

# Novel Collagen-Polyphenols-Loaded Silica Composites for Topical Application

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## 1. Characterization of polyphenolic extract obtained from *Salvia officinalis*

The composition of the polyphenolic extract obtained from *Salvia officinalis* by ultrasound-assisted extraction in ethanol, at 40 °C was evaluated through high-performance liquid chromatography with photodiode array detector (HPLC-PDA). according to the previously reported method [26].

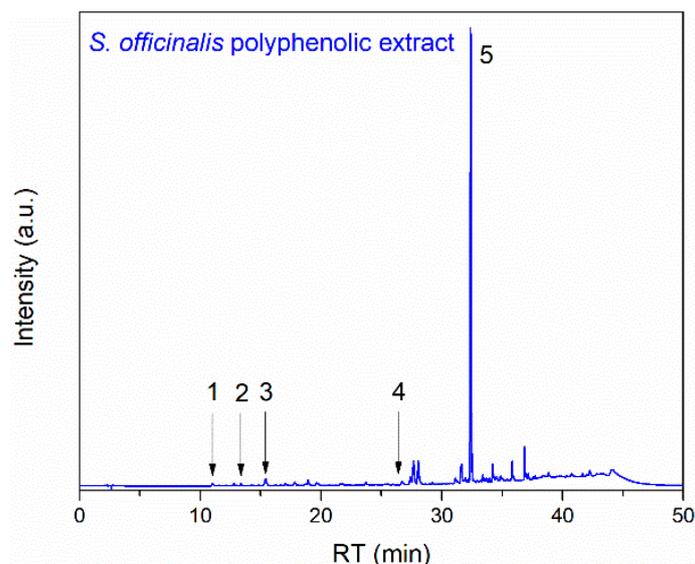


Figure S1. HPLC chromatogram of *Salvia officinalis* polyphenolic extract

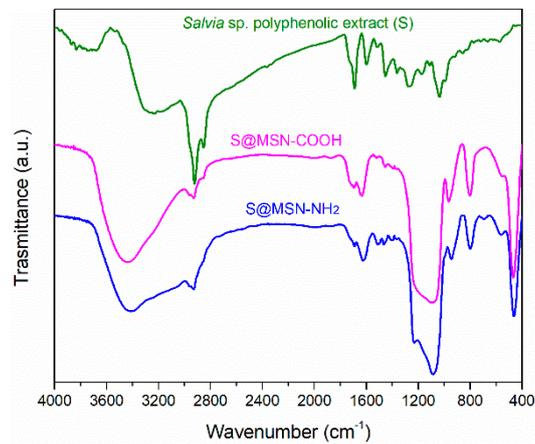
Table S1. Composition of *S. officinalis* polyphenolic extract

No.	Compound	RT min	c mg compound / g extract
1	Caftaric acid	11.09 ± 0.07	0.551 ± 0.022
2	Chlorogenic acid	13.06 ± 0.03	0.197 ± 0.045
3	Caffeic acid	15.58 ± 0.06	0.409 ± 0.008
4	Rutin hydrate	26.44 ± 0.04	0.632 ± 0.006
5	Rosmarinic acid	32.27 ± 0.01	25.564 ± 0.180

RT – retention time; c – concentration.

## 2. Characterization of polyphenolic extract-loaded carriers

FTIR spectra of polyphenols-loaded MSN (Figure S2) exhibit the vibrations of the functionalized silica carriers, which have been already described in section 3.1., together with those of the polyphenols present in the *S. officinalis* extract. Thus, the most intense bands are the sharp bands at  $2920\text{ cm}^{-1}$  and  $2850\text{ cm}^{-1}$ , which are ascribed to the stretching vibrations of the C-H bonds, followed by the vibration of the C=O bonds around  $1700\text{ cm}^{-1}$ . The intensity of the other bands belonging to the extract are attenuated after the adsorption of the extract into the mesopores of the carriers, most of them overlap the silica bonds.



**Figure S2.** FTIR spectra of polyphenols-loaded MSN



**Figure S3.** SEM-EDX image of the collagen-MSN-NH<sub>2</sub>-composite