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Forecasts and Discoveries in Painting Colorant Analysis : Specifying a Nondestructive Analysis of Early Modern Japanese Paintings Using a Portable X-ray Fluorescence (pXRF) Analyzer

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In academia, researchers are required to find irregularities in cultural and historical matters concerning their fields. To achieve this, they conduct scientific analyses of target objects. This process requires knowledge of the regularities that should be established using the same methodology. However, the colorants of the "regular" palette used in Japanese paintings of the Edo period, especially those made by hand using brushes, remain unknown.

Focusing on the colorants used mainly in the Edo period, a collaborative research project on the acceptance and changes of Japanese early modern painting techniques and materials was conducted from 2014 to 2016 by researchers specializing in different categories such as material analysis, Japanese art history, *Kano* and *Rinpa* school paintings, *Nishiki-e* (Japanese wood prints), Western-style paintings, and sculptures. The researchers exchanged knowledge about the colorants and realized that none of the categories had a concrete palette that could be compared with each other.

To systematically understand the colorants used around the Edo period, each specialist must set up their category's palette based on their knowledge and experience. When a regular palette is established, it is reconsidered with the analytical results. In the Edo period, paintings were made with a palette assigned for each grade or community. These were painted by each category's professionals with selected colorants, although they were sometimes used in categories other than the original. Finding these irregularities reveals an aspect of the actual society in the Edo period. To delve deeper, the first goal was to establish a regular palette for each category.

Keywords: Japanese paintings, Early modern paintings, colorants analysis, treatise