجم/مل- 256 ميكروجم/مل , على التوالي. وكان معامل الخطيه يساوي 1.000 للعقارات الثلاثه.

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List of Abbreviations

ISO	International Organization for Standardization
Avg	Average
FDA	Food and Drug Administration
ICH	International Conference of Harmonization
LOD	Limit Of Detection
LOQ	Limit Of Quantitation
NSAID	Non-Steroidal Anti-Inflammatory Drug
RSD	Relative Stander Deviation
S	Slop of the Calibration Curve
RMSE	Root Mean Squire Error
STDEV	Standard Deviation
USP	United states pharmacopeia

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