

Scientific Research into the Green Metallic Luster of Safflower Red Pigment extracted by Traditional Method

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ABSTRACT

High quality safflower red pigment was extracted by an improved method of traditional one. The extracted pigment shows a green metallic luster in a dry state. In this project, this phenomenon was studied scientifically and the obtained results were expressed as a movie film.

1. INTRODUCTION

"Beni" is a pigment used for makeup such as lipstick, and is bright red. However, if "Beni" is applied thickly, the color becomes green with metallic luster instead of red. Since the late Edo period, makeup methods utilizing this phenomenon have been widely known. It is called "Sasabeni" and means shiny green like bamboo leaves, and can be seen in Ukiyo-e.

Almost at the same time in 1810, Johann Wolfgang von Goethe published "Theory of Color (Zur Farbenlehre)". He described in the part 3 of the book, 578 of Chemical Colours, "A remarkable appearance may be here adverted to; pigments, in their deepest and most condensed state, especially those produced from the vegetable kingdom, such as the indigo just mentioned, or madder carried to its intensest hue, no longer show their own colour; on the contrary, a decided metallic shine is seen on their surface, in which the physiological compensatory colour appears."

In modern Japan, there is a long-established store that deals almost exclusively with cosmetic "Beni". They explain, "The red pigment is so pure that it absorbs red light and emits the opposite color, green light, so it looks iridescent in the dry state." As we can be seen from the expression of opposite color, Goethe "Theory of Color (Zur Farbenlehre)" has gained wide acceptance in traditional industries and the arts.

However, it is difficult to accept these explanations as it is from Newton's optical point of view that leads to modern science.

Then, we started the scientific research about green metallic luster of safflower red pigment after modification of traditional extraction method of the pigment. Since then 6 years were passed, we came to present the results as this film work today.

2. ABOUT THE FILM

Title: "Sasa color lipstick" (The Green Metallic Luster by Safflower Red Pigment) Prores422HQ 11 min.

Background : The previous our film produced in 2016 is

remaining an unsolved matter, which the "Beni" shows greenish metallic luster in the dry state. This film is produced to reveal the mystery. The main production staff are the same as the previous work. The production method is also planned to be finished only with 35 mm film, and in fact, some scenes have been executed. The remarkable changes in the video production environment over the last few years have made it difficult to finish works only with film prints. As a result, it became hybrid work of film print and digital data.

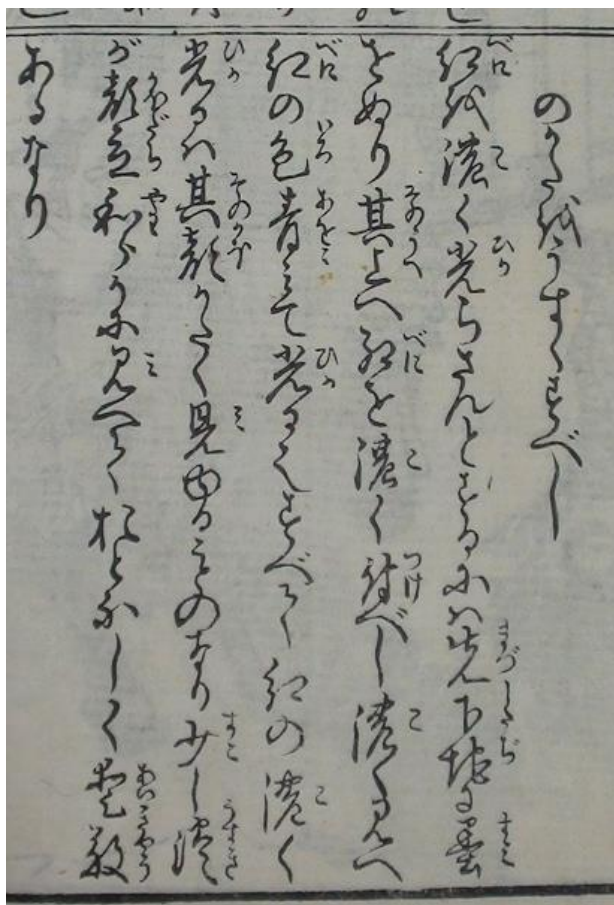


Fig. 1 Screen shot of "Miyako fūzoku kewai den"(Hanshichimaru Sayama).

3. OVERVIEW OF THE FILM

Scientific considerations on the phenomenon that red pigment "Beni" produced from safflower has a green metallic luster when it is dried state.



Fig. 2 Safflower grown on Atsugi campus.

4. TARGET OF THE FILM

We assumed that high school students could understand.

5. HIGHLIGHT OF THE FILM

The "Beni" make-up scene, as operation manual written in the Edo period, show that the lower lip has a green metallic luster, and the bright red color of the upper lip is accompanied by red fluorescence.

6. STAFF OF THE FILM

Staring	Momoka Endou
Music	Yoshiharu
Director/Producer	Hiroshi Yajima, Maiko Sasaki
Cinematography	Hisoshi Nose
Cooperation	
	Kanazawa Institute of Technology
	Nobeyama Radio Observatory
	Hadano City
	Pola Reserch Institute of Beauty&Culture

7. SCIENTIFIC BASIS OF THE FILM

This work is not commercial film, and is awareness film. All comments in the film are scientifically supported by journal papers as follows:

1. "Green Metallic Luster on the Film of Safflower Red Pigment Extracted by a Traditional Method -Approach with Optical Measurements-" Hitoshi Yajima, Maiko Sasaki, Keiko Takahashi, Kazuyuki Hiraoka, Masato Oshima, Katsumi Yamada, J. Soc. Photogr. Sci. Technol. Jpn., (2018), Vol.81, 65-69

2. "Influence of Photo-illumination on Greenish Metallic Luster of Safflower Red Pigment Film" Hitoshi

Yajima, Maiko Sasaki, Keiko Takahashi, Masato Oshima, Kazuyuki Hiraoka, Morio Yashiro, Katsumi Yamada, Bull. Soc. Photogr. Imag. Japan. (2018), Vol. 28-2, 18-22.



Fig. 3 Screen shot of "Beni".

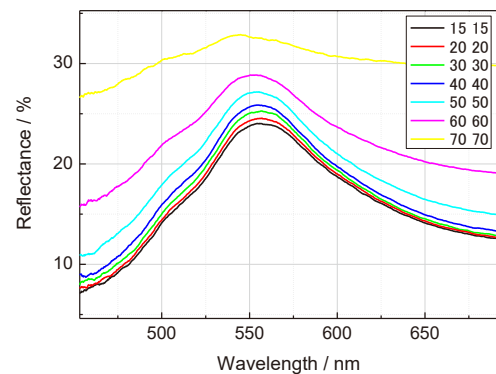


Fig. 4 Specular reflection spectra of safflower red pigment film ("Beni") on the black base. Incident angle and reflected angle were 15° - 70° and 15° -70° for surface normal, respectively.



Fig. 5 Screen shot of green metallic luster of "Beni".