

Cosmetic Science and Technology Series

Volume 30

Cosmetic Formulation of Skin Care Products

edited by
Zoe Diana Draelos
Lauren A. Thaman

Cosmetic Formulation of Skin Care Products

COSMETIC SCIENCE AND TECHNOLOGY

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Cosmetic Formulation of Skin Care Products

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About the Series

The Cosmetic Science and Technology series was conceived to permit discussion of a broad range of current knowledge and theories of cosmetic science and technology. The series is composed of books written by either one or two authors or edited volumes with a number of contributors. Authorities from industry, academia, and the government participate in writing these books.

The aim of the series is to cover the many facets of cosmetic science and technology. Topics are drawn from a wide spectrum of disciplines ranging from chemistry, physics, biochemistry and dermatology to consumer evaluations, safety issues, efficacy, toxicity and regulatory questions. Organic, inorganic, physical, analytical and polymer chemistry, microbiology, emulsion and lipid technology all play important roles in cosmetic science.

There is little commonality in the scientific methods, processes and formulations required for the wide variety of toiletries and cosmetics in the market. Products range from hair, skin, and oral care products to lipsticks, nail polishes, deodorants, body powders and aerosols, to cosmeceuticals which are quasi-pharmaceutical over-the-counter products such as antiperspirants, dandruff shampoos, wrinkle reducers, antimicrobial soaps, acne treatments, or sun screen products.

Emphasis in the Cosmetic Science and Technology series is placed on reporting the current status of cosmetic science and technology, the ever-changing regulatory climate, and historical reviews. The series has now grown to 30 books dealing with the constantly changing trends in the cosmetic industry, including globalization. Several of the books have been translated into Japanese and Chinese. Contributions range from highly sophisticated and scientific treaties to primers and presentations of practical applications. Authors are encouraged to present their own concepts as well as established theories. Contributors have been asked not to shy away from fields that are in a state of transition or somewhat controversial, and not to hesitate to present detailed discussions of their own work. Altogether, we intend to develop in this series a collection of critical surveys and ideas covering the diverse phases of the cosmetic industry.

The thirtieth book in this series, *Cosmetic Formulation of Skin Care Products* edited by Zoe Diana Draelos, MD and Lauren Thaman, MS comprises 22 chapters authored or co-authored by over 30 experts in the field. The development of cosmetics and toiletries represents a highly diversified field involving many subsections of science and “art.” It covers the discovery of novel raw materials, development and manufacture of unique formulations, ever more sophisticated testing methods particularly in the areas of safety, clinical and performance efficacy evaluations, and claim substantiation. But even in these days of high technology and ever increasing scientific sophistication, art and intuition continue to play an important part in the development of formulations, their evaluation,

selection of raw materials, and, perhaps most importantly, the successful marketing of new products. Aesthetic considerations, such as fragrance, color, packaging and product positioning often can be as important to the success of a new cosmetic product as delivering the promised (implied) performance or the use of a new magic ingredient.

The application of more sophisticated methodologies to the evaluation of cosmetics that began in the 1980s has continued and has greatly impacted such areas as claim substantiation, safety and efficacy testing, product evaluations and testing, development of new raw materials, such as biotechnology products, for example products produced by microorganisms where genes are modified by recombinant DNA technologies. But regardless how great the science and the medical proofs behind a new product, bad or just indifferent aesthetics can hurt the performance in the marketplace.

New cosmetic formulations usually are the result of systematic development programs sponsored by corporations and carried out either in their own laboratories or by sponsored programs in cooperation with consulting laboratories. Their development involves individuals with diverse backgrounds, experience, and objectives. Though multi-tasking has become a favorite buzzword, there are obvious limitations. Top management and marketing and advertising executives identify areas of new product development that were either developed internally or brought to their attention by various outside sources. This sometimes leads to a push for extravagant claims that might require the repeal of one or more laws of nature. The product development chemists (formulators) in the laboratory are then charged with meeting the performance objectives and product parameters set by management. In addition, they have to be concerned with a host of considerations, ranging from safety issues, global regulations, raw material cost and availability, awareness of the competitive climate, patent status, adequate preservation, stability and compatibility issues, product scale-up and production problems, to cosmetic elegance considerations, such as fragrance selection, color, and packaging. Finally, there is the medical fraternity, often dermatologists, devising and supervising efficacy and safety tests concerned with the performance of the products. This can be a key activity particularly with cosmeceuticals and other products making clinical claims that need substantiation and scientific credibility.

