JIA International Journal of Interdisciplinary and Intercultural Art
e-ISSN:2548-0634
Volume: 7, Issue: 14, June-July / 2022
Cilt: 7, Sayı: 14, Haziran-Temmuz / 2022

ADAÇAYI, LAVANTA VE REZENE'NİN GUM BİKROMAT FOTOĞRAF BASKISINDA PİGMENT OLARAK ETKİSİ

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Özet

Mungo Ponton, Daguerre'in ve Talbot'un fotoğrafik görüntüyü buldukları dönemde potasyum bikromat solüsyonu sürdüğü resim kağıdının üstüne negatif film koyup güneş altında pozlandırdığında görüntü elde etmişti. Gümüş tuzlarının kullanılmadan görüntünün elde edilebilmesi onun başarısı olmuştur. İcad ettiği fotoğrafik tekniğini 1839 yılında "Fotoğraf Amaçlı Kağıt Hazırlamanın Ucuz ve Basit Bir Yöntemi" başlığıyla duyurmuştur.

Arap zamkı ve potasyum bikromat ile yapılan baskı, sonraları farklı kişilerce boyar maddeler ilave edilerek renklendirilmiştir.

Günümüzde eski fotoğrafik baskı yöntemleri ile günümüzün görüntüleme teknolojilerini birlikte kullanan sanatçılar vardır. Onlar bu yaklaşımı sanatsal ifadelerini, duygu yükünü arttırmak amacıyla tercih ederler. Ayrıca doğala dönüş günümüzde sanatçıların da seçimidir.
İnsanlığın bitkilerle olan diyaloğu çok eskiye uzanır. Bitkiler ilaç, kozmetik, gıda sanayinde her geçen gün daha fazla yer almaktadır. Birçok bitki doğal pigment özelliğinden dolayı yün, kumaş boyamada kullanılmaktadır.

Bu çalışmamızda eski bir fotoğrafik baskı yöntemi olan gum bikromatın renklendirilmesinde tıbbi ve aromatik yararlı otlar olan kurutulmuş adaçayı, lavanta ve rezene'nin görsel etkileri araştırılmıştır. Çalışmamızda kullanılan bitkilerin gum bikromat baskı yönteminde kullanımına dair araştırmaya literatür taramasında rastlanmamıştır. Farklı boyar madde için pigmentli baskı sonuçları spektro fotometrik ve densitometrik ölçümler, makro ve mikroskobik fotoğraflar ile irdelenmiştir. Yapılan uygulamalar adaçayı, lavanta ve rezenenin baskıya farklı tonlarda belirgin renk verdiğini göstermiştir.

Anahtar kelimeler: Adaçayı, Lavanta, Rezene, Gum bikromat baskı, Fotoğraf

THE EFFECT OF SALVIA, LAVANDULA AND FENNEL AS PIGMENTS IN GUM BICROMATE PHOTO PRINT

Abstract

Mungo Ponton obtained the image whilst Daguerre and Talbot found the photographic image when he put a negative film on the picture paper on which he had applied a potassium bichromate solution and exposed it under the sun. It was his success that the image could be procured without the use of silver salts. He claimed the photographic technique he invented in 1839 with the title "An Inexpensive and Simple Method of Preparing Photographic Paper". The printing made with paper, gum arabic and potassium bichromate was later colored by adding dyestuffs by different people.

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Today, there are artists who use old photographic printing methods together with today's imaging technologies. They prefer this approach to increase their artistic expression and emotional load. Besides, returning to nature is also the choice of artists today.

Humanity's relationship with plants goes back a long way. Plants are taking place more and more in the pharmaceutical, cosmetic and food industries. Many plants are used for dyeing wool and fabric due to their natural pigment properties.

In this study, the visual effects of dried salvia, lavandula and fennel, which are medicinal and aromatic herbs, were investigated in coloring gum bichromate, which is an old photographic printing method. The research on the use of the plants practiced in our study in the gum bichromate printing method was not found in the literature review. Pigmented printing results for different dyestuffs were examined with spectrophotometric and densitometric measurements, macro and microscopic photographs. Applications have shown that salvia, lavandula and fennel give distinctive color to the print in different tones.

