Received: 20 August 2023 | Accepted: 17 April 2024

DOI: 10.1111/jdv.20145

JEADV JOURNAL OF THE EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

ORIGINAL ARTICLE

International expert consensus recommendations for the use of dermocosmetics in acne

Diane Thiboutot[1] | **Alison M. Layton**[2] | **Ibrahima Traore**[3] | **Gabriel Gontijo**[4] | **Patricia Troielli**[5] | **Qiang Ju**[6] | **Ichiro Kurokawa**[7] | **Brigitte Dreno**[8]

[1]Milton S. Hershey Medical Center, Penn State College of Medicine, Hershey, Pennsylvania, USA

[2]Skin Research Centre, Hull York Medical School, University of York, York, UK

[3]Dermatology Clinic, Conakry Region, Guinea

[4]Dermatology Clinic, Belo Horizonte, Minas Gerais, Brazil

[5]Department of Dermatology, University of Buenos Aires, Buenos Aires, Argentina

[6]Department of Dermatology, Renji Hospital, School of Medicine, Shanghai Jiaotong University, Shanghai, China

[7]Department of Dermatology, Meiwa Hospital, Meiwa, Japan

[8]Nantes Université, INSERM, CNRS, Immunology and New Concepts in ImmunoTherapy, INCIT, UMR 1302/EMR6001, Nantes, France

Correspondence
Brigitte Dreno, Nantes Université, INSERM, CNRS, Immunology and New Concepts in ImmunoTherapy, INCIT, UMR 1302/EMR6001, F-44000 Nantes, France.
Email: brigitte.dreno@atlanmed.fr

Funding information
L'Oreal Dermatological Beauty; La Roche-Posay Laboratoire

Abstract

Background: A wide variety of dermocosmetics (products with both active skincare and cosmetic activity) are available for the management of acne vulgaris. These products are important because they may be the first line of approach for patients desiring to self-treat and they can also have beneficial effects—reducing lesion counts and improving global acne severity. When used in conjunction with medical therapy, dermocosmetics can improve tolerability and enhance results. We reviewed available evidence and combined it with our clinical experience to help guide clinicians in selecting skincare products with acne-targeting ingredients.

Methods: An international panel of dermatologists with an interest and expertise in managing acne performed a literature review, formulated clinical questions related to the role of dermocosmetics in the acne setting, used a modified GRADE approach to evaluate available evidence and then utilized an online iterative Delphi process to create consensus recommendations. It should be noted that due to the limited number of available studies, the category of dermocosmetics was evaluated rather than specific ingredients.

Results: The quality of evidence was found to be low to moderate. Key recommendations were made based on available evidence for the use of dermocosmetics in acne to improve acne global assessment, reduce acne lesion counts, reduce superficial skin oiliness and serve as maintenance therapy after medical treatment, while providing a good tolerability. Recommendations were also made for using dermocosmetics as adjuncts to medical treatment.

Conclusions: While there is a need for better quality evidence, dermocosmetics have demonstrated some benefit for acne both when used alone in its milder clinical presentations or in maintenance post acne medication and as adjunct to acne treatments.

INTRODUCTION

Acne vulgaris is very common around the world, and while efficacious treatments are available, clinicians and patients alike are continuously searching for ways to improve acne management and prevent relapse. Acne has a significant burden of disease and impact on quality of life and mental wellness (self-esteem and stigmatization), which do not directly correlate with the severity of disease.[1–5] Skincare—including basic routines and use of dermocosmetics—can have an important role in management of acne.

