

Thin-layer chromatography of L-carnitine in micellar and cyclodextrin mobile phases

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Abstract

L-carnitine (lat. *Levocarnitinum*, eng. Levocarnitine) is a natural substance akin to B vitamins. Normalizing metabolic processes in the human body and having a wide range of therapeutic actions, L-carnitine is widely used in cardiology, neurology, gastroenterology, and sports medicine. Currently, modern analytical techniques, such as mass spectrometry, high performance liquid chromatography, radiation methods, etc., are used to analyze L-carnitine. Most of them are rather expensive and time consuming. Thin-layer chromatography (TLC), which is notable for its simplicity, feasibility of analysis, separation efficiency and low cost, has received much less use. In this regard, the purpose of this work was to reveal the analytical capabilities of water-organic, micellar and cyclodextrin mobile phases for the analysis of L-carnitine by means of TLC.

Initial L-carnitine solutions with a concentration of 20 mg/ml were prepared by diluting solutions for injections. Their chromatography was carried out by ascending thin-layer chromatography on plates of various polarities (Sorbfil, Plasmachrom, and RP-18) with a fixed sorbent layer. Aqueous solutions of surfactants (cetyltrimethylammonium bromide, cetylpyridinium chloride, sodium dodecyl sulfate, Triton X-100), of cyclodextrins (β -cyclodextrin, 2-hydroxypropyl- β -cyclodextrin), hydroxypropyl- γ -cyclodextrin) were used as mobile phases. The zone of the main substance (L-carnitine) was identified by treating the plate with a mixture of freshly prepared 0.1N solution of potassium permanganate and 2.0 N acetic acid (the zone was colored in a light yellow color).

Main features of the chromatographic behavior of L-carnitine were revealed. Based on the calculation of the number of theoretical plates and the height equivalent to one theoretical plate, it was shown that aqueous micellar and cyclodextrin mobile phases allow one to improve the chromatographic process efficiency and the shape of the chromatographic zones of L-carnitine as compared to water-organic eluents; cheaper Sorbfil plates (Russia) can be used for practical purposes.

Optimal chromatographic systems and conditions for their use in the thin-layer chromatography of pharmaceuticals and food products have been selected and substantiated.

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