

## Accepted Manuscript

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PII: S1386-1425(17)30017-3  
DOI: doi: [10.1016/j.saa.2017.01.015](https://doi.org/10.1016/j.saa.2017.01.015)  
Reference: SAA 14868

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 20 April 2016  
Revised date: 25 December 2016  
Accepted date: 6 January 2017

Please cite this article as: Emilio Catelli, Lise Lyngsnes Randeberg, Bjørn Kåre Alsberg, Kidane Fanta Gebremariam, Silvano Bracci , An explorative chemometric approach applied to hyperspectral images for the study of illuminated manuscripts. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Saa(2017), doi: [10.1016/j.saa.2017.01.015](https://doi.org/10.1016/j.saa.2017.01.015)

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# An explorative chemometric approach applied to hyperspectral images for the study of illuminated manuscripts

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## Abstract:

Hyperspectral imaging (HSI) is a fast non-invasive imaging technology recently applied in the field of art conservation. With the help of chemometrics, important information about the spectral properties and spatial distribution of pigments can be extracted from HSI data. With the intent of expanding the applications of chemometrics to the interpretation of hyperspectral images of historical documents, and, at the same time, to study the colorants and their spatial distribution on ancient illuminated manuscripts, an explorative chemometric approach is here presented. The method makes use of chemometric tools for spectral de-noising (minimum noise fraction (MNF)) and image analysis (multivariate image analysis (MIA) and iterative key set factor analysis (IKSFA)/spectral angle mapper (SAM)) which have given an efficient separation, classification and mapping of colorants from visible-near-infrared (VNIR) hyperspectral images of an ancient illuminated fragment. The identification of colorants was achieved by extracting and interpreting the VNIR spectra as well as by using a portable XRF instrument.

## Keywords:

VNIR hyperspectral imaging, chemometrics, illuminated manuscripts, colorants

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