Keywords: Salvia, Lavandula, Fennel, Gum bichromate printing, Photography

Introduction

Mungo Ponton acquired the image by placing a negative film on a picture paper on which he applied potassium bichromate solution and exposed it under the sun. His success is the same as the year of the invention of photograph. The method was heard in Ponton's presentation entitled "An Inexpensive and Simple Method of Making Photographic Paper" to members of the Scottish Art Association on May 25, 1839. It was the period when Daguerre and Talbot explained their method for obtaining photographic images. Ponton's technique was different in terms of method and content, especially at that time when different applications of Talbotype were introduced as a new development. It was also inexpensive and easy to make. Ponton, did not use silver salts to be light sensitive, but did not patent his work (Image, 1952, s. 3). In 1855, Alphonse Louis Poitevin and John Pouncy developed the method by adding colored pigments to the bichromate solution. (King, 2000, s.163). In the history of photography, the contents of this method are basically the same; Demachy gum method is also expressed with different names such as Photo aquatint, Multi-gum printing, Three-color gum printing, Gum dichromate, Albumin-gum bichromate method and Gum method (Kaplan ve Stulik, 2013, s. 192).

Considering the chemical content of the method; paper was used as carrier layer, gum (Arabic gum) as binder and potassium bichromate as chemical forming the image. In order to color, ready-made paints are mostly preferred (Erutku, 2019, s.110).

Today, photographic image acquisition and processing technologies have reached great opportunities. Until digital photography technology become widespread, images obtained with serious effort can be easily chosen among dozens of options and images can be created. However, today, there are quite a few artists who still prefer designing beforehand, planning and calculating shots over working with a hand-held device. It is even possible to see works that blend traditional methods and new technologies, either as a photographer or as a contemporary artist. Trying to return to the natural and blending the traditional with the present are among the preferences of today's artists. In this study, the visual effects of dried salvia, lavandula and fennel on the coloring of gum bichromate, an old photographic printing method, were investigated. These plants are medicinal and aromatic useful herbs. The oldest known paintings of mankind are in the caves of Altimira in Spain,

Lascoux and Chauvet in France; Natural dyes gave color in Çatalhöyük in Anatolia. It was also used to dye papyrus and cloth in Mesopotamian civilizations (Baydar, 2021, s.183).

The earliest and most comprehensive scholarly work on beneficial herbs is Causis Palntarum and Historia Plantarum, written by the Greek philosopher Theophrastus. Historia Plantarum is considered the most important work of natural history, in which he examines and systematically classifies more than 550 plant species (Lerodiakonou, 2020, s. 1).

The book of El-Kânûn Fi't-Tıb, which is the biggest work in the history of Islamic medicine, in which Ibn-i Sina, one of the most important names of medieval medicine, began to write in 1012, compiled and systematized the Hellenistic, Byzantine and Syriac medical literature and wrote his own observations, consists of five books. The second book is about drugs (Kahya, 2018, s. 331-333). This volume contains many applications and observations on medicinal plants.

Humanity's dialogue with plants dates back to ancient times; Today, it is taking place more and more in the pharmaceutical, cosmetic and food industries with the effect of the orientation towards the natural. Many plants are used for dyeing wool and fabric due to their natural pigment properties.

The characteristics of the plants we used in our research are as follows;
Salvia (Salvia officinalis): It is a fragrant herbaceous plant of the genus salvia from the Lamiaceae family. It is also called toothwort or Meryemiye. It is a woody and branched perennial evergreen that can grow up to 75 cm. Blooms purple - blue in summer (Clevely vd., 2010, s. 115). It has shaggy whitish leaves with a rough surface. Ether essential oils, thujon, cineol, linalool, borneol, salven, pinene, camphor; tannins, triterpenoids, flavones, estrogen analogs, resinous compounds (Seçkin, 2014, s.433-435).

Salvia, which represented fertility in ancient Egypt, has been referred to as a medicinal plant since ancient times (Seçkin, 2014, s.435). In this context, there are many studies on the antimicrobial, antifungal, antioxidant, anticancer, anti-hyperglycemic, anti-cholinesterase, anti-angiogenic effects of Anatolian sage (Elmas ve Elmas, 2021, s. 117).

Today, salvia is used in the pharmaceutical industry. It is used as a spice, especially in Mediterranean cuisine; It is also used in processed foods due to its antioxidant effect (Quoted from Muhrasib, Elmas, 2021, s.114). Salvia, whose main essential oil components are thuyon, 1,8-cineol and camphor, is also preferred in aromatherapy (Baydar, 2021, s.237).

The luteolin in its content is a yellow dye. The leaves and stems of the plant are suitable for fresh or dry coloring (Becenen and Sarıca, 2018, p.48). In Anatolia, its flowers and leaves are used to obtain yellow, green and khaki colors in natural fabric dyeing. Colors vary depending on the mordant used (Karadağ, 2007, s.16).

