Stability Studies of **Minoxidil Solution**

Mujahed Rokan Ameen, BS [1], Samvel G. Chailyan, DSci [2*]

**samvelch@yahoo.com*

1. Department of Pharmacy, Eurasia International University, Department of Pharmacy, Yerevan, Armenia

2. Department of Inorganic and Analytical Chemistry, Yerevan State University, A. Manoogian 1, 0025, Yerevan, Armenia

Background. Minoxidil was the first introduced as an oral medication antihypertensive medication in the 1970s. Coincidentally, physicians observed hair regrowth and generalized hypertrichosis in balding patients, and the discovery of its common adverse event, hypertrichosis, led to the development of a topical formulation for promoting hair growth, which led to the development of a topical minoxidil formulation for treating androgenetic alopecia (AGA) first in male and then in female individuals.

The 2% minoxidil solution was first launched in the market in 1986, followed by the 5% solution in 1993. Despite its global acceptance for over 30 years, the mechanism underlying the hair growth-promoting effects of Minoxidil remains to be fully elucidated. To date, topical Minoxidil is the mainstay treatment for androgenetic alopecia and is used as an off-label treatment for other hair loss conditions. Despite its widespread application, the exact mechanism of action of Minoxidil is still not fully understood. The aim of the work was the evaluation of the stability of Minoxidil in the conditions of application of high temperature equal to 42 C as well as increase of the acidity.

Methods. Minoxidil was injected into the system of HPLC (High Performance Liquid Chromatography) in a volume equal to 10 ul as it is. The samples were incubated at about 40°C in thermostat (TC-80M, Russia) over the 7 days. For the experimental analyses we used the Shimadzu LC system, which consists from the Controller CBM -20A, Pump A-LC-20AD, Autosampler –SIL-20 A, Oven, CTO-20A, PDA-SPD-M20A. For the analyses it was also used the Column

Waters Symmetry 300TM C18, with the pore size 5 mcm, size parameters of the column were equal to 4.6x250 mm. The spectrophotometric methods were applied for the detection of the maximums of absorption of Minoxidil (Cary 60, Agilent, USA).

Results and conclusions. Accelerating stability test of Minoxidil in the conditions of 40C, incubation over 7 days didn't initiate any significant degradation processes, which were evaluated by the RP-HPLC. Stability of Minoxidil was also checked by the spectrophotometric scanning process from 190-1100 nm, which was more sensitive than the HPLC method. Acceleration of instability of Minoxidil was initiated by the decrease of pH up to 3.35 as well as increase of temperature of the water bath up to 100C. Scans of the boiled and acidated Minoxidil were slightly different. Baking or acidating of Minooxidil is slightly initiating the degradation of the medicines.

Key words: HPLC, analyses, Minoxidil, stability exeperiments