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Determination of polythiazide in the presence of vanillin in Renese tablets by second-order derivative UV spectroscopy

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A second-derivative spectroscopic method for simultaneous determination of polythiazide and vanillin in Renese tablets has been developed. Methanol solutions of the tablets were analyzed by measurement of the amplitudes of the positive peak at 282 nm with respect to the negative peak at 270 nm for polythiazide, and the amplitude of the negative peak at 218 nm with respect to the base line for vanillin. The method allows specific, rapid and accurate determination of the binary mixture in the tested concentration range of 1–10 μg ml^{-1} for polythiazide and 1.5–15 μg ml^{-1} for vanillin.

Polythiazide is a well-known diuretic and antihypertension agent (1–3). Besides polythiazide, vanillin is one of the ingredients of Renese tablets. The chemical structures of polythiazide and vanillin are shown in Fig. 1.

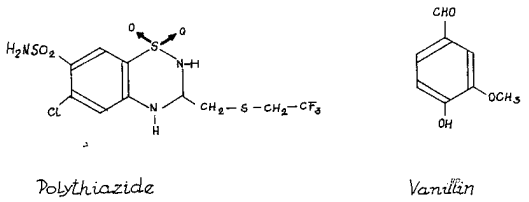

Fig. 1. Chemical structures of polythiazide and vanillin.

Several analytical methods have been described for assaying either polythiazide (4–10) or vanillin (11–16). These include the spectrophotometric method (4, 11, 13), liquid chromatography determination (5, 12), HPLC (6, 8, 9, 14, 16), thin-layer chromatography (10, 15) and determination by iodometric titrations (7). However, no method has been described for their simultaneous quantitation in two-component mixtures.

The zero-order UV spectra of polythiazide and vanillin overlap in the 200–280 nm region and the corresponding absorption maxima differ only by approximately 5 nm, which makes their simultaneous determination by conventional UV spectroscopy difficult. In recent years, the derivative transformation of spectral data has been shown to be

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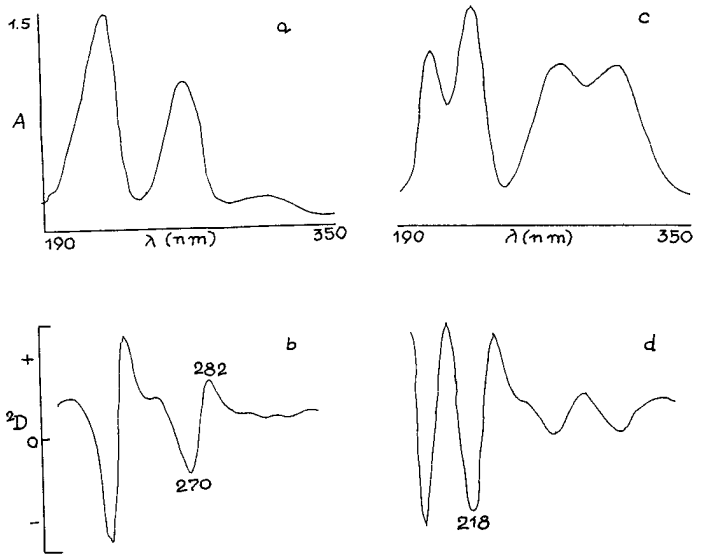

Fig. 2. Zero-order (a, c) and second-order (b, d) derivative UV spectra of polythiazide (a, b; 10 μg ml^{-1}) and vanillin (c, d; 7.5 μg ml^{-1}) in methanol. The amplitudes of the positive peak at 282 nm with respect to the negative peak at 270 nm, and the negative peak at 218 nm with respect to the base line, were used for quantitation.

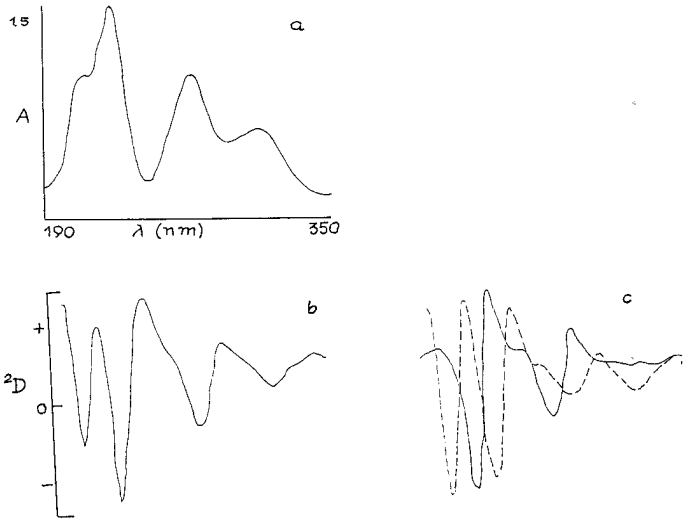

Fig. 3. Zero-order (a) and second-order (b) derivative UV spectra of a binary mixture of polythiazide (10 μg ml^{-1}) and vanillin (7.5 μg ml^{-1}) in methanol. (c) Second-order derivative of polythiazide (solid line) and vanillin (broken line) overlaid to show areas of spectral overlap.

dures, and is easily applied to routine usage, thus confirming its potentials as an analytical tool for simultaneous quantitation of drugs in multicomponent pharmaceutical preparations.

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SAŽETAK

Određivanje politiazida u prisutnosti vanilina u Renese tabletama upotrebom derivacijske spektrofotometrije drugog reda

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Za simultano određivanje politiazida i vanilina u Renese tabletama upotrebljena je derivacijska spektroskopija drugog reda. Mjerenjem amplitude pozitivnog pika na 282