Lavandula (Lavandula angustifolia mill): Historically, the Ancient Egyptians, Phoenicians and Arabs used lavandula as a perfume because of its pleasant, peaceful scent. The Egyptians also preferred lavandula during the mummification process (Largo, 2021, s. 215).

Lavandula is a genus of lavandula from the Lamiaceae family. It is a semi-shrub, perennial fragrant aromatic herb. It has many branches and grayish green leaves that grow to an average of 50 cm. The purple flower part is in the form of a spike on the stem. The active ingredients of the plant are terpenes (oides) and phenolics (Baydar, 2021, s.289). It contains camphor, β-o-cymene, coumarin, sesquiterpene, linalool, linalyl acetate, cineole, flavones, tannin. Essential oils taken from its flowers

are used in the cosmetics and perfume industries (Alp, 2021, s. 121). Lavandula, which has soothing and antiseptic properties, is also preferred in aromatherapy (Seçkin, 2014, s. 448).

Fennel (Foeniculum vulgare): Latin name comes from the word foenum meaning fragrant (Clevely vd., 2010, s. 302). Fennel is featured in the pagan potion book titled "Nine Herb Talismans" in the 10th century. In Greek mythology, Prometheus used fennel stalks to steal fire from the gods. In ancient Greek, fennel was called a marathon or marathos, and it got this name because the bloody Greco-Persian "marathon battle" in history was fought on the fennel-filled plain (Largo, 2021, s. 288).

Fennel is an anise-scented herbaceous plant of the genus foeniculum in the family umbelliferae. Also called tangle. It is perennial and bluish green (Seçkin, 2014, p.722). The leaves are filamentous and segmented. The yellow flowers of the plant, which can be up to 1.5 meters tall, are in the form of an umbrella. It contains terpene (oit), phenol and fixed oil as active ingredient (Baydar, 2021, s. 309). In folk medicine, the root, stem bark, leaf, flower and seed parts of the plant are used for the treatment of different diseases (quoted from Shubham, Katar, 2021, p. 1021). The fruit parts have antiseptic, laxative, diuretic, carminative, sedative and stimulant effects. Therefore, it is also used in the pharmaceutical industry. Fennel, which is used as a spice in food, is also used in the cosmetics and perfume industry (Baydar, 2021, p. 309).

Used materials

The density of the film used (in the lightest region) is 0.97 R, 1.12 G, 1.23 B.
Osram / Ultra-vitalux 300W was used as the light source. The exposure time is 11 minutes from a distance of 30 cm.

Gum arabic as binder (35 g per 100 ml of water); Potassium bichromate (5 g potassium bichromate in 50 ml water) was used as sensitizer. Potassium bichromate is a type of mordant used in natural vegetable dyeing of wool and similar products.

The pigments were taken in a food processor as 200 gr each. It was then added to 1 liter of water and boiled for 1 hour. Finally, the solution was filtered with the help of cheesecloth, purified from plant residues and 400 ml of dyestuff was obtained.

The same type of engraving paper was used for each print.

Application of Prints

5 gr Sensitizer was dissolved in 50 ml of pigment and then added to the binder solution. Next; Sensitizer, binder and pigment were mixed and applied to the paper with the help of a brush.

The photosensitive paper was dried at room temperature in the absence of UV light. The dried paper was exposed under UV light for 11 minutes. After exposure, the prints were washed in water at room temperature for 10 minutes and then dried at room temperature.

Results

Densitometric and spectrophotometric measurements, macro and microscopic photographs from the pigmented printing results for different dyestuffs were tried to be taken from the same regions of the image.

Density measurement from a print with a non-pigmented potassium dichromate plum: 0.04 R - 0.11 G - 0.22 B.

The density measurement of the print made using gum bichromate plum containing salvia pigment is: 0.13 R - 0.31 G - 0.66 B. The microscopic image obtained from this print is seen in Image 1 and the macro detail image is seen in the photograph presented in Image 4.

Density measurement of the print made using gum bichromate plum containing lavandula pigment: 0.07 R - 0.20 G - 0.42 B. The microscopic image obtained from this print is seen in Image 2 and the macro detail image is seen in the photograph presented in Image 5.

Density measurement of printing made using gum bichromate plum containing fennel pigment: 0.04 R - 0.14 G - 0.33 B. The microscopic image obtained from this print is seen in Image 3 and the macro detail image is seen in the photograph presented in Image 6.

Image 1: Microscopic view of salvia pigment print. Photograph: Bülent Erutku.

Image 2: Microscopic image of the lavandula pigmented print. Photograph: Bülent Erutku.

