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## The synthesis and characterization of a castor oil-based photoinitiator as a sustainable material

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During recent advances in the field of UV coatings and printing inks, researchers have tried to shift from less sustainable processes to more sustainable processes. Talking about sustainability, first and foremost concept that comes to mind is replacement of petrochemical products with biobased products. Traditional photoinitiators (PIs) that are being used could have potential health problems not only for humans but also for biota. The conventional use of photoinitiators (PIs) has raised concerns regarding potential health hazards for both humans and the environment. These PIs pose a risk of migration, especially when incorporated into biomaterials and food packaging, potentially leaching harmful substances into the food products [1, 2]. In biobased products, nature has bestowed us with cellulose, lignin and vegetable oils. Among these, Castor Oil emerges as a naturally occurring polyol with inherent double bonds and carboxylic group functionality. Harnessing these attributes, the focus is on transforming Castor Oil into a biobased product by substituting its -OH group(s) with -SH. This strategic modification not only renders Castor Oil conducive for biobased applications but also introduces the potential for self-initiation, even at room temperature. The innovative approach of utilizing castor oil and a Thioxanthone derivative [3] enables an esterification reaction, producing photoactive castor oil for our subsequent preparation of sustainable photopolymers [4]. This ease of application aligns with the overarching goal of exploring possibilities for curable coatings that balance economic considerations with biobased principles. The intersection of sustainable practices and technological innovation opens new horizons for the synthesis of coatings and inks that not only meet high-performance standards but also contribute to a greener and more environmentally conscious future.

Keywords: Biobased photoinitiator, Thioxanthone, Castor oil

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