Basic skincare

Studies indicate that acne is accompanied by altered barrier function and microbiome dysbiosis.[6] Basic dermocosmetics for all acne patients include acne skin appropriate cleansers, moisturizers and sunscreens; as much as possible, dermocosmetics should address both barrier dysfunction and dysbiosis. Cleansers have been shown to improve outcomes, tolerability and support the health of the skin barrier. Cleansers should remove dirt and sebum but maintain lipids and skin moisture.[7–9] The optimal pH of skin is between 4.7

and 5.75, and it is important for cleansers to have a pH in that range.[10] A pH that is too high or too low can compromise the skin's barrier function and can lead to dry or sensitive skin.[8] Traditional soaps have a pH in the range of 10–11, and should be avoided; synthetic detergents and lipid-free cleansers are preferred.[7] In addition, cleansers can affect skin microbial communities, and skincare products should be selected to maintain a healthy diversity in the microbiome, potentially including pre- or post-biotic ingredients.[11,12] Moisturizers also have shown benefit in acne and acne-prone skin, both alone (as maintenance and in mild forms of acne) and as adjunct to medical therapy. Sunscreens should be utilized as appropriate for the season and climate, and are important to prevent post inflammatory hyperpigmentation, especially in darker skin phototypes. Readers may also wish to consult the National Institute for Health and Care Excellence (NICE) guideline titled 'Skin Care Advice', which can be accessed at: https://www.nice.org.uk/guidance/ng198; https://www.nice.org.uk/guidance/ng198/evidence/b-skin-care-advice-for-people-with-acne-vulgaris-pdf-9144159950.

Dermocosmetics

The term dermocosmetics describes a range of products that can have both active skincare and cosmetic value.[13] Although there is no standardized definition, dermocosmetics (or cosmeceuticals) can be considered skincare products that are clinically tested with dermatologically active ingredients shown to have effectiveness in vitro or in vivo. These products directly support or care for symptoms of various skin conditions in a fashion that does not occur from use of their vehicles alone.[13,14] An international survey has shown a link between improved adherence to acne therapy and prescriber recommendation of cosmetics.[15] Figure 1 shows the primary ingredients of interest in dermocosmetics for acne and their intended targets available at the time of writing.

This publication is based on literature review and consensus of an expert panel of dermatologists with interest and expertise in dermocosmetics and acne management. The information is intended to guide clinical practice and augment information that is available in guidelines for use of prescription therapy. Available studies of dermocosmetics do not have the same methodologic rigour as prescription acne studies. In many cases there are smaller sample sizes (no power calculations so underpowered); less rigorous design (e.g. no placebo control); and populations frequently ill-defined in terms of acne severity. Those evaluating dermocosmetic monotherapy included patients with very mild to mild acne (as would be expected for studies that do not include prescription products). Further, there are no standardized grading systems used to allow for comparison across studies. Finally, dermocosmetics often contain several ingredients in different concentrations; therefore it is difficult to attribute the observed clinical

