New, Natural-based Quaternary Conditioners for Personal Care Applications

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Abstract

Intensive research and development efforts were conducted for the introduction of new products that are natural, from sustainable raw materials, and that display improved toxicity relative to commonly used ingredients.

One of our first efforts in this area has led to a group of cationic products with broad application. We have created quaternary compounds that bring all of the quat-type benefits to a formulation: namely substantivity to skin and hair, and some anti-microbial benefits. But unlike the standard quaternary products (Cetrimonium chloride – CTAC, Quaterniums) the products described in this article our products avoid all of the negatives. They don't interfere with the viscosity of the formulators' product, they don't affect the color in a negative way, they don't add irritation to formulations, and they don't suppress the foam.

These new products, based on alkyl polyglucoside starting materials, show much less toxicity than standard quaternary products. The results indicate that these products are especially useful as conditioners in personal care products such as shampoos, conditioners, and body washes.

Introduction

We have been conducting research and development efforts toward the invention of new and improved cationic surfactants, useful as conditioners in a variety of personal care products.

There are numerous conditioners in the marketplace for personal care products, but most of these quaternium-type products have serious deficiencies. Most commercial products that claim to have conditioning effects in shampoo or conditioning formulations, have one or more deleterious effects on the overall formulation. These negative effects include reduction of viscosity and decrease in foaming, among others. In addition, the potential for irritation to human skin or eyes can be very substantial for many of these products.

The products that are the subject of this paper overcome many of these effects. These quaternium products are based on alkyl polyglucoside (APG) precursors, and retain much of the properties of these versatile nonionic surfactants. When the APG molecules are derivatized with lauryl or stearyl dimethylquat groups, the resultant cationic products have good foaming, solubility and viscosity properties.

The APG precursors bring many positive attributes to these products. They are based on renewable raw materials. They are extremely mild. They are readily biodegradable and are safe for the environment. They are viscosity enhancers. They have good cleansing power. They modify rheology in positive ways. They have substantivity to the hair. They are stable over a wide pH range.

However, once the APG has been derivatized into a cationic surfactant, many of these attributes are dramatically enhanced. The foam properties are improved, they have even less irritation and their solubility is greatly enhanced.

The viscosity response in a standard shampoo formulation is much more favourable than when using traditional quat conditioners. The toxicity profiles of the Suga®Quat products are much improved compared to CTAC or Benzalkonium chloride (BAC). In addition, these products are biodegradable, and are produced from renewable, natural plant sources.