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REVIEW ON ANALYSIS OF ETHINYL ESTRADIOL AND DROSPIRENONE IN COMBINED DOSAGE FORM

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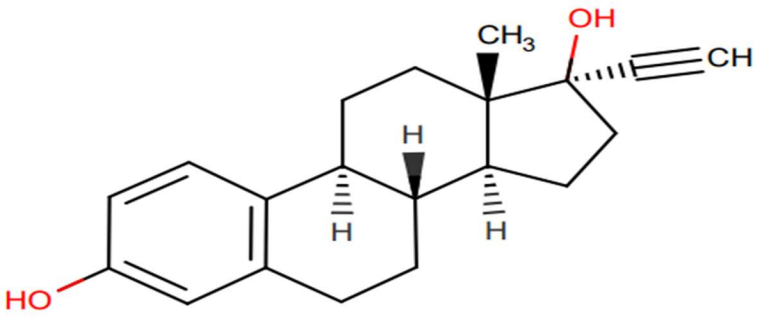
ABSTRACT

The Ethinyl Estradiol and Drospirenone both drugs used in contraceptive in combined dosage forms. To analyze the determination of Ethinyl Estradiol and Drospirenonein available drug combination with the analytical methods. HPLC, SPECTROPHOTOMETRIC METHODS, RP-HPLC are few of the methods that have been reviewed in this article. HPLC method mentioned in this article was given out accurate and precise result with in a short runtime. RPHPLC Technique report in this article also has an accurate and precise result. Few development and rational method accessible for the calculation of EthinylEstradiol and Drospirenone.

Keyword: Ethinyl Estradiol and Drospirenone, Spectrophotometric, HPLC, RP-HPLC

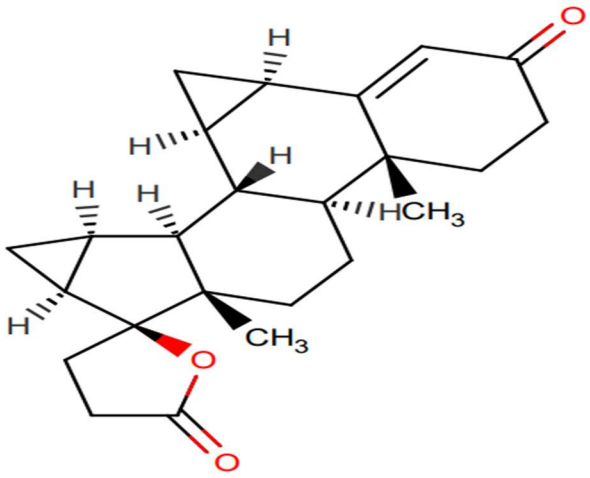
INTRODUCTION:

The 17 beta-estradiol derivative ethynylestradiol (EE) is also called as ethynylestradiol (EE). Menopausal symptoms and female hypogonadism were first treated by semi-synthetic steroidal oestrogen. Ethinylestradiol is an orally bioactive oestrogen that is found in practically all current oral contraceptive pill formulations **[1]**. This is the structure of Ethinylestradiol **[2]**. It was widely used to treat a variety of conditions, including menopausal symptoms, gynaecological disorders, and hormone-sensitive cancers. It is usually taken by mouth but is also used as a patch and vaginal ring. Breast discomfort and enlargement are common side symptoms of the drug.



Ethinylestradiol

Drospirenone is a synthetic counterpart of the antimineralocorticoidspironolactone made from androstenone. Drospirenone, a spironolactone derivative, displays biochemical and pharmacologic profiles that are comparable to natural progesterone, particularly in terms of antimineralocorticoid and antiandrogenic effects **[2]**. This is the structure of Drospirenone **[3]**.



Drospirenone

DRUG PROFILE

ETHINYL ESTRADIOL

Name of the drug is ethinyl estradiol is an estradiol used as a contraceptive in drugs. IUPAC name of the drug is (8*R*,9*S*,13*S*,14*S*,17*R*)-17- ethynyl-13-methyl-7,8,9,11,12,14,15,16-octahydro-6*H*-cyclopenta[*a*]phenanthrene-3,17-diol, Chemical formal of the drug is $C_{20}H_{24}O_2$, Molecular weight 296.4, The half-life of a 30µg oral dosage is 8.4±4.8h, solubility in methanol , Appearance of the drug is White to Pale Yellow Solid, melting point at 165-169ºC **[2]**.

DROSPIRENONE

Name of the drug is drospirenone is a progestin that is found in oral contraceptive tablets and is used to prevent pregnancy and other problems, IUPAC name of the drug is 6R,7R,8R,9S,10R,13S,14S,15S,16S,17S)-,3',4',6,6a,7,8,9,10,11,12,13,14,15,15a,16-Hexadecahydro-10,13-dimetylspiro-[17H dicyclopropa[6,7:15,16]cyclopenta[a]phenantrene-17,2'(5'H)-furan]-3,5'(2H)-dione Chemical formula $C_{24}H_3OO_3$, Molecular weight is 366.49, Drospirenone's half-life is predicted to be 30 hours, Bioavailability 66–85% **[4]**.

