

STATISTICAL ANALYSIS BASED GREEN PLANAR CHROMATOGRAPHIC METHODOLOGY FOR QUALITY CONTROL OF FOOD SUPPLEMENTS: CASE STUDY ON *ORIGANUM VULGARE*

Jelena Trifković,^{a,*} Marko Jović,^a Vukosava Živković Radovanović,^a
 Filip Andrić,^a Petar Ristivojević,^a Dušanka Milojković-Opsenica^a

^a University of Belgrade - Faculty of Chemistry, Studentski trg 12-16, 11158 Belgrade, Serbia

* jvelicko@chem.bg.ac.rs

The guarantee of food safety and quality along the food chain has become an important issue which challenges the worldwide and attracts the extensive attention. In order to ensure food safety and quality, efficient analytical methodologies must be applied in the detection of food authenticity, origin, product quality control, food microbiology, genetically modified ingredients, pesticide residues, allergens and toxins.^[1] The aim of this study was to develop a green, simple, and high throughput procedure for the quality assessment of food supplements using a high-performance thin-layer chromatography (HPTLC)/bioautography with multivariate statistics. Bioautography assays were developed for the identification of constituents with radical scavenging (DPPH assay), antimicrobial (*Bacillus subtilis*, *Escherichia coli*, *Micrococcus luteus*), and enzymes (alpha-amylase) activities of different oregano samples (Figure 1). Further, the combination of chemical screening/bioprofiling and chemometrics was used for identification of target, most potent compounds and additionally, search of the most potent oregano samples.

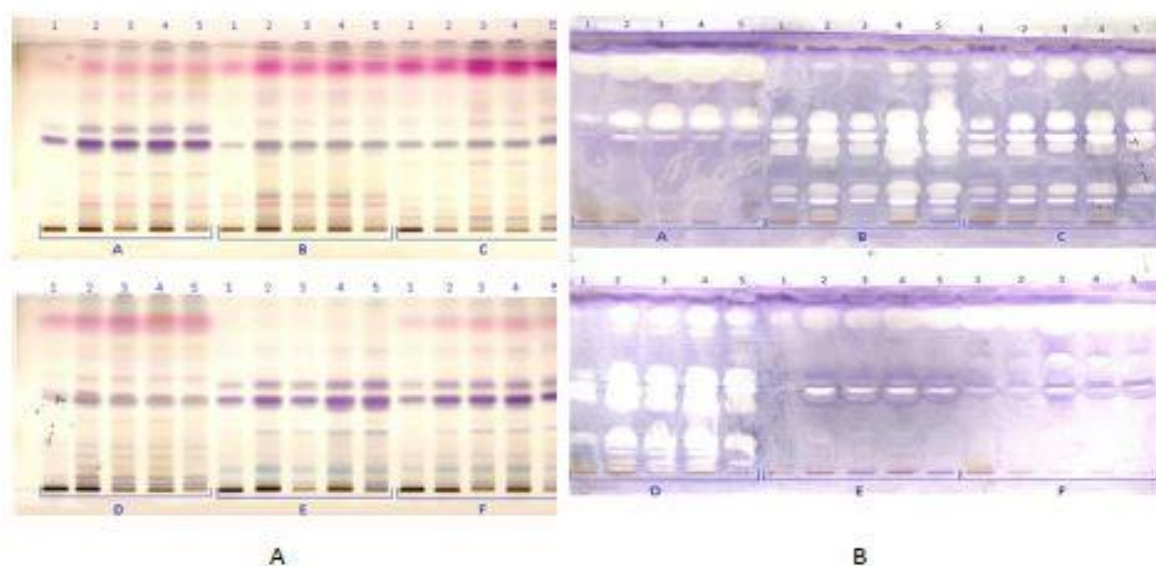


Figure 1. HPTLC chromatograms for six samples of oregano obtained with different solvents (1 - methanol, 2 - ethanol, 3 - ethyl acetate, 4 - acetone, 5 - dichlormethane);
 A – chemical profile, B – *B. subtilis*.

Due to several advantages such as minimum requirements for sample preparation and minimal amount of investigated sample, possibility of selection of eco-friendly and harmless organic solvents, *in situ* identification of target compounds, multi detection of investigated compounds, and low solvent consumption (200-500 μ L per sample) planar chromatography/bioautography is recognized as green technique. Methodology suggested in this study confirmed its possible application in quality control of food supplements.

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REFERENCES

- [1] P. M. Ristivojević, A. Tahir, F. Malfent, D. M. Opsenica, J. M. Rollinger, *Journal of Chromatography A* **2019**, *1594*, 190–198.