molecules

MDPI

Supplementary Materials

Effectiveness of volatile natural deep-eutectic solvents (VNADES) for the green extraction of *Chelidonium majus* isoquinoline alkaloids

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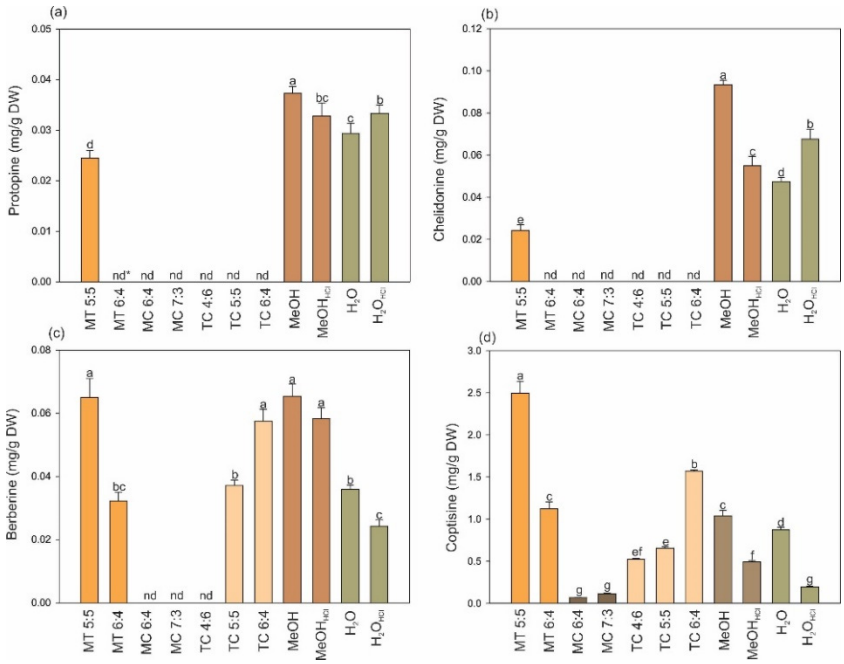

Figure S1. Yields of extraction of isoquinoline alkaloids from *Chelidonium majus* shoots with volatile natural deep-eutectic solvents and commonly used extractants. MT – menthol-thymol mixtures; MC – menthol-camphor mixtures; TC – thymol-camphor mixtures. The mass:mass ratio of the components in the mixtures is shown next to the symbols. $MeOH_{HCl}$ and H_2O_{HCl} – MeOH and water acidified with hydrochloric acid to a concentration of 0.05 M. Data are mean ± SE (n = 5); values for individual raw materials followed by the same letter are not significantly different ($p < 0.05$, Tukey's test).

