

Dr. Ratan Chaudhuri's Biography

Dr. Ratan Chaudhuri is Director, Cosmetics Research & Applications at EMD Chemicals, Inc., an affiliate of Merck KGaA, Darmstadt, Germany. Prior to joining EMD in 1996, Dr. Chaudhuri has worked at International Specialty Products (ISP) for eleven years. Dr. Chaudhuri has been educated in the United States (University of Wisconsin, Madison), Switzerland (Swiss Federal Institute, Zurich), Germany (University of Bonn, Bonn) and India (Banaras Hindu University, Varanasi). He has been cited in the Marquis Who's Who in Science & Engineering®, America's Registry of Outstanding Professionals, and International Who's Who of Professionals™. Dr. Chaudhuri was a recipient of Alexander von Humboldt (Germany) and Dorenkamp (Switzerland) fellowships. Dr. Chaudhuri has been a frequent speaker at the national and international scientific meetings.

Dr. Chaudhuri has sixty one US patents and well over four hundred foreign patents. He has published over seventy scientific papers and written several book chapter articles. Dr. Chaudhuri also contributes a column on the "Cosmetic Science" in the Soap, Perfumery & Cosmetics magazine, UK. Dr. Chaudhuri has been credited with being instrumental in conceptualizing & commercializing several key new products for Personal Care, Pharmaceutical, Agricultural and Industrial markets while at ISP and Merck KGaA organizations.

Dr. Chaudhuri's current research includes developing evidence-based skin care products of plant origin, designing new molecules for skin and hair care and developing new application systems for sunscreens, anti-aging, skin lightening and color cosmetic products.

An Overview of Antioxidants Combined with a Look at the Future of Skin Care Products with Antioxidants

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Although reactive oxygen species (ROS) are part of normal regulatory circuits and the cellular redox state is tightly controlled by antioxidants, increase ROS load and loss of cellular redox homeostasis can promote photo-aging and carcinogenesis. Elastin accumulation and collagen degradation are prominent hallmarks in photodamaged skin. ROS play a key role in collagen metabolism. They not only directly destroy interstitial collagen, but also inactivate tissue inhibitors of metalloproteases and induce the synthesis and activation of matrix-degrading metalloproteases. UV-A radiation of human skin cells induces release of iron, a known contributor to free radical reactions. The presence of this free iron may cause even more deleterious oxidative reactions in already damaged skin.

The purpose of using antioxidants is to quench ROS. In choosing skin care products, do we really look at how stable (hydrolytic and photolytic) these antioxidants are? Antioxidants can also act as pro-oxidant. Do we really look at why antioxidants act as pro-oxidants? ROS also induces production of matrix metalloprotease (MMPs). The damage caused by excessive MMP on the ECM (extracellular matrix) proteins does not appear overnight, but results from the accumulation of successive molecular damages, especially in the case of overexposure to UV light. Do we really formulate our products selecting the right MMP inhibitors?

Sunscreens would also be necessary for such skin care products. A broad-spectrum sunscreen, i.e., one that offers coverage over both UV-B and UV-A areas, needs to be included in skin care products. Do we critically look at the photostability of organic sunscreens or the photoreactivity of inorganic sunscreens? Consumers who are unaware of this may tend to stay in the sun longer, because of the false perception of having "protected skin;" in reality, we are damaging our skin more, which results in enhancing the aging process with a possibility of having skin cancer.

To sum up: what is really needed to create true anti-aging products? We need to have ingredient(s) having a quencher for ROS, a chelator for iron and copper, and an inhibitor for matrix metalloprotease enzymes, along with photostable broad-spectrum sunscreens with SPF of about 15.