

## Natural Waxes – Perfect Beauty and Care Provided by Mother Nature

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### Introduction

Waxes are a class of chemical compounds that can form at around room temperature. Typically, they are harder, less greasy and more brittle than fats and show extreme resistance to moisture, oxidation and microbial degradation. Characteristically they melt above 45°C, yielding low viscosity liquids. Waxes are insoluble in water but soluble in organic, non-polar solvents. Natural waxes consist mainly of complex mixtures of esters of fatty acids and long chain alcohols and free forms of these molecules, whereas synthetic waxes constitute long-chain hydrocarbons lacking functional groups.

Natural waxes are synthesised biochemically by numerous plants and animals. Those of animal origin typically consist of wax esters derived from a variety of carboxylic acids and fatty alcohols. Those of plant origin additionally contain characteristic mixtures of unesterified hydrocarbons. The chemical composition depends not only on the species but also on the geographic location of the organism. Typically, as a consequence of the fact that these waxes are complex mixtures, naturally produced waxes are softer and melt at lower temperatures than their pure components would.

The most commonly known animal wax is beeswax but other insects also secrete waxes. A major component of beeswax is the ester myricyl palmitate which is an important constituent enabling the construction of the bees' honeycombs. Its melting point is 62-65°C.



Figure 1. Carnauba Palm

Especially in warm climates, plants secrete waxes as a way of controlling evaporation and hydration, essentially to protect against de-hydration. In industry, the most widely used type of wax is carnauba wax, a hard wax obtained from the Brazilian palm *Copernicia prunifera*. This species produces large amounts of wax in order to protect its leaves against dehydration. This so-called epicuticular wax and similar waxes produced by other species are mixtures of substituted long-chain aliphatic hydrocarbons, containing alkanes, fatty acids, primary and secondary alcohols, diols, ketones and aldehydes.

Traditionally waxes are used as a consistency modifier, co-emulsifier and stabiliser, particularly in W/O emulsions. It is also common to thicken and harden oleogels with them, which is a usual practice in the formulation of anhydrous systems such as lip balms and cream blushes or pigment pastes such as lipsticks and mascara.

In the past, many people perceived formulations with waxes as heavy, dull, sometimes sticky and too occlusive. Therefore, in skin care, waxes were primarily used in cold and barrier creams and other rich W/O emulsions. Constant innovation and optimisation in order to obtain more refined and, for the cosmetic industry, better and more widely applicable and acceptable natural waxes has, however, unlocked many doors for the application of natural waxes in skin care and colour cosmetics.

It is now recognised that waxes have gained a much bigger potential. They are very useful because of their virtually innumerable advantageous properties. Besides providing stability, enhancing viscosity and consistency, they form flexible, protective layers and many of them have a superb, light, soft and buttery skin feel.

Amongst others there are four outstanding waxes that need to be highlighted and described.