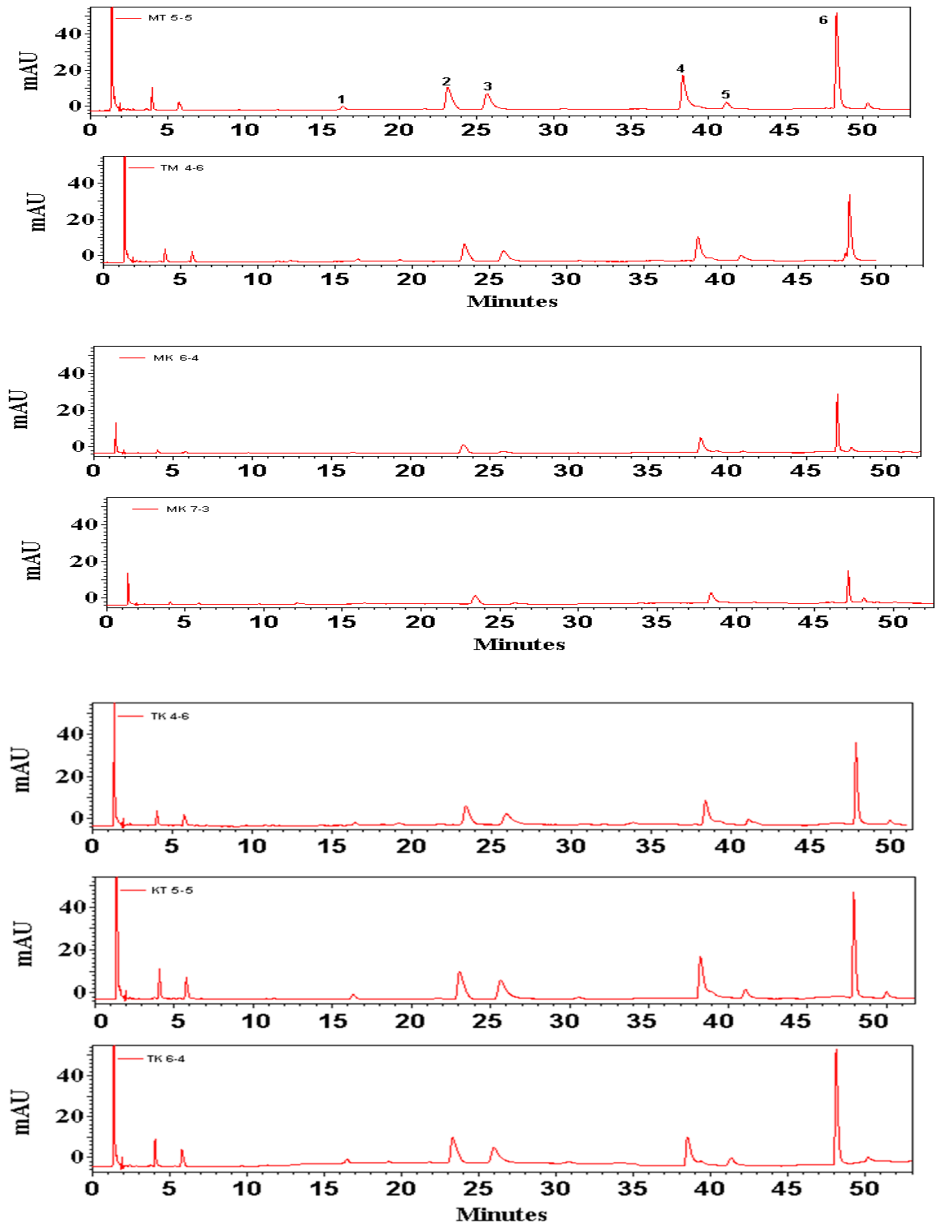

Figure S2. Examples of HPLC-DAD chromatograms of extracts obtained with VNADES (λ=254 nm); 1- protopine, 2- chelidonine 3- coptisine 4- sanquinarine 5- berberine 6- chelerytrine. IA were determined using the methodology published previously [1]: VWR Hitachi Chromaster 600 chromatograph with a spectrophotometric detector (DAD) and EZChrom Elite software (Merck) was used for chromatographic analysisThe samples were analyzed on XB-C18 reversed-phase core-shell column (Kinetex, Phenomenex, Aschaffenburg, Germany) (25 cm × 4.6 mm i.d., 5 µm particle size) using mixture of: acetonitrile (solvent A) and 10mM water solution of ammonium acetate adjusted to pH 4 with acetic acid (solvent B) as mobile phase, at temperature of 30 °C and eluent flow rate 1.2 mL·min^{-1} according to gradient program: A 20%, B 80% during 0-20 min, A 25%, B 75 % during 20-27 min and next A 30%, B 70% during 27- 60 min.