Image 3: Microscopic image of the fennel pigmented print. Photograph: Bülent Erutku.

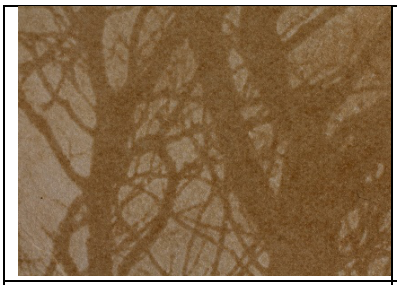

Image 4: Detail of salvia pigment print. Photograph: Bülent Erutku.

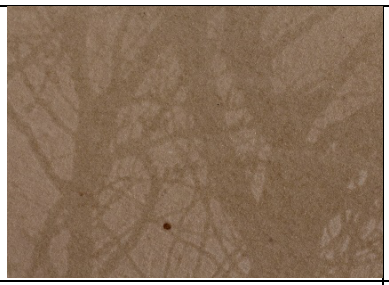

Image 5: Detail image from the lavandula pigment print. Photograph: Bülent Erutku.

Image 6: Detail image from the fennel pigment print. Photograph: Bülent Erutku.

Spectro photometer measurement values: The device used is Konica / Minolta CM700 D. The measurement setting is SCI 2˚ / D65.

The coordinate values of the CIE Lab color system are: L* Clarity: 0-100. 0 Black 100 Colorless. a*: Red / Green. >0 Red, <0 Green. b*: Yellow / Blue. >0 Yellow, <0 Blue.

The spectrophotometer measurement values taken from the sample prints are given in Table 1 as a whole for comparison. In addition, the coordinates of the print using salvia is shown in Image 7, the

print using lavandula is shown in Image 8, and the print using fennel is shown in Image 9 in the color space.

Sample	L*	a*	b*
Salvia	74,39	-0,29	30,73
Lavandula	81,67	-1	17,09
Fennel	90,13	-1,62	6,97

Table 1: L*, a*, b* Values.

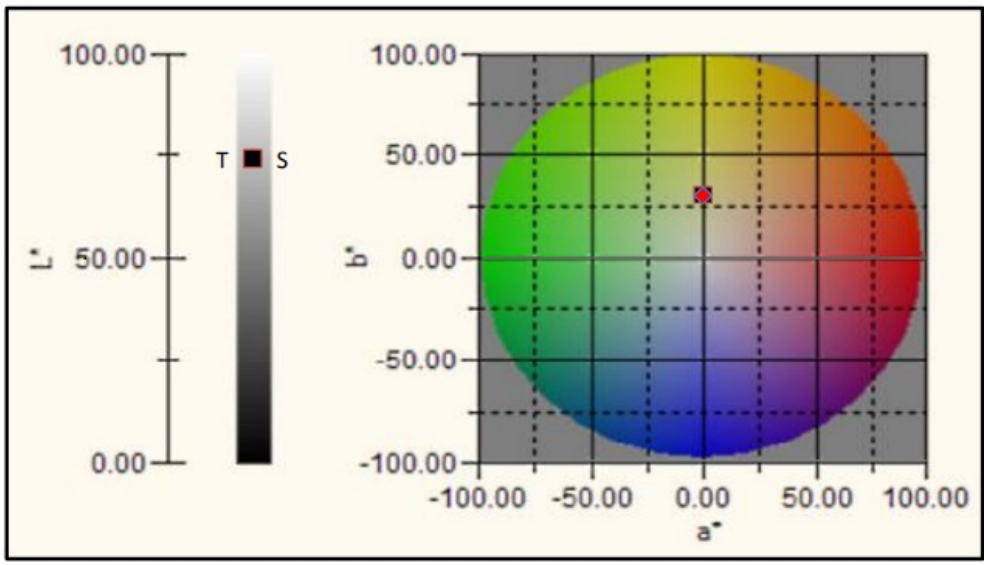

Image 7: Coordinates in the color space of the print using salvia. Bülent Erutku.