When looking at the total process of developing and commercializing a new cosmetic product, there are a number of stakeholders: top management, marketing and sales, R&D and operations, academic support groups, and consultants. These groups may have quite different philosophical approaches and goals. While all share a common goal of coming up with a commercially successful product, there are often real differences in how the various groups view or perceive the project. Some are clearly business-driven; others are science-driven.

This book tries to bridge some of these differences. Business-driven activities include top management's desire to have the product in the market place with good customer acceptance, a strong business plan and strategy, and good profit margins; involvement in the details on how this is achieved is secondary. To quote a speaker (Harvey Gedeon, Estee Lauder Companies) at the 2005 Annual meeting of Society of Cosmetic Chemists, "Management expects us to create low-cost breakthrough products that are the best-in-category." Marketing and sales are concerned with developing the marketing strategies and coordinating and directing the management of the new product or brand. Science-driven activities predominate in the laboratory. The formulators and the clinical workers attacking the various technical problems will be intrigued by the use of new chemicals, clever processing techniques, patentability and new testing techniques, often involving expensive new and intriguing new technical tools to solve the technical challenges presented by the project. Sometimes too many technical

tangents can delay the timely resolution of new product development projects. Building a good communication bridge between the business and different science-driven groups is the key to the success of a new cosmetic product.

I want to thank all the contributors and the editors, Zoe Diana Draelos, MD and Lauren Thaman, MS for participating in the Cosmetic Science and Technology series and the Informa Healthcare organization, particularly Sandra Beberman, with whom I have worked since the inception of this series twenty-five years ago, for their support and help.

Eric Jungermann, PhD

*I dedicate this book to my two sons, Mark and Matthew,
who constantly challenge me to see the world in new fresh ways!*

Zoe Diana Draelos

*I dedicate this book to my many P&G colleagues
who consistently demand and force me to think what's next.*

Lauren Thaman

Preface

Cosmetic formulation is becoming increasingly complex given the challenges of formulating for a technologically sophisticated consumer. This text is designed to meet the needs of the cosmetic chemist, scientist, dermatologist and formulator who must understand a wide range of issues to create successful, novel skin care products for a diverse population. To accomplish this end, the text is divided into the key knowledge areas of cutaneous formulation issues, formulation development, raw materials and active ingredients, and product testing, efficacy, and clinical assessment. The section on cutaneous formulation deals with the unique aspects of formulating for specific body areas, such as the face, eyelids, lips, hands, underarms, etc., while discussing the needs of special populations, such as individuals with sensitive skin, rosacea, atopic dermatitis, etc. Issues specific to both genders and all skin color types are presented. This initial section presents the framework necessary to design products that successfully perform in body areas with unique anatomic considerations while considering gender and ethnic differences.

The text continues by delving into formulation development by product category: cleansers, moisturizers, toners, antiperspirants, and sunscreens. This allows the reader to take the information learned in section one regarding unique anatomic needs and create skin care products by employing state-of-the-art formulation chemistry. However, the skin care industry has moved beyond basic skin maintenance product categories into actives designed to deliver skin-enhancing benefits. These areas of skin treatment include the realms of acne, photoaging, dyspigmentation, and inflammation. Actives that are important in these areas include salicylic acid, benzoyl peroxide, hydroxy acids, retinoids, vitamins, hydroquinone, antioxidants, botanicals, etc. Understanding the mechanism of action and formulation issues regarding these actives allows the creation of skin care products that deliver benefits into the treatment realm beyond maintenance.

In summary, the text presents diverse knowledge sets from dermatology, cosmetic chemistry, and product formulation. It synthesizes the information into one cohesive unit for practical application by the dermatologist, cosmetic chemist, formulator, or testing facility. Only by understanding all aspects of cosmetic formulation can technology expand the skin care marketplace.