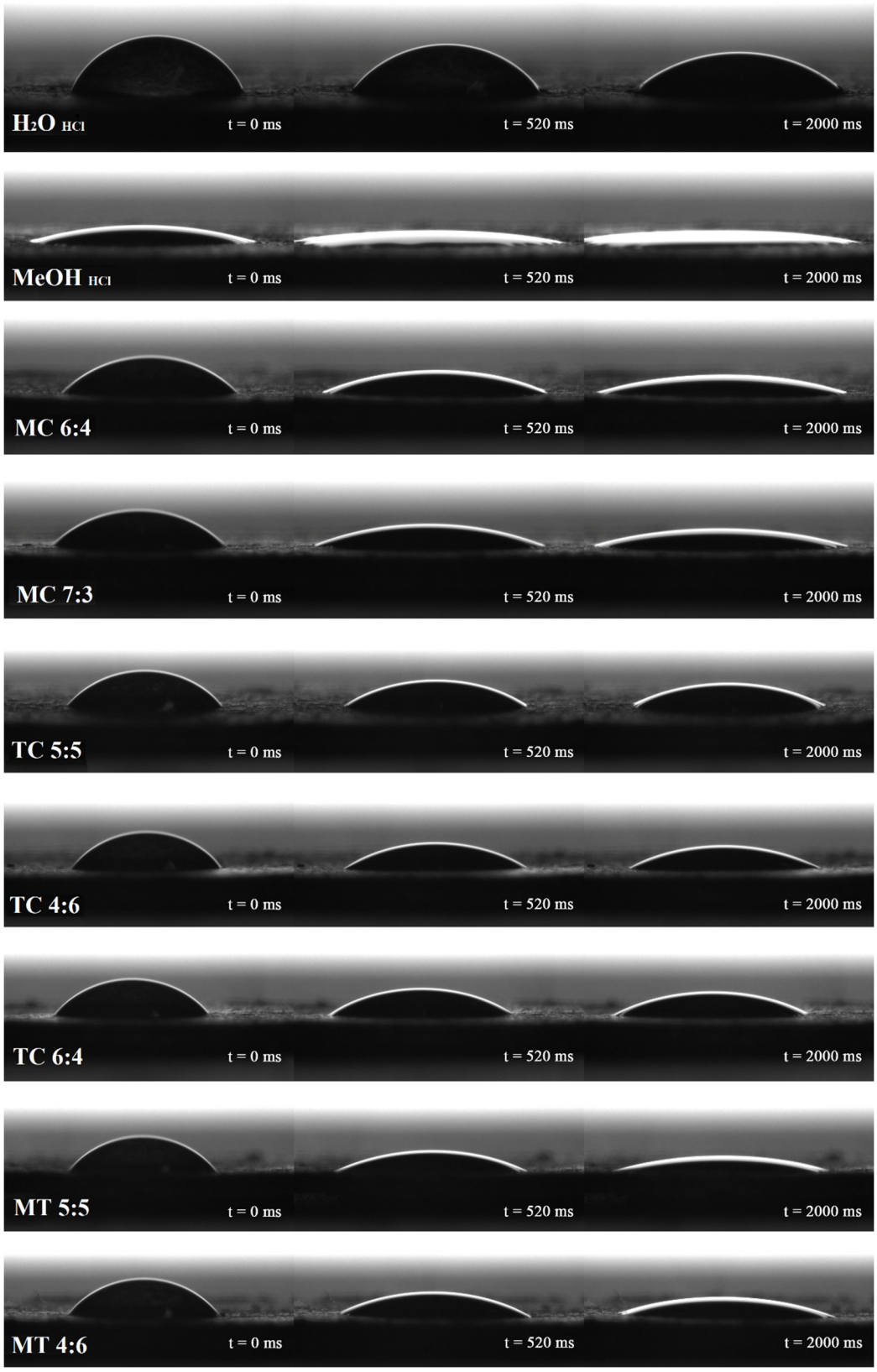

Figure S3. The photographs of drops of applied extractants on the surface of the root *Chelidonium majus*.

