

# Analytical tools for greenness assessment of chromatographic approaches: Application to pharmaceutical combinations of Indapamide, Perindopril and Amlodipine

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## Abstract

The green profile of the proposed method was assessed and compared with reported classical methods via four tools of greenness which are: Eco-Scale, National Environmental Methods Index (NEMI), Assessment of Green Profile (AGP) and Green Analytical Procedure Index (GAPI). A simple, precise and rapid (RP-HPLC) has been developed for the quantification of Indapamide (IND), perindopril (PER) arginine and amlodipine besylate (ADB) in binary and ternary mixtures. A greener alternate RP-HPLC method was presented for the determination of pharmaceutical combinations composed of the cited medications using an eco-friendly eluent and quick run time with the least waste yield. Chromatographic separation was achieved using Waters Spherisorb ODS-2 C18 column (150 × 4.6 mm, i.d., 5 μm) and eluent formed of acetonitrile : phosphate buffer (20 mM, pH = 3): methanol in the ratio of (65: 30: 5, by volume) at flow rate 1.0 mL/min with DAD-detection at 220 nm. This procedure was valid over linearity ranges of 0.5620–2.5640 μg/mL for IND, PER and AML, respectively. The presented chromatographic method was completely validated regarding ICH guidelines and were statistically compared with those of the reported methods applying t-test and F-test at 95% confidence. The proposed method was found to be greener in terms of usage of hazardous chemicals and solvents, energy consumption, and waste production.

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