

Suitability for Commercial Utilization of Carnauba and Sugarcane Waxes through Determination of Possible Alterations during an Accelerated Stability Test

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In plants, waxes cover the epidermal cells of fruits, petals and leaves, the cuticle act as a physical barrier against pathogens (i.e., bacteria, yeast, fungi, virus) and environmental conditions (i.e., wind and rain) [1,2]. Hydrocarbons, wax esters, fatty alcohols, ketones, sterols but also triglycerides [1] determine the physicochemical properties of waxes and its commercial applications (i.e. foods, cosmetic, lubricant, coatings, polymers) [2]. However, most of those compounds are unsaturated [3] and therefore prone to autoxidation [4].

This work aims to study the possible alterations during storage of carnauba wax (one of the most widely commercially used) and sugarcane wax (obtained from plant by-products). Samples were placed in an incubator with controlled temperature (50 °C) and humidity (75%) and the physicochemical profile was evaluated by FTIR-ATR, Gas Chromatography-Mass Spectrometry (GC-MS) and Differential Scanning Calorimetry (DSC). Concerning both waxes, fatty alcohols content decreased throughout time from T0 to T3) probably indicating oxidation/decomposition. Such variation was more extensive in carnauba samples. Interestingly, DSC results pointed out that degradation temperature for carnauba was 256.9°C and 228.7°C for Sugarcane wax while activation energy was 241.0 kJ/mol and 67.2 kJ/mol, respectively. Thus, waxes can undergo degradation of fatty alcohols during storage, mainly in carnauba. This seems to be the main feature related to the stability of these waxes.

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