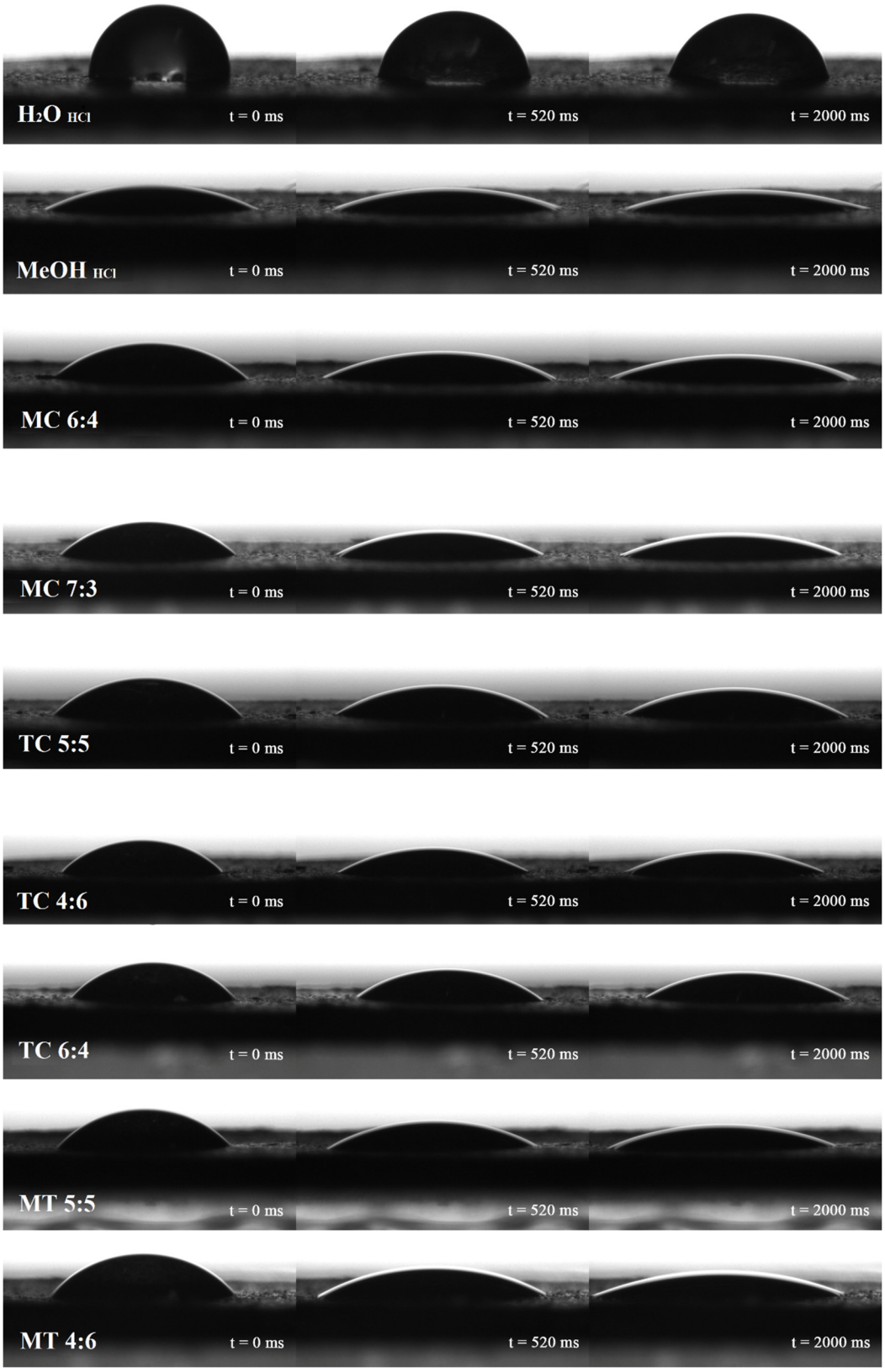

Figure S4. The photographs of drops of applied extractants on the surface of the herb *Chelidonium majus*.

References

1. Wójciak-Kosior, M.; Sowa, I.; Dresler, S.; Kováčik, J.; Staniak, M.; Sawicki, J.; Zielińska, S.; Świeboda, R.; Strzemski, M.; Kocjan, R. Polyaniline based material as a new SPE sorbent for pretreatment of *Chelidonium majus* extracts before chromatographic analysis of alkaloids. Talanta **2019**, 194, 32–37, doi:10.1016/j.talanta.2018.10.009.