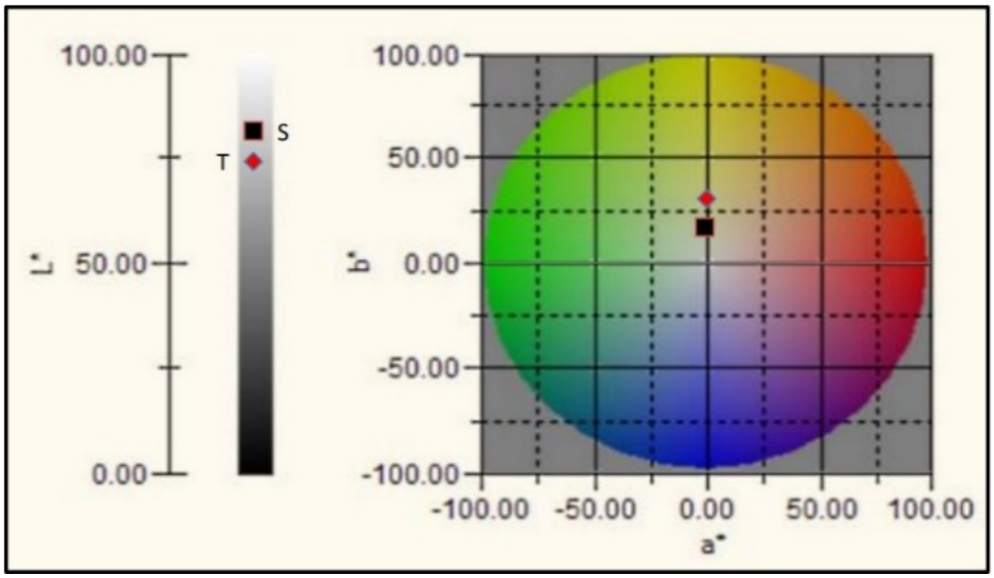

Image 8: The coordinates of the print using lavandula in the color space. Bülent Erutku.

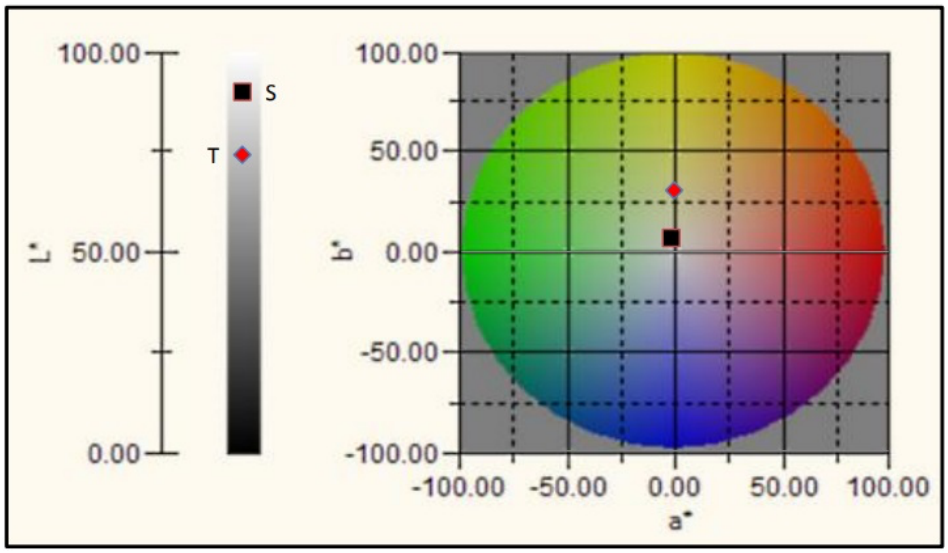

Image 9: Coordinates in the color space of the print using fennel. Bülent Erutku.

Conclusion

When the spectrophotometer measurement values are examined according to the CIE Lab system; Print using salvia has the lowest L* value. This situation shows parallelism with densitometric data and visual inspection. The image of the print made with salvia is more distinct and contrasting than the others.

The a* values of all three prints are negative. It is the print containing fennel with the highest green density. The image of the print with fennel has less contrast than that containing salvia but more distinctly than that containing lavandula. b* When the data is analyzed, all three editions are positive values; hence they have yellowish tones. b* The print with the highest value is salvia. In the print made with salvia, there is a yellow-brown dominance visually. The image of the print made with lavandula has lower contrast than those with salvia and fennel. The tree branches in the photo are less sharp.

Experiments have shown that gum bichromate plum with salvia, lavandula and fennel pigments gives a distinct color in yellowish-greenish-brown tones to the print after exposure. When the pigmented content is applied more than once, the desired clarity, tone and color effect can be changed.
In the light of these data, different natural dyestuffs can be researched to obtain a single color, as well as the usability of salvia, lavandula and fennel pigment in other old photo printing methods can be investigated with different studies.

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Visual Resource

Image 1: Bülent Erutku

Image 2: Bülent Erutku

Image 3: Bülent Erutku

Image 4: Bülent Erutku

Image 5: Bülent Erutku

Image 6: Bülent Erutku