



# INTERNATIONAL Convention on Colorants - 2007



## ABSTRACT

## Session 1: Paper 2 INNOVATION IN HAIR DYES CHEMISTRY Jean-Marie Adam

Hair dye is one of the oldest known beauty preparations, and was used by ancient cultures in many parts of the world. Records of ancient Egyptians, Greeks, Hebrews, Persians, Chinese, and early Hindu people all mention the use of hair colorings. Early hair dyes were made from plants (Henna, Indigo, Chamomile), metallic compounds (copper, iron, lead derivatives), or a mixture of the two. Preparations such as these were the only hair dyes available until the late nineteenth century. The main breakthrough in hair coloring was made by E. Schueller who developed the first safe commercial hair dye based on oxidation dyes.

Modern hair dye products are synthetic organic molecules which may be divided into three categories, i.e., permanent, semi-permanent and temporary hair colors. Temporary hair colorants do not penetrate the hair shaft itself, these dyes remain adsorbed to the follicle and can be easily removed with a single shampoo. Semi-permanent hair dyes are smaller molecules which are therefore able to penetrate the hair shaft. They also last longer than temporary hair colors, keeping intact up to 8-14 shampoos. Permanent hair dyes penetrate deeply into the hair shaft and don't wash out. The dyes are produced inside the hairs from colorless precursors by oxidation with hydrogen peroxide in alkaline solution. Only with these dyes can all the requirements, such as adequate color range, masking of white hair, and permanence, be satisfied.

An important innovation in the segment of semi-permanent hair colors occurred few years ago with delocalised cationic dyes which give brighter, more vibrant shades such as citrus yellow, orange and ruby, that was difficult to achieve with classical semi-permanent and permanent hair colour. However semi-permanent hair colour products hold a lesser market than permanent agents, and therefore several attempts are made to improve the permanency of these vibrant colours.

This presentation gives an overview on interesting recent works aiming at making vibrant colours more permanent. Different approaches will be presented such as more substantive delocalised dyes and reactive delocalised dyes as well as several alternatives to oxidation dyes based on other principle than p-phenylenediamine and peroxide.

Jean-Marie Adam completed his education at Ecole Nationale Supérieure de Chimie, University of Montpellier (France). He is a Chemical Engineer & Master of Science, with a Ph.D., having done his thesis on the subject of "Microbiological Hydroxylation of Indole Alkaloids." His career includes a stint as R & D Chemist, Ciba-Geigy, where he worked on Acid and disperse anthraquinone dyes, and as a Research Manager, Ciba-Geigy, successively in charge of acid dyes for wool and polyamide, cationic dyes for paper and basic research on dyestuff chemistry. He worked on special projects for 3 years, where he was Head of textile stabilizers research and then Head of wool and polyamide research. He retired in 2005 as Head-Technology Center, Electronic Materials, where had a Worldwide responsibility for R&D activities in Japan, India, USA, Basel. Since 2006, he has been a consultant for R&D chemical projects in the field of Dyes, pigments & advanced chemicals. He has more than 100 patents and 10 scientific publications to his credit.

