Student uses plant waste to create sustainable alternative to dye

September 4 2019, by Joanna Wilson

Credit: Imperial College London

Imperial student Nicole Stjernswärd is using plant waste to create natural powder pigments that can be used for paints, inks or textiles.

Historically color came from plants and minerals, but with the onset of industrialization, cheap, petrochemical colors became the norm, at a cost to the environment.

The colors in most consumer products are now derived from petrochemicals, however with an ever-increasing global focus on sustainability, Nicole thinks that pigments are due for change.

Nicole is a student on the Innovation Design Engineering Master's course, offered jointly by Imperial College London and the Royal College of Art.

High value resource

Many plants and fruits eaten every day, such as avocados, onions and pomegranates, have valuable colors within their skins and peels. Normally these are left to rot in landfills, but KAIKU transforms this waste into a high value resource.

KAIKU's color making machine converts plant dyes into paintable pigments, allowing the user to create custom colors and have total control over the source of the colors. Plant dyes are added to the machine's reservoirs and are then vaporised into dry powders. This process takes minutes and results in pigments that can be used for traditional artists' paints, inks and textiles.

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Unique natural pigment

Depending on how it is cared for, natural plant color can fade in just a few months, making it perfect for items used for a short time. Items needed for a longer time can be re-dyed or re-colored as needed.

Every batch of natural pigment is unique and subject to the growing conditions of the raw plants used, for example one batch of avocado pigment will differ slightly from another. This allows mass-produced products to feel more handmade and unique, and makes the applications

numerous.

Nicole's inspiration for the project began with oil paints, which used to be made more naturally, but are now mostly made from synthetically-derived materials and chemicals. She then met textile designers, who spoke about wanting to use more natural dyes, but found that these must be used quickly as they go moldy. Nicole says her system is easier to use and has a better shelf life.

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Hands-on process

She said: "The project uses existing, old knowledge that people might have forgotten about, incorporating new technologies."

Studying at both Imperial College London and the Royal College of Art allowed Nicole to "access specialists in the field and experts on both sides. I really liked working with different disciplines, and I'm exploring how I can continue to do this after graduation."

Nicole hopes that her hands-on process will spark interest in the public and encourage them to care about the products they buy and where they've come from.

Provided by Imperial College London