

Natural Dyes in the United States: An Exploration of Natural Dye Use Through the Lens of the Circuit of Style-Fashion-Dress

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In the field of apparel manufacturing, there are two broad categories for dyes: natural and synthetic. Petroleum forms the base for synthetic dyes, while plants, animals, minerals, or fungus create natural dyes. In manufacturing, synthetic dyes have become a reliable source of inexpensive, consistent, and high-performing color (Gregory, 2007). Scientists and environmentalists have criticized synthetic dyes and manufacturers for contributing to water and soil pollution (Brigden et al., 2012; Gregory, 2007). The fashion industry is once again adopting natural dyes and citing them as a more eco-friendly and renewable option to synthetics after widely disregarding them for the last 160 years. Natural dyes are considered by some as a more environmentally friendly option because they are biodegradable (Cardon, 2007; Fletcher & Grose, 2012), and may reduce the fashion industry's impact on waterways and soil (Bechtold et al., 2003, p. 502). Nevertheless, natural dye use is a complex subject when it comes to sustainability. Experts have voiced concerns about natural dye production and noted various problems, including natural dyestuff production, multiple wet processing steps, color consistency and fastness, and scalability (Bechtold et al., 2003; Doty et al., 2016; Fletcher & Grose, 2012; Saha et al., 2018). More research on natural dye use is needed before brands can claim sustainability with confidence.

Purpose & Methods: The purpose of this research was to explore the challenges and innovations that surround the use of natural dyes through the theoretical lens of the circuit of style-fashion-dress (CSFD) (Kaiser, 2012, p. 13-27). CSFD is used to help interpret qualitative data gathered in this study. Specifically, we examined how different “structures of feeling”—i.e., ambivalence, anxiety, ambiguity—articulate with the production, distribution, consumption, regulation, and subject formation(s) associated with natural dyes (Kaiser, 2012, p. 41). We concentrated on fashion and textile production in the U.S. to narrow the scope of our research. To document the use of natural dyes in U.S. fashion production, we integrated various qualitative collection methods (e.g., interviews, participant observation, field notes and sketches, documentary filmmaking, and surveys). The lead author conducted 15 in-depth interviews over three years (2016-2019) with people who work with natural dyes. These included fashion and textile designers who used natural dyes, natural dye growers, production dyers, and apparel companies that sold naturally dyed garments. Fieldwork took place in 12 different locations across the U.S., including New York, NY, multiple locations in Brooklyn, NY, Gap, PA, Springfield, TN, Portland, OR, multiple locations in the San Francisco Bay Area, CA, Los Angeles, CA, and San Clementi, CA. Throughout our research, the lead author recorded approximately 130 hours of film and over 700 photos. In the summer of 2017, we took part in a research project with Wool&Prince, a menswear company based in Portland, OR. As part of the project, we dyed 80 wool t-shirts in four different natural colorants. After dyeing, Wool&Prince

sold the t-shirts through their online website and included a description of the study. We sent e-mails to individuals who purchased a naturally dyed t-shirt and solicited their participation in two online surveys: the first survey immediately after their purchase and then sent a follow-up survey four months later.

Results: (Production): Fashion labels have developed ways to produce more naturally dyed garments at one time to decrease production costs. This increase in production has led to the emergence of dedicated natural dye houses and large-scale natural dye growing operations in the U.S. One challenge natural dyer's described was difficulty in color reproduction from one dye bath to another. Different variables affect the growth of a dye plant, including sunlight, water, soil, predation, and temperatures which can change the final color a plant will dye. Even slight alterations in color can require a dye house to re-dye or discard a batch of garments or textiles. However, there are natural dye growers in the U.S. who are using mass sampling of dye plants during cultivation to produce consistent pigment for use in large-scale manufacturing. (Distribution): During the distribution phase natural dyers found it challenging to communicate and market information about natural dyes to their clients. Since natural colorants are unknown to much of the fashion industry, production dyers have found they need to educate their clients about the realities of natural colorant use. (Consumption): In our first survey to individuals who bought and consumed naturally dyed garments from Wool & Prince, out of the 24 respondents, three people noted that they wanted to support more environmentally friendly apparel production. In our follow up survey four months later, when asked if they were satisfied with their naturally dyed t-shirt, all 18 respondents replied "yes", and two individuals mentioned the need for a reasonable price point. (Regulation): In natural dye communities, intellectual property concerns around natural dye processes are the main subject of regulation. Natural dyers often choose, through a process of self-regulation, whether to share information with other individuals. Those who agreed to participate in our study, for the most part, readily provided us with information. Interest in growing natural dye communities and promoting the environmental sustainability movement was central to many of our participants' identities. The one exception was a company that is beholden to investors. To gain access to interviews at this company the lead author had to sign a non-disclosure agreement. As businesses invest money into the development of natural dyes, it is increasingly likely researchers will see more information become proprietary. (Subject Formation): Subject formation is the process of being and becoming (Kaiser, 2012). Environmental concerns were a key theme that emerged from consumers of natural dye products. Many of the participants we interviewed made the connection between natural dyes and environmental sustainability.

Significance and Future Research: This study is significant because we broadly reviewed natural dye production in the U.S. and give readers a snapshot of a complex industry with recently renewed interest in natural colorants. We also provide information for those interested in the use of natural dyes for apparel production. We followed the process from plants to garments to individuals and explored the challenges and innovative use of natural dyes. Ideas for future research include interviewing individuals working at dye houses switching from synthetic to natural dyes.

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