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Note

Determination of the ophthalmic drug guaiazulene by high-performance liquid chromatography

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Guaiazulene (Fig. 1) is a sesquiterpene hydrocarbon used as an anti-inflammatory agent in numerous pharmaceutical preparations[1,2] and in particular in dermatology and ophthalmology, where it is used to treat conjunctivitis. As it is used therapeutically, it is important to possess specific methods for testing its purity and for its determination, especially as it is an unstable molecule.

Two high-performance liquid chromatographic (HPLC) methods have been used: reversed-phase HPLC on an octadecyl-bonded silica with a binary eluent [acetonitrile–water (77.5:22.5)[3]] and HPLC on a silica column with cyclohexane as eluent, the main peak containing guaiazulene being separated in a subsequent step by gas chromatography. A new HPLC procedure is described in this paper which makes possible the determination of guaiazulene in an eye-drop solution.

EXPERIMENTAL

A Waters Assoc. Model M 510 pump fitted with an U6K universal injector is used in combination with a UV 490 spectrophotometer. A Microinformatic digital data processor is used to calculate retention times and peak areas.

Separations are carried out under isocratic conditions using a μPorasil 10-μm column (30 cm × 4 mm I.D.) (Waters Assoc.). The mobile phase is *n*-hexane–ethyl acetate (98:2) at a flow-rate of 1 ml/min and detection is performed at 600 nm.

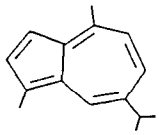

Fig. 1. Guaiazulene.

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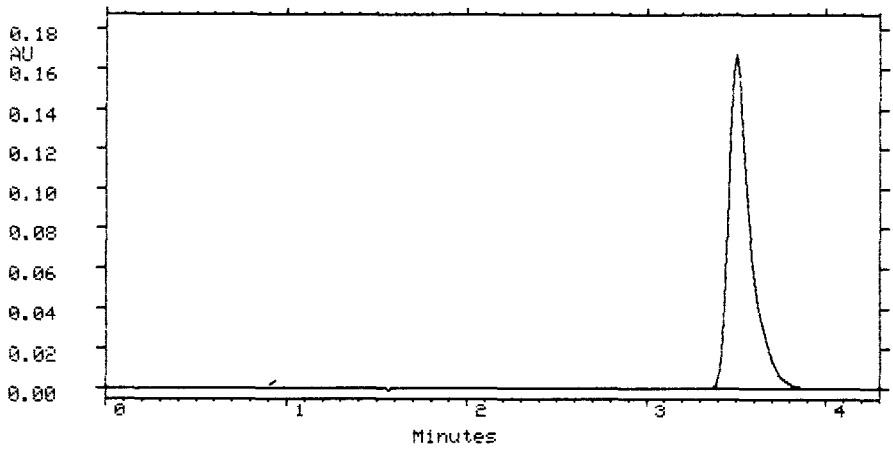

Fig 2. Typical chromatogram of eye-drop solution.

Standard

A 50-mg amount of guaiazulene (Merck, Ref. 4250) is dissolved in 100 ml of borate buffer prepared by dissolving 1.71 g of boric acid and 0.265 g of sodium borate in water and diluting to 100 ml. A 10-ml volume of the solution is extracted three times with 10 ml of light petroleum (b.p. 40–65°C) and the organic phases are filtered and evaporated to dryness. The residue is dissolved in 2 ml of ethyl acetate.

A 20-μl volume of 2.5 μg/ml solution of guaiazulene was injected.

Sample

A 10-ml sample of eye drops is extracted in the same way as for the standard. A 20-μl volume of sample solution is injected.

RESULTS AND DISCUSSION

The calibration graph is linear for guaiazulene concentrations in the range 0.125–2 mg/ml ($n = 10$) with a correlation coefficient of 0.9999. For the sample concentrations investigated the coefficients of variation are between 0.75 and 1.38%.

Fig. 2 shows that the peak for guaiazulene appears at 3.48 min. At the wavelength used (600 nm) there is no interference from other constituents.

The procedure is rapid, sensitive and reliable and is suitable for the routine determination of guaiazulene in eye-drop solutions.

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