ANALYTICAL METHODS:

HPLC

METHOD 1

For the measurement of ethinylestradiol and drospirenone in tablet formulation, a high-performance liquid chromatographic (HPLC) technique was devised and validated. The technique uses a Waters HPLC system with a load of 15microlit, Thermo Hypersil BDS C18 Column with a flow rate of 1.0 ml/min on A flow rate of 1.0 ml/min was achieved using a Thermo Hypersil BDS C18 Column (4.6250 mm and 5 m). The mobile phase was made up of acetonitrile and ammonium acetate buffer in a 30:70 ratio. The detection was done at a wavelength of 258 nm. Ethinylestradiol and drospirenone had linearity ranges of 0.06- 0.18 g/ml and 6-18 g/ml. Retention Drospirenone and ethinylestradiol have 1.4 and 5.3 minute, respectively. Ethinylestradiol and drospirenone were shown to be 97-103 percent equivalent in the percent recovery study. The stressed samples of the combination product were examined after being subjected to acid/base, hydrolytic, photolytic, and peroxide stress conditions. Ethinylestradiol and drospirenone were effectively quantified in medicinal dose forms using this newly established approach.

METHOD 2

For the detection of Ethinylestradiol and drospirenone in tablet formulation, a highperformance liquid chromatographic (HPLC) technique was devised and validated. Chromalith RP 18E C18, flow rate of 0.5 ml/min, injection volume of 20. Chromalith RP 18E C18 follows Waters HPLC system on Prontosil C18ace-EPS and the flow rate is measured as 0.5 ml per min, and injection volume as 20. 222 nanometer will be the detection wavelength for drospirenone and ethinylestradiol. The excitation is at 215 nano meter and emission is at 315 nano meter in fluorescence detector respectively.Excitation in a fluorescence detector is at 215 nanometers, whereas emission is at 344 nanometers. The retention durations for Ethinylestradiol and drospirenone was monitored as 47 minutes

and 34 minutes and the retention time for EthinylEstradiol Related Compound B was monitored as 41 minutes. The ethinylestradiol and drospirenone in dose forms were determined by the above method in quantitative amount **[5, 6]**.

RP-HPLC

In order to identify Segesterone and EthinylEstradiol in bulk and medicinal dose form, an RP-HPLC method was devised. C18 Column on Phenomenex was used to accomplish chromatographic separation (150 x 4.6 mm).At a flow rate of 0.7 ml/min, the optimal mobile phase, consisting of 45:55 percent v/v water and acetonitrile, was supplied over the column. The temperature was kept at 30 degrees Celsius.260 nm was chosen as the optimal wavelength.Segesterone and EthinylEstradiol had retention times of 0.9 and 0.7, respectively. A percentage For Segesterone and EthinylEstradiol, recovery rates were 99.91 percent and 98.61 percent, respectively.Using regression models, the LOD and LOQ values for Segesterone and EthinylEstradiol were y = 21000x + 637.6 for Segesterone and y = 25485x + 24862 for EthinylEstradiol, respectively. Both the retention and run times were shortened **[7, 8]**.

SPECTROPHOTOMETRIC

METHOD 1

For the concurrent measurement of drospirenone and ethinylestradiol, a spectrophotometric technique had been devised and validated. Ethinylestradiol at 211 nanometer and drospirenone at 298 nanometer and 302 nanometer were quantified by first order derivative spectrum. The developed above method was linear for ethinylestradiol and drospirenone over concentration ranges of 0.250-2.50 gram per millilitre and 20-200 gram per millilitre. For both compounds the precision and accuracy were good in Within-day and between-day. The suggested technique was used in simultaneous determination of ethinylestradiol and drospirenone without any separation before the analysis process **[9, 10]**.

METHOD 2

The first order derivative approach was used for analysis using methyl alcohol as the solvent in the spectrophotometric methodology for estimating drospirenone and ethinylestrdiol. Drospirenone has a maximum absorbance of 242nm, while ethinylestradiol has a maximum absorbance of 218nm. In the range of 10-50g/ml for drospirenone and 32-38g/ml for ethinylestradiol, these two medicines follow Beer's Law. The findings of the recovery experiments were established in accordance with ICH rules, and the

correctness of the suggested approach was determined. The outcomes were good, and without the involvement of common excipients, the approach was effectively employed to estimate drospirenone and ethinylestradiol in tablet form **[11, 12]**.

SUMMARY AND CONCLUSION:

The article containts more than one analytical method were presented for the determination of EthinylEstradiol and Drospirenone along with their combinations. The analytical methods mentioned above are extremely prudent and permits the determination of the oral contraceptive along with their combination.

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CONFLICT OFINTEREST:

Author has declared there is no conflict of this study.

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