

PRODUCT DEVELOPMENT AND PRODUCT CHEMISTRY

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Ingredient selection and good synthesis practice are good starting points for any product development; it is usually seen as the most important stage of any product development. There are several stages that one has to overcome in order to put together the right template for product development. We will try to discuss the importance of ingredient selection and knowledge of application. The use of key ingredients such as EO and PO in product synthesis, their role in the overall performances of emulsion formation and how they can influence active ingredient delivery; The role of EO/ PO in irritation reduction in an emulsion and the delivery of Lipophylic and Hydrophylic actives. We will examine the nature of reaction and importance of these materials. Irritation is one key item that is constantly dealt with by cosmetic chemist developing relaxer formulae. This discussion will throw some light into minimizing relaxer emulsion irritation.

EO and PO

Ethylene Oxide



Propylene Oxide



Fatty alcohols are seen as essential structuring agents and viscosity builders. They also do well in other areas of conditioning. We will examine the role of fatty alcohols and their ethoxylates in emulsion formulation. Finally, we will look at active ingredients and their base interaction. Esters and other essential oils will be discussed in relaxers.

Fatty Alcohol and Ethoxylation.

R-OH and R-OH + EO

Fatty Alcohol and Propoxylation

R-OH and R-OH + PO

The use of essential oils as conditioning agents in place of quaternary ammonium compound. This is an interesting experiment that has been documented in several reports and publication. In a recent lab work that was conducted under a high school science project by Yvonne Obukowho and I as a mentor, we set out to explore the benefit of using natural oils as the only source of conditioning for the hair. The experiment was carried out in Croda Lab using SEM and Contact Angle Analyzer as the instrument to measure conditioning. Other works that have been published have measured levels of protein to determine damage.

Experiment: The use of essential oils such as coconut oil in place of quaternary ammonium compound in cream rinse conditioner.

Materials: Curly wavy damaged hair, SEM, Contact Angle Analyzer and Lye relaxer.

Method: Hair tresses of about 5.0gms each were prepared and treated with a Lye relaxer for 15mins. The hair tresses were then rinsed with tap water and towel dry. The cream rinse conditioner with 10% coconut oil was applied and was rinsed out after 5mins. No shampooing was done because we do not want to compromise the effect of the essential oil. This experiment was described as experimental A. Experimental B was done in the same format without the use of coconut oil. All method of product application and timing was the same.

Observation: We initially conduct a contact angle experiment on strands of hair before treatment to establish the degree of dryness. All hair tresses show a very high level of dryness. We then proceeded to do combing force experiment; the results also show difficulties in combing. The second phase of the experiment with sample A and B gave totally different results. Sample A has improved contact angle which is an indication of hydrophobicity and sample B was slightly better than the original tresses with no treatment; an indication of less cuticle coating. The results of the combing force reduction as showed favorably with sample A with the 10% coconut oil in the cream rinse conditioner.

Conclusion: This is a confirmation of the fact that other essential materials such as oils and esters could be use to improve the conditioning of the hair with out the use of quaternary ammonium compound. This presentation will site other examples and the need to understand roles of other ingredients in product formulation. We will also look at ingredients and their ethoxylates and how this can be beneficial to the overall performances of our products.

Ref: Effect of Coconut Oil On Hair Damage by AARTIS RELE; Journal of Cosmetic Science March/April 2003.

Ester Formation

