

Redefining Color Coating

Color palette for sustainable future by Soňa Otiepková



Doctoral research:
Realization:
Researcher:
Research supervisor:
Text:

Color in the Design of Bioplastic Products
2020 — ongoing
Mgr. art. Soňa Otiepková
Assoc. Prof. Andrea Urlandová, PhD.
Michala Lipková



Paints and color coatings significantly contribute to pollution by microplastics in our environment. In cooperation with the Faculty of Chemical and Food Technology STU in Bratislava, the doctoral research by Soňa Otiepková addresses the specific problem of bioplastics surface coloring. While bioplastics' main advantage is degradability, most paints and coatings are designed to last much longer than the product.

To develop a biodegradable color palette, Otiepková experimented with samples of Nuatan, a bioplastic developed by the crafting plastics! studio. The resulting formula contains binder resin based on soybean oil and mineral pigments. The final color palette is suitable for bioplastic surface coloring, and it was carefully designed to meet the requirements of commercial design projects utilizing bioplastics.

Soňa Otiepková's doctoral research project aims to map, document, and classify emerging approaches to color in product and material design from the perspective of circular design. Otiepková spotlights the long-overlooked problem: the contribution of paint to global plastic leakage. Research organization EA - Earth Action, in their 2021 report *Plastic Paints the Environment*, claimed that particles of paint account for more than half (58%) of all the microplastics that end up in the world's oceans and waterways every year (Paruta et al. 2021, 14). The main research question was therefore framed as follows:

"The majority of current progressive approaches to design creation and research is set in an ecological framework, considering their impact on the environment. The question is not whether color is present in this process, but rather where it stands, whether it can help it, and how much it affects it" (Otiepková, 2021).

The prevailing use of synthetic and chemically enhanced colors makes products hard to recycle, and as Otiepková aptly points out, "the color today is designed to last much longer than the product itself!"

In one of her published research papers (2021), Otiepková identifies three problem areas in the relationship between color and design:

- **“research gap”** - arguing that the potential of color in the context of sustainability is not being researched sufficiently and the topic is being overlooked,
- **“color manufacturers”** - Otiepková points to the distortion of the perception of colors by manufacturers in order to maximize profits, be it, e.g., the gender color coding (blue vs. pink) or the pressure to achieve unnatural long-lasting colors that will not fade,
- and so-called **“color relativity,”** with which Otiepková refers to “the flatness of the color industry,” described at the example of the concept of branded corporate colors, strictly avoiding any changes in the shade when used for promotional products.

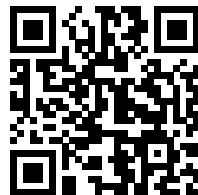
In her mapping of the sustainable approaches to color in design, the author classifies four contemporary trends:

1. sustainable (progressive) coloring approach,
2. coloring of recycled materials,
3. coloring of bio-based materials,
4. reusing products through new color coating solutions. (Otiepková, 2021)

In the practical part of her research, Otiepková focuses on coloring bio-based materials by collaborating with a Slovak design studio crafting plastics! (www.craftingplastics.com), known for their long-term experimentation with bioplastic materials and their own certified biodegradable material blend Nuatan (www.nuatan.com). The main objective of the

cooperation with the studio within Otiepková’s doctoral research project is to expand the possibilities of using bioplastic materials in durable products through color. In cooperation with the Faculty of Chemical and Food Technology STU, the specific problem of the surface coloring of bioplastics is solved through experimental research: examining various creative methods of surface coloring with the use of natural pigments, dyes, and binders.

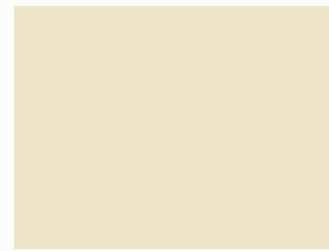
Through experiments and durability tests, Otiepková developed a formula containing binder resin based on soybean oil, which she has successfully used on bioplastic surfaces. The formula was used in a creative workshop with design students at the FAD STU in Bratislava as a part of the research. The workshop resulted in a palette of colors with a given formula and mineral pigments specified in the NCS color system. The palette’s individual colors are chosen carefully to be easily combined. According to the author’s words, the goal of the research is to “contribute to the development of creative methods of coloring of bioplastics, which complement and support the ecological properties and the lifespan of the material and also expand the possibilities of using bioplastics in creative industry and product design.”



Soňa Otiepková
sona.otiepkova@stuba.sk
@medena_studio

Soňa Otiepková’s work is mainly characterized by working with colors and textures. She co-founded Villo Design, an awarded children’s furniture company. She works as a researcher in the field of colors and materials and collaborates with the studio crafting plastics! She is a doctoral degree candidate at FAD STU in Bratislava. Besides her work in product design, Otiepková is also dedicated to contemporary weaving on 100-year-old looms, exploring the possibilities of color within the craft technique.





