

## ***Characterization and Classification of Aqueous Pollen Extracts Using SERS and Multivariate Statistics***

**S. Seifert,<sup>1,2</sup> U. Panne<sup>2</sup> and J. Kneipp<sup>1,2</sup>**

<sup>1</sup> Humboldt-Universität zu Berlin, Department of Chemistry, Brook-Taylor-Straße 2,  
12489 Berlin, Germany

<sup>2</sup> BAM Federal Institute for Materials Research and Testing, Richard-Willstätter-Straße 11,  
12489 Berlin, Germany

Identification, classification, and characterization of pollen are currently a time-consuming task. One possibility to save time and to increase accuracy in pollen detection is to use methods of vibrational spectroscopy in combination with multivariate statistics. It has been shown that Raman<sup>1</sup> and also infrared-spectroscopies<sup>2</sup> can be used for pollen spectra classification. Furthermore we showed that using immobilized nanoparticles for SERS experiments results in a good reproducibility of the spectra of pollen extracts.<sup>3</sup> Thus these nanoparticles can be used for characterization and classification of aqueous pollen extract samples. This method provides a lot of advantages, in particular short acquisition times, low fluorescence background in the spectra, small amounts of sample and the possibility to low excitation intensities.

Here we show that classification can also be achieved by SERS on the aqueous extract of pollen in nanoparticle suspensions. This significantly reduces the preparation time required for the analysis.

We have optimized the parameters for these SERS experiments on the water-soluble fraction of pollen samples, in particular regarding amount of sample, sample preparation, excitation wavelength, the time elapsed between the addition of Millipore-water and the measurement and the amount of spectra gathered per pollen extract. We show that these spectra can be used to classify pollen grains with different taxonomic relations using different methods of multivariate statistics.

### References:

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