

New Polyurethanes for Colour Cosmetic Formulations: Baycusan® C

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Abstract

This article discusses the use of a new polyurethane film former, Baycusan® C, and a polyurethane powder, Baycusan® C 1005 in various colour cosmetic formulations. Key properties of both polyurethane products have been investigated and compared to currently used polymer film formers and powders.

Baycusan® C acts as a film former in foundation and mascara formulations, improving long lasting wear and water resistance. It forms a very uniform flexible film on skin. Due to the polymer's unique structure, the after-feel is non-greasy and non tacky. In loose and pressed powders, as well as in liquid foundations, Baycusan® C improves the spreadability of formulations on the skin. It also imparts uniformity of colour coverage and a powdery velvety finish.

Thanks to a unique manufacturing and filling process, the Baycusan® C products are environmentally and skin friendly. They are free of monomers and co-solvents such as alcohols, N-methylpyrrolidone or other cross-contaminants. Baycusan® C products are supplied preservatives-free.

Introduction

Numerous polymeric materials are used in colour cosmetic formulations as film formers, sensory additives, thickener etc. The discussion in this article will focus only on a liquid film forming polymer and a sensory additive in a powder form. Colour cosmetic chemists typically use a film former as a main ingredient in makeup formulations to improve water or oil resistance, transfer resistance and durability (long lasting properties) of the product. Two film forming technologies are primarily known to offer some of these properties: film formers based on polyvinylpyrrolidone (VP/Eicosene copolymer, VP/hexadecane copolymer) or carboxylated resins (acrylate copolymer, acrylate/acrylamide copolymer).

Whilst providing long wear and water resistance, these polymers classes still show some disadvantages:

- Carboxylated resins and vinyl pyrrolidone impart a tacky skin feeling to formulations.
- The mechanical properties of polymer film formed on skin or eyelashes are difficult to control. In the most cases, these polymers form brittle film or they can not form a continuous film at all.

Nylon, crosslinked polymethylmethacrylate, modified starch, boron nitride and silica technologies are examples of powders that are currently offered to the market. These sensory additives impart a range of sensory attributes to face and eye makeup products, such as liquid foundation, loose and pressed powders.

Current colour cosmetic trends reflect consumers' need for cosmetic products having comfortable natural feeling on the skin (i.e. non tacky skin feeling, no tightening effect on skin) with long-lasting wear properties. To address this demand, we have developed two new products based on polyurethane chemistry for colour cosmetic formulations: Baycusan® C 1000 as a new film former and Baycusan® C 1005 as a sensory additive. The efficacy of these products in various colour cosmetic formulations will be demonstrated in this article.

Chemistry

Baycusan® C 1000 is an aqueous polyurethane dispersion consisting of 40 wt.% polymer (polyurethane) and 60 wt.% water. The stability of the dispersion is ensured by reacting an internal emulsifier into the polyurethane backbone. Segmented structure of Baycusan® C 1000 is responsible for the mechanical properties of the polymer film. In fact, it is a linear copolymer consisting of crystalline segments formed by low molecular weight aliphatic diisocyanate and solubilizing agent referred to as "hard block" and of amorphous rubbery segments formed by high molecular weight polyols, so called "soft blocks".