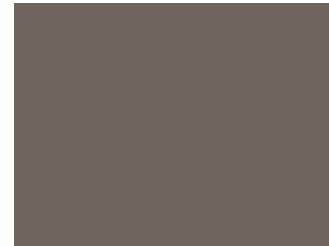
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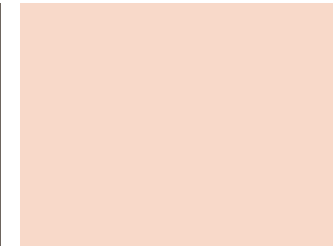
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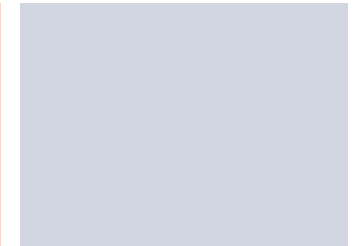
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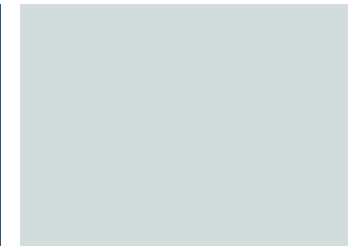
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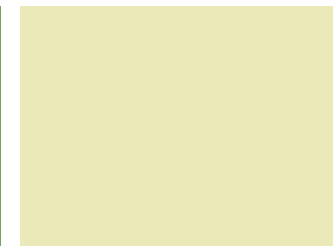
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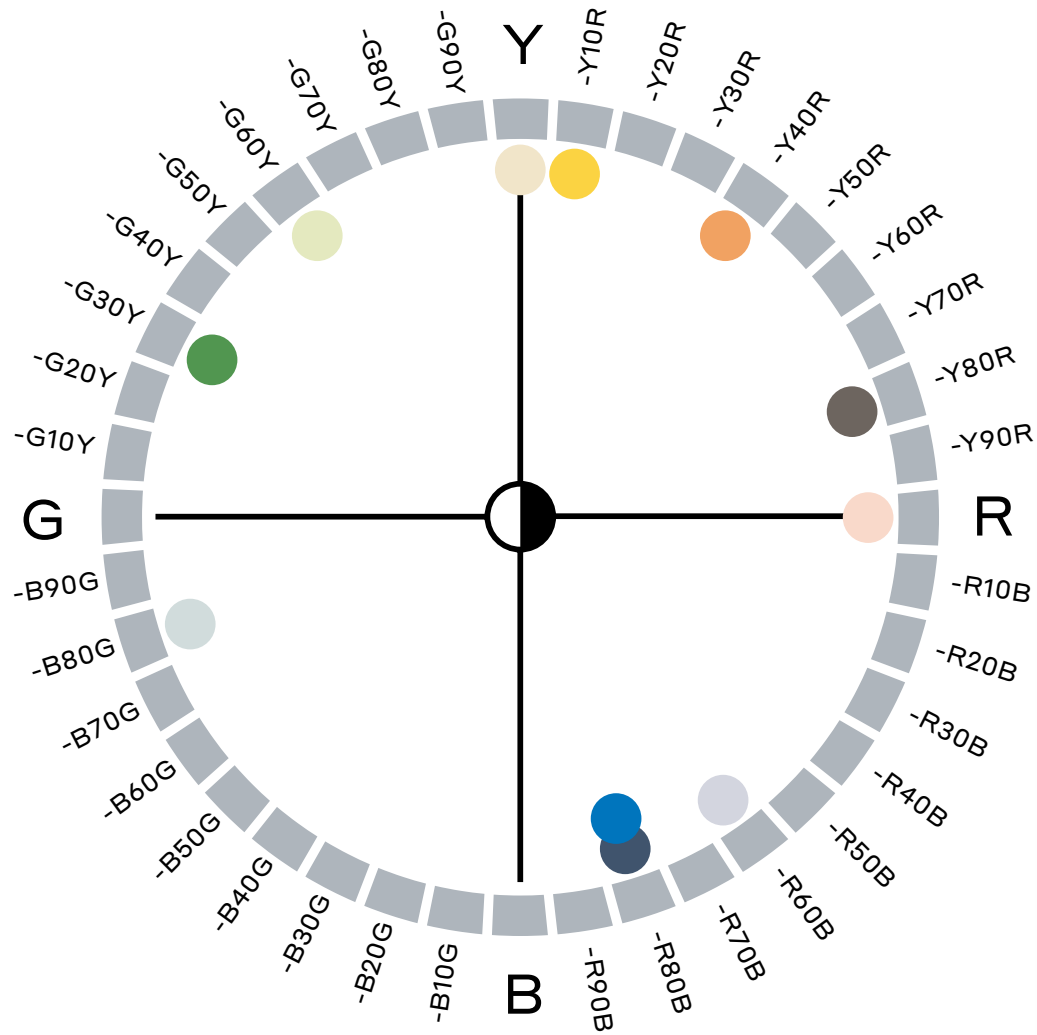
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Left: Creative workshop with students of design at the FAD STU in Bratislava, September 2022

Top: The final palette of colours, suitable for surface colouring of bioplastics



Right: Creative workshop with students of design at the FAD STU in Bratislava, September 2022

Top: The final palette of colors specified in the NCS color system



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