*Zoe Diana Draelos
Lauren A. Thaman*

Contents

About the Series Eric Jungermann *iii*
Preface *ix*
Contributors *xix*

1. Cosmetic Formulation of Skin Care Products **1**
Zoe Diana Draelos
Introduction: How to Utilize This Text 1

PART I: CUTANEOUS FORMULATION ISSUES

2. Cutaneous Formulation Issues **3**
Zoe Diana Draelos
Site-Specific Cutaneous Needs 3
Suggested Readings 26

3. Formulation for Special Populations **27**
Zoe Diana Draelos
Gender 27
Age Issues 28
Skin Color 29
Hair Shaft Architecture 30
Sensitive Skin 31
Contact Dermatitis Issues 32
Acne Issues 34
Summary 34
References 34

PART II: FORMULATION DEVELOPMENT AND APPLICATION

4. Personal Cleansing Products: Properties and Use **35**
Keith Ertel
Introduction 35

Skin Cleansing	35
Personal Cleanser Effects on Skin	40
Some Practical Considerations When Choosing a Personal Cleanser	54
References	59
5. Toners and Astringents	67
<i>Melanie Smith</i>	
Introduction	67
Product Nomenclature	67
Function and Order of Application Within a Skin Care Regimen	68
Formulation Considerations	68
Product Claims	73
Claims Testing Methods	74
Uses in Dermatology	74
Adverse Reactions	75
Summary	75
References	76
6. The Dry Skin Cycle	79
<i>Paul J. Matts and Anthony V. Rawlings</i>	
Introduction	79
Stratum Corneum and Epidermal Structure	80
Stratum Corneum Lipid Chemistry and Biophysics	81
Stratum Corneum Corneodesmosomes and Corneodesmolysis	84
Corneocyte Envelope Maturation and the Role of Transglutaminases	87
Stratum Corneum Natural Moisturizing Factors (NMF)	89
The Effect of Humidity on Epidermal Differentiation and Stratum Corneum Quality	92
The Pathophysiology of Winter- and Soap-Induced Dry Skin	93
The “Dry Skin Cycle” Model: A New Way to Describe Induction and Propagation of the Xerosis	96
Management of Dry Skin	99
Summary and Conclusions	106
References	107
7. Factors Influencing Optimal Skin Care and Product Selection	115
<i>James Q. Del Rosso</i>	
Basic Skin Care Processes	115
The Epidermal Barrier and Water Content	116
Epidermal Barrier Integrity, Function, and Repair	117
Impact of Exogenous Moisturization on Barrier Repair	117
Clinical Implications of Exogenous Moisturization	117

Components of Moisturizer Formulations 118
 Balancing Effects and Cosmetic Elegance of
 Product Components 118
 Formulation Characteristics 119
 Special Additives and Ingredients 119
 The Significance of Gentle Skin Cleansing 120
 Basic Cleanser Formulations 120
 Conclusion 120
 References 121

8. Antiperspirants 123
John E. Wild, A. C. Lanzalaco, and D. F. Swaile
 Introduction 123
 Antiperspirants 124
 Antiperspirant Efficacy 126
 Formulation 128
 Formulating for the Consumer 131
 Introducing New Antiperspirant Active Formulations 131
 Medical Approaches to Hyperhidrosis 131
 References 134

PART III: ACTIVE INGREDIENTS FOR SKIN TREATMENT

9. Sunscreens 135
J. F. Nash and Paul R. Tanner
 Introduction 135
 Sunscreens 136
 Self-Tanning Products 141
 Formulation Challenges 143
 Regulatory Issues 144
 Safe Sun Strategy 145
 Conclusions 148
 References 149

10. Photoprotection and the Prevention of Photocarcinogenesis 153
Nathalie Nguyen and Darrell S. Rigel
 Overview 153
 Relationship of UV Exposure to Skin Cancer Development 154
 Spectral Differences Related to UV Photocarcinogenesis 155
 Photocarcinogenesis-Decreasing Photoprotection
 Modalities 155
 Sunscreens 156
 Types of Sunscreens and Mechanisms of Action 156
 Chemical Sunscreens 157
 Physical Sunscreens 159
 Photocarcinogenesis Reduction by Wearing Clothing 159

