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Note

Rapid quantitative method for the simultaneous determination of carbamazepine, carbamazepine-10,11-epoxide, diphenylhydantoin, mephenytoin, phenobarbital and primidone in serum by thin-layer chromatography

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This note describes the adaptation of our recently published method [1] to the analysis of carbamazepine-10,11-epoxide. The epoxide was kindly donated by Ciba-Geigy, Basel, Switzerland. A working standard solution was prepared containing 12.5 mg each of caffeine, carbamazepine and carbamazepine-10,11-epoxide together with 25 mg each of diphenylhydantoin, mephenytoin, phenobarbital and primidone per 100 ml absolute ethanol. This standard solution was applied to drug-free serum, extracted and chromatographed as described by us [1]. A scan of this thin-layer separation is shown in Fig. 1. The epoxide metabolite exhibits the absorption spectrum shown in Fig. 2. The recovery of the epoxide metabolite added to serum was found to be 80%.

With this method we measured the concentration of carbamazepine and its epoxide in 31 serums from patients treated with carbamazepine and other anticonvulsants. The mean value of carbamazepine in these serums was found to be 4.2 mg/l and the epoxide metabolite 1.1 mg/l which is 26.2% of the carbamazepine concentration.

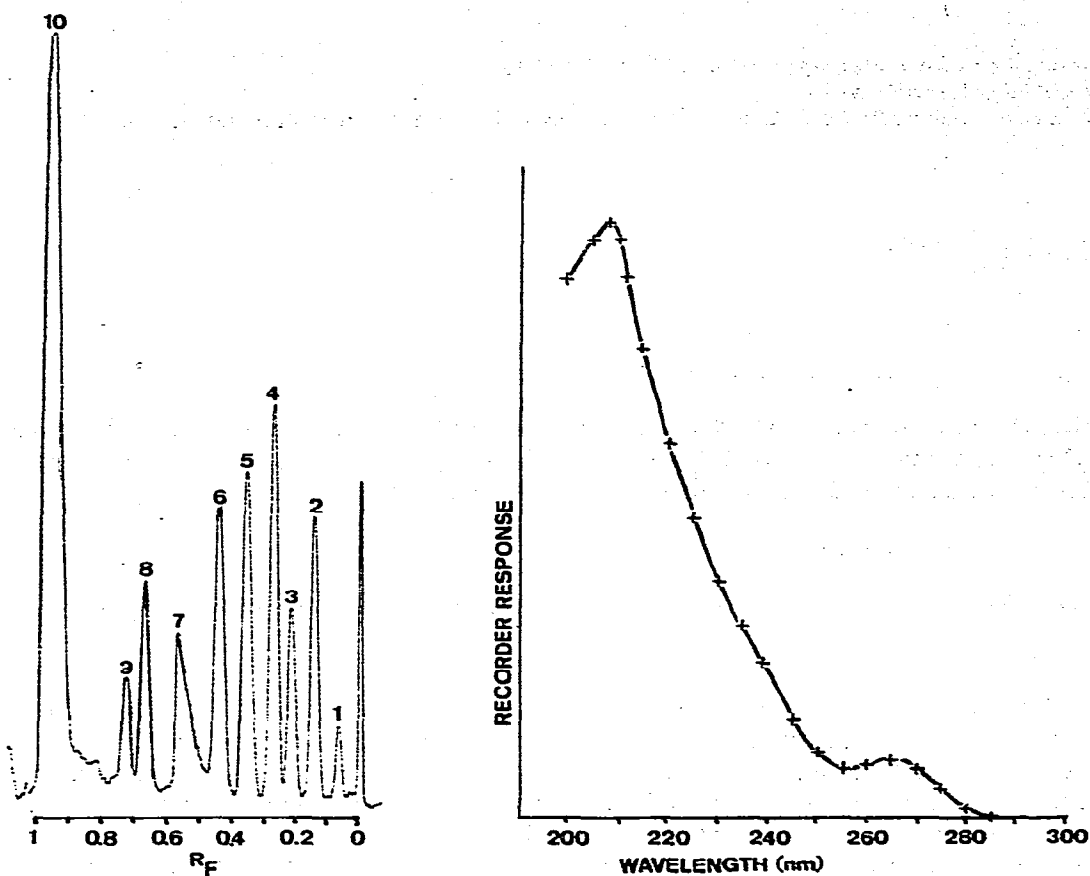


Fig. 1. Results obtained from a scan at 215 nm of a TLC plate after the separation of a serum containing 8.2 mg/l each of carbamazepine-10,11-epoxide (2), caffeine (3), carbamazepine (4), and 16.5 mg/l each of primidone (1), diphenylhydantoin (5), phenobarbital (6), mephenytoin (8). Peaks (7) and (9) are unidentified serum peaks and peak (10) is the solution front.

Fig. 2. Ultraviolet absorption spectrum of a thin-layer chromatogram containing carbamazepine-10,11-epoxide, applied directly to the plate, separated chromatographically and measured in situ with the Zeiss chromatogram-spectrophotometer.

REFERENCE

- 1 N. Wad, E. Hanifi and H. Rosenmund, *J. Chromatogr.*, 143 (1977) 89.