IDENTIFICATION AND DETERMINATION OF TESTS OF HERBAL INULIN SUBSTANCES BY THIN-LAYER CHROMATOGRAPHY IN ACCORDANCE WITH THE BRITISH PHARMACOPOEIA

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Introduction. To identify and determine the purity of active pharmaceutical ingredients the method of thin-layer chromatography (TLC) is widely used. It is a quite simple in implementation and economical pharmacopoeia method that has high sensitivity and speed of separation and allows you to separate even close in the connection properties. The TLC method is also applied for assessing the quality of inulin - the fructan that is a mixture of oligomers and polymers of fructose and one molecule of glucose.

On the market today there are a small number of inulin substances of pharmaceutical quality. A significant amount of products contain in their composition the admixture of other carbohydrates; therefore they do not correspond to the declared name “inulin”.

Thus, the implementation of the quality control of inulin substances by the TLC method is a promising research direction.

Aim. To identify the structural components of inulin and to investigate possible admixtures that may be present in the plant substances of given fructan.

Materials and methods. Six herbal inulin substances obtained from such plant sources as Chicory, Agave, and Jerusalem artichoke have been selected for the analysis. The TLC method given in the British Pharmacopoeia 2009, monograph "Inulin" was used as the basis.

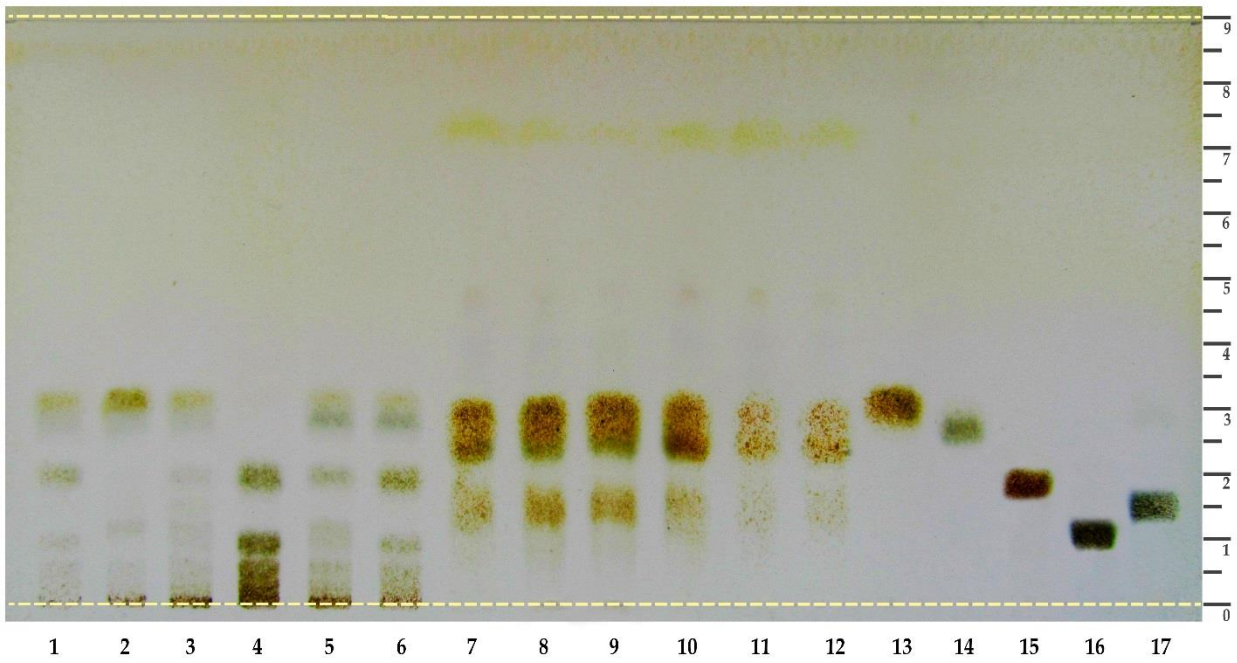
The conditions of chromatography are as follows: stationary phase – plate Silica gel G, Merck; plate activation by immersion in 0.3% solution of sodium acetate; eluent – a mixture of glacial acetic acid – chloroform – water (70:60:10); a mixture of acetone with diphenylamine, aniline and phosphoric acid was used for identification.

3.0 μl of each of the solutions were applied on the plate (Fig. 1). To control the presence of admixtures solutions of sucrose, lactose and mannose standards were additionally applied on the plate.

Results and discussion. According to the results of the study (Fig. 1), the method allows to determine the admixtures present in the analyzed substance before the hydrolysis of inulin (spots 1-6), as well as to identify fructan according to the structural components after the hydrolysis of the base material (spots 7-12).

According to the chromatogram five of six investigated inulin objects have free fructose and glucose before the hydrolysis (samples 1, 2, 3, 5, and 6); however, their small number is valid for herbal fructan substances. In addition, some of them contain free sucrose (samples 1, 4, 5, 6) and lactose (samples 1, 4, 5, and 6).

On the spots 7-12 the analyzed inulin substances were identified with such products of hydrolysis as fructose and glucose. Besides, there are traces of other sugars on the chromatogram of samples 7-12, the determination of which requires further research.



Spots 1-6 – 2.5% solutions of samples of inulin in water;
spots 7-12 – 2.5% solutions of inulin after hydrolysis by 10.0% solution of oxalic acid;
spots 13-17 – 2.5% solutions of standards of fructose (13), glucose (14), sucrose (15), lactose (16) and mannose (17).

Fig. 1. The results of thin layer chromatography of herbal inulin substances

Conclusions. The method given above allows carrying out identification and identifying the admixtures of other sugars in the analyzed samples of the fructan, so it can be used for primary quality control of the pharmaceutically active inulin component.