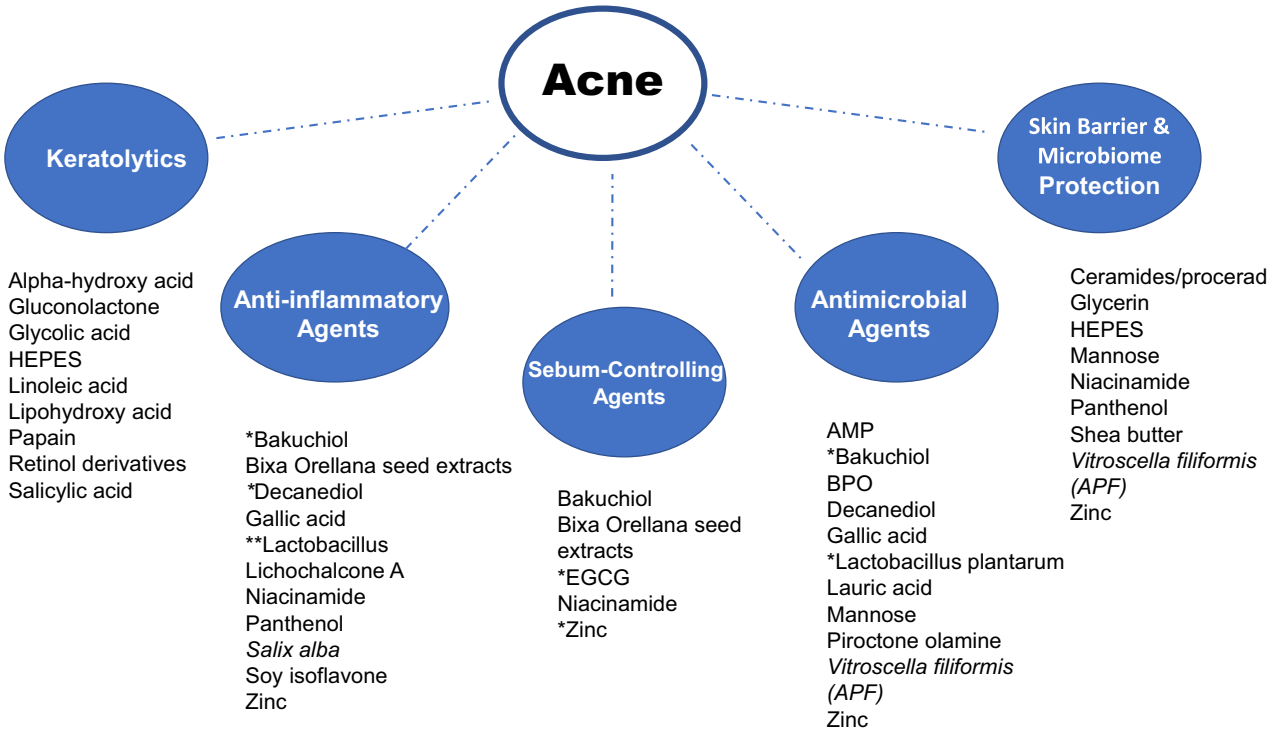

FIGURE 1 Active ingredients for acne in dermocosmetics and their intended targets. Alpha-hydroxy acid, linoleic acid, salix alba, decanediol, lactobacillus, EGCG, Vitroscella filiformis (APF), lactobacillus plantaris, piroctone olamine and shea butter are included as well as ingredients with moisturizing properties that may add benefit for acne patients. In addition, some of these terms were identified independently of the searched terms (e.g. those were mentioned as ingredients along with searched terms). *Additional/secondary action. **Fermented. AMP, antimicrobial peptides; APF, aqua posae filiformis; BPO, benzoyl peroxide; EGCG, epigallocatechin-3-gallate.

effect to a single compound. So it is not possible to estimate whether other products containing some ingredients with a proven efficacy will also be effective. The authors adopted a similar process to the established GRADE evidence assessment for clinical trials but, appreciating the paucity of robust trial methodology in dermocosmetic studies, the chairs and panel modified GRADE with these factors in mind. It was agreed this provided a standardized framework for a consistent evaluation of these studies and some extrapolation of data, trends, and comparisons where possible. The objective of this publication is to provide an overview of the evidence supporting the use of dermocosmetic products in acne along with our panellist's recommendations for incorporating such products into acne management.

METHODS

As an initial step based on ingredients listed in Araviiskaia et al., a PubMed search of relevant terms was conducted, including "acne" plus the following: dermocosmetics, cosmeceutical, salicylic acid, lipohydroxyacid, niacinamide, nicotinamide, zinc, retinol, glycolic acid/phytic acid, lichocalcone, HEPES, licorice, mannose, glycyrrhiza, panthenol, glycerine, bakuchiol, ceramide, cleanser, moisturizer and sunscreen.[16] The search results were then filtered for 'clinical trials' and 'randomized clinical trials'. Then, the studies identified in the search were manually reviewed for inclusion, and the group as a whole reviewed the studies along with the categorization of quality. The criteria used to evaluate suitability were study population, study design and methodology, study intervention, comparator and study outcomes where dermocosmetics were primary focus of investigation. Because of the relative paucity of literature, all studies were included but were separated by methodology. Detailed description of the steps taken in the search and Delphi process are provided in Appendix S1 and Figures S1–S3.