Behavior Modification	160
Effectiveness of Photoprotection	160
Photoprotection and Vitamin D	160
Patient Recommendations and Future Directions	161
References	162
11. Anti-aging Skin Care Formulations	167
<i>Donald L. Bissett</i>	
Introduction	167
Vitamin A	167
Vitamin B3	170
Vitamin C	174
Peptides	176
Dimethylaminoethanol (DMAE)	178
Kinetin (N ₆ -Furfuryladenine)	179
Triterpenoids	180
Ubiquinone (Co-Enzyme Q10)	181
Other Technologies	181
Discussion	181
References	183
12. The Role of Cosmeceuticals in Dermatology	187
<i>David H. McDaniel, Joseph DiNardo, and Joseph Lewis</i>	
What Are “Cosmeceuticals”—Cosmetics vs. RX Drugs	187
Domestic and International Regulatory Guidelines	
Impacting Cosmetics	191
Categories of Currently Popular Cosmeceuticals	
in Dermatology	192
How to Select the “Best” Formulation of a Cosmeceutical	199
The Future of Cosmeceuticals	200
References	202
13. Skin Lightening Agents	205
<i>Wen-Yuan Zhu and Ru-Zhi Zhang</i>	
Tyrosinase Inhibition	205
Product Reduction and Reactive Oxygen Species	209
Inhibition of Melanosome Transfer	211
Skin Turnover Acceleration	212
Traditional Chinese Medicine	213
References	215
14. Medical and Surgical Approaches to Skin Lightening	219
<i>Marta I. Rendon and Jorge I. Gaviria</i>	
Introduction	219
Topical Depigmenting Agents	221
Phenolic Depigmenting Agents	221
Non-Phenolic Agents	224

Topical Cosmeceuticals 225
 Botanicals 226
 Physical Therapies 226
 Chemical Peels 227
 Microdermabrasion 228
 Dermabrasion 228
 Lasers 228
 Our Therapeutic Approach 230
 Conclusions 231
 References 232

15. Topical Exfoliation—Clinical Effects and Formulating 237
Considerations 237
M. Elizabeth Briden and Barbara A. Green
 Exfoliation 237
 Physical Exfoliants: Scratching the Surface 238
 Chemical Exfoliation 239
 Conclusion 247
 References 247

16. Over-the-Counter Acne Medications 251
Theresa Chen and Yohini Appa
 Introduction 251
 Clinical Considerations 252
 Highlights of Over-the-Counter Acne Monograph 253
 Formulation of Over-the-Counter Acne Products 253
 Trends in Over-the-Counter Acne Formulations 254
 Advances in Over-the-Counter Acne Formulations 255
 Summary 267
 References 268

17. Acne Treatment Methodologies 273
Emmy M. Fernandez, Andrea L. Zaenglein, and Diane M. Thiboutot
 Introduction 273
 Morphology 276
 Topical Retinoid 276
 Cleansers 279
 Hydroxy Acids 279
 Benzoyl Peroxide 281
 Other Topical Treatments 281
 Oral Antibiotics 281
 Hormonal Therapy 286
 Isotretinoin 287
 Manual Treatments 290
 Phototherapy 291
 References 292

- 18. Topical Botanicals** 297
Tracy Cornuelle and Jan Lephart
Introduction 297
Selecting Plant Species 298
Sourcing Plant Material 298
Accurate Identification of Plant Species 299
Harvesting Plant Material 299
Cosmetic Extracts 300
Standardization of Extracts 302
Quality Issues 303
Safety and Toxicology 304
Conclusions 305
References 305
- 19. Herbs in Cosmeceuticals: Are They Safe and Effective?** 309
Carl Thornfeldt
Background 309
Processing Botanicals 310
Regulatory Climate 311
Adverse Reactions 311
Specific Herbs 328
Summary 347
References 347
- 20. Topical Anti-inflammatories** 351
Bryan B. Fuller and Dustin R. Smith
Introduction 351
Biology of Skin Inflammation 351
Prescription and Over-the-Counter Treatments for Inflammation and
Mechanism of Action 353
Anti-inflammatory Cosmeceutical “Actives” 361
Biological Screening Assays to Identify Novel
Anti-inflammatory Compounds 363
Development of Effective Topical Formulations 368
Conclusions 373
References 373
- 21. Topical Nutritional Antioxidants** 377
Karen E. Burke
Introduction 377
Vitamin C 377
Vitamin E 379
Selenium 384
New Combinations of Antioxidants 386
Soy Extract: Genistein 387
Alpha-Lipoic Acid 390

Ubiquinone 394
Summary 395
References 396

22. What Is Next in Skin Care Cosmetic Products? 403

Lauren A. Thaman

Cosmeceuticals 403
Nutraceuticals 405
Medical Mimics 405
Customized Products 406
Skin Tone Alteration 406
Delivery Systems 407
New Users 407
The Skin Care Market 407
References 408

Index 409

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