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Nesocodin: A natural red colorant that's easily synthesized

A method to synthesize a novel, natural red colorant that is biodegradable and likely non-toxic.

IP Status: EPO (PCT/US2020/047488) and US Utility Patent applications (#17/636,729) filed

Applications

- Natural food dye
- General biodegradable dye (hair, cosmetics, fabrics, etc.)
- Covalent dye for some polymers (natural and synthetic)
- Detection system for amines
- Fluorescent tag/compound for research

Key Benefits & Differentiators

- **Natural, consumable and biodegradable colorant:** Nesocodin is consumed by vertebrates with no known ill effects, likely due to its natural degradation in the acidic environment of the digestive tract.
- **Scalable synthesis:** Identification of the natural precursors facilitates creation of large quantities in the lab.
- **Ability to design new related compounds:** Precursor analogues have already been used to generate synthetic dyes with novel spectral qualities.

Borrowing from nature's color palette

Driven by growing consumer demand, there is an increasing call for natural pigments and dyes by a variety of industries. To date, much of the effort in obtaining these colors has been placed on how to extract them from nature. However, this approach limits the quality and purity of pigment that's attainable depending on the properties of the source material. One color in nature's palette is found in the red nectar of the flower *Nescodon mauritianus*. Researchers at the University of Minnesota identified the chemical structure of the scarlet (and fluorescent) plant pigment, dubbed "Nesocodin", and determined how to synthesize it in the lab using natural precursors. Not only does this overcome the limitations associated with extracting the color from its natural source, it also introduces the ability to substitute portions of the precursors to make novel related compounds and colors.

Synthesizable and non-toxic

Professors Clay Carter and Adrian Hegeman at UMN found that nesocodin was previously misidentified as an aurone and is in fact an alkaloid . Using organic synthesis, it was shown that the compound can successfully be created in the lab, and using analogues of the precursors will likely lead to the generation of new, synthetic dyes with novel spectral qualities. Furthermore, as nesocodin (in plants) is readily consumed by vertebrates in the wild and is naturally degraded in the acidic environment of the digestive tract, it is unlikely to be toxic. Due to its likely favorable

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safety profile and scalable synthesis, nesocodin would be well suited for development as a dye in the food and beverage industry (among other applications).

Phase of Development

Proof of concept. Demonstrated ability to take known precursors to synthesize nesocodin and related compounds under alkaline conditions.

Researchers

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