A live meeting of the authors was held to review the identified data for use of dermocosmetics in acne management. The literature was stratified into use of dermocosmetics as monotherapy in patients with milder forms of acne or in maintenance post medical treatment and use of dermocosmetics as adjuncts to medical therapy either to complement their mode of action or to improve their tolerability. It was agreed that the Delphi methodology could be used to help develop recommendations for use of dermocosmetics in acne. This methodology incorporates expertise into a collective judgement via a panel of experts who respond to a set of questionnaires.[17] The panel comprised eight internationally recognized dermatologists from Argentina, Brazil, China, France, Guinea, Japan, USA and the United Kingdom.

To draft initial statements for the Delphi process, clinical questions were designed using the PICO framework—Population, Intervention, Comparison and Outcome (Table 1). Then, data quality assessment was performed using a modified Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system. Modifications to GRADE process included (1) evaluating dermocosmetics as a class, not by individual ingredients due to the low number of available studies; (2) one reviewer instead of two; (3) in the absence of systematic reviews, based evidence profiles and summary of findings on the results from individual studies; and (4) did not consult with patient stakeholders. As recommended, statements were based on effect and certainty of evidence (Table 2). In the GRADE system, the evidence is therefore initially set to either high (if included studies are randomized studies) or low (if they are observational studies). There are then five criteria that can be used to downgrade one, two or in the case of indirectness, sometimes three steps. These are (1) risk of bias in individual studies—for example, methodological issues in included studies such as inadequate blinding (e.g. participants knew they were in control/treatment group); (2) inconsistency of results between studies; (3) indirectness of evidence—as an example: participants were children although the systematic review was about adults; (4) imprecision—results were not statistically significant, or the effect was clinically important once the studies were meta-analysed; and (5) publication bias—result was biased due to a file-drawering effect, as studies not showing a statistically significant effect are less likely to be published. Then the statements were circulated to the Delphi panel online for voting. The panellists refined statements over a series of three rounds of online voting until a consensus agreement of >80% of panel members was reached.

TABLE 1 Clinical questions considered for Delphi consensus process.

- In patients with milder forms of acne (Grade 1–2 global assessment), is the use of dermocosmetics as *monotherapy* versus placebo or comparators able to[a]
  1. Improve global assessment,
  2. Reduce acne lesion counts,
  3. Provide good tolerability that can potentially enhance adherence,
  4. Reduce skin oiliness and
  5. Maintain acne clearance?
- In patients with acne, is the use of dermocosmetics as *adjunct* to prescription therapy versus prescription therapy alone or with placebo or comparators able to[a]
  1. Improve tolerability of acne treatments (reduce irritation and/or adverse events),
  2. Reduce superficial skin oiliness/improve barrier function (corneometer and TEWL scores),
  3. Improve adherence, satisfaction or quality of life,
  4. Enhance efficacy and
  5. Reduce pigmentary problems?

[a]Question designed using PICO framework: Population, Intervention, Comparison and Outcome. Data quality assessment was performed using modified GRADE system.

CONSENSUS RECOMMENDATIONS

The clinical questions were divided by use of dermocosmetic use alone (monotherapy) or use as adjuncts (adjunctive care). Table 1 summarizes clinical questions, Table 2 summarizes the results of the GRADE evaluations, while Tables 3 and 4 correlate the studies included with the outcomes related to the defined clinical question subsets. Table 5 summarizes

TABLE 2 Summary of findings used to generate estimate of effectiveness.

