Enhancing shellac stability using polyetheramines

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Abstract

Shellac is a unique natural resin derived from the secretion of insects. It is widely used as a preservative coating or a confectionary glaze in the food industry and as an enteric coating in the pharmaceutical industry. Despite the high potential of shellac as an environmentally friendly protective coating, its utilization is still limited due its mechanical brittleness and poor stability caused by self-polymerization reactions. This study introduces a novel strategy for enhancing the mechanical properties and stability of shellac coating through compounding with the biocompatible modifying agents Jeffamine®. The modified coating materials exhibited excellent film forming properties when applied on a variety of surfaces. The new stabilization approach has demonstrated the prevention of the loss of shellac solubility during storage, as well as producing films with superior mechanical properties and thermal stability, over a period equivalent to 18 months, at standard storage conditions. This enhancement is a result of stable amide bonds and acid-base interactions formed between shellac and Jeffamine®, so hindering the self-polymerization which occurs in native shellac and therefore, significantly extending the coating shelf life.

Keywords: shellac; stability; Jeffamine®; polyetheramine