No. studies	Limitations	Inconsistency	Indirectness	Imprecision	Publication bias	Overall quality
Monotherapy						
(1) Dermocosmetics improve global assessment						
5 RCTs, 5 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(2) Dermocosmetics reduce acne lesion counts						
7 RCTs, 9 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(3) Dermocosmetics provide good tolerability						
2 RCTs, 5 low quality studies	Serious[a]	None serious	Moderate[b]	Moderate[c]	Not reported	Low
(4) Dermocosmetics reduce skin oiliness						
5 RCTs, 2 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(5) Dermocosmetics maintain acne clearance						
3 RCTs, 2 low quality study	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low due to small number and size of studies
Adjunctive dermocosmetics						
(1) Dermocosmetics reduce irritation and/or adverse events of medical therapy						
5 RCTs, 5 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(2) Dermocosmetics can reduce superficial skin oiliness/improve barrier function when used with medical therapy						
2 RCTs, 4 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(3) Dermocosmetics have a beneficial effect on adherence, patient satisfaction and quality of life with medical therapy						
3 RCTs, 8 low quality studies	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low to moderate due to study heterogeneity
(4) Dermocosmetics can enhance efficacy of medical therapy						
5 RCTs, 4 low quality study	Mild[a]	None serious	Mild[b]	Moderate[c]	Not reported	Low due to small number and size of studies
(5) Dermocosmetics can reduce the potential for and duration of pigmentation problems						
2 low quality study	Serious[a]	None serious	Moderate[b]	Moderate[c]	Not reported	Low

Abbreviation: RCT, randomized controlled trial.

[a]Limitations due to small sample sizes and low-quality studies.

[b]Differences in definitions of populations.

[c]Imprecision in definition of patient population, small populations and outcome measures.

the recommendations. Figure 1 provides a listing of dermocosmetic ingredients and their actions in the setting of acne, while Figure 2 presents an algorithm for use. Due to the nature of existing data, it is not possible to establish a clear ranking of the individual ingredients; however, in Figure 2 we have listed those with most evidence in bold. It should also be noted that the search terms glycyrrhiza, licorice and phytic acid were used, but there was a lack of evidence within the past 10 years to support their use.

Dermocosmetics used alone (monotherapy)

Improving global acne severity

The first question evaluated was whether dermocosmetics with acne-targeting ingredients could improve global acne severity in patients with milder forms of acne. We identified 10 studies addressing this question. Five were randomized controlled clinical trials (RCTs) and five non-RCTS, of which two included a placebo for comparison and three did not include a comparator, as such these were deemed much lower quality studies.[18–27] The studies collectively included 444 patients managed with dermocosmetics and 312 patients in comparator or placebo groups. Although the RCTs had differences in assessment tools used, three showed that dermocosmetics were significantly superior in improving acne versus comparators or placebo while two showed that dermocosmetic products had an effect on acne severity comparable to BPO 2.5% or 5% and retinoic acid 0.025%.[18–20] Two of the non-RCTs reported significantly superior improvements in the global assessment versus comparators or placebo, and the remaining three with no comparators reported 40%–80% improvement in global scoring.[21–25]

TABLE 3 Dermocosmetic used as monotherapy: Studies included and results that related to clinical questions posed for GRADE evaluation.

Monotherapy		
Study/quality grade	**Methodology**	**Results related to clinical questions**
Shamoradi et al.[18] **A**	**RCT, double blind, 8 weeks, *n* = 60 female** patients with mild-to-moderate acne defined as NILs plus ILs <20 and no nodules/cysts treated with niacinamide or clindamycin; 5% niacinamide versus 2% clindamycin	**1 Global assessment**: The groups had significant reductions in acne severity index at endpoint versus baseline ($p < 0.0001$)
Khodaeiani et al.[19] **A**	**RCT, double blind, 8 weeks**, $n = 80$ patients with moderate inflammatory acne (Grade III); topical 4% niacinamide (DC) versus 1% clindamycin gel both BID	**1 Global assessment**: Acne grade decreased from 5.93 to 2.08 at Week 8 in DC group, and from 5.70 to 2.03 in the clindamycin group (within-group $p < 0.001$, between-group $p > 0.05$)
Yoon et al.[20] **A**	**RCT, split-face, vehicle-controlled, 8 week, *n* = 35** patients with mean BL Leeds acne score 5.1, patients treated half face ECGC 1% (DC) or 5% versus vehicle	**1 Global assessment**: Treatment with 1% and 5% DC significantly decreased the mean revised Leeds score from 5.1 to 1.2 ± 0.4 and 1.7 ± 0.6, respectively, at W8 **2 Acne lesion counts**: NIL reduced by 79%, IL by 89%
Kozan et al.[21] **B**	**Randomized, open-label, 8 weeks, *n* = 90** patients in three groups: BPO 5% BID versus BPO 5%/ erythromycin 3% BID versus niacinamide 4%, gallic acid 1%, lauric acid 1% BID patients with mild acne (DC)	**1 Global assessment**: Global acne grading scale scores decreased from BL to Week 8 ($p < 0.01$) in DC group **2 Acne lesion counts**: Total lesions decreased from 29 at BL to 13.5 at Week 8 with DC
Villani et al.[22] **C**	**Open-label, 2 months, *n* = 25** female patients aged 14–30 (median 23.4 years); product including retinol, hydroxypinacolone retinoate, antimicrobial peptide, salicylic acid, glycolic acid, niacinamide gel (DC)	**1 Global assessment**: GAGS score improved **2 Acne lesion counts**: Significant reductions in total acne lesions at Week 4 (−57%) and 8 (−80%) **3 Tolerability**: Good tolerability and adherence **4 Reduction in skin oiliness**: TEWL remained unchanged, 'showing gel did not impair barrier function'
Dall'Oglio et al.[23] **C**	**Open label, multicentre, prospective, observational study, 8 weeks, *N* = 91** adult patients with mild acne; product including licochalcone A + salicylic acid + L-carnitine fluid in morning plus Licochalcone A + hydroxy complex 10% cream at night (DC)	**1 Global assessment**: Improvement in global grading score at 4 weeks with DC **2 Acne lesion counts**: Approximate 40% reduction in lesion counts, at 8 weeks 64% less comedones and 71% less papules with DC **4 Reduction in skin oiliness**: Approximately 52% reduction in sebum with DC
Li et al.[24] **B**	**Randomized open-label, 56 day, *n* = 66** in three groups, octyl salicylic acid/salicylic acid/linoleic acid/ nicotinamide/piroctone olamine (DC) versus DC + BPO versus BPO	**1 Global assessment**: DC + BPO better than DC alone, DC + BPO had fastest and best clearance rates
Veraldi et al.[25] **C**	**Open-label 12 week study**, $N = 98$; 0.1% hydroxypinacolone retinoate (synthetic ester of 9-cis-retinoic acid), 1% retinol in glycospheres and 2% papain (DC)	**1 Global assessment**: 1% mean reduction in the GAGS score was observed with DC **2 Acne lesion counts**: a 40.8% mean reduction of total lesions was recorded with DC
Wongtada et al.[26] **B**	**Randomized, investigator blinded, 3 months, *n* = 45** patients with mild acne treated with (1) aqua posae filiformis + LHA + salicylic acid + linoleic acid + niacinamide = piroctone olamine (DC) versus retinoic acid 0.025% (RA) versus BPO 2.5%	**1 Global assessment**: Improvement in GEA in all three groups with increased proportion of GEA 0–1 **3 Tolerability**: Fewer AEs in DC group versus others (7.1% vs. 13.3% BPO and 28.6% RA) **4 Reduction in skin oiliness**: p = NS reduction in sebum amounts on tape stripping
Dal Belo et al.[27] **B**	**Randomized, controlled, 56 day, *n* = 150** patients with mild to moderate acne treated with (1) salicylic acid + LHA + niacinamide + procerad, piroctone olamine, zinc, aqua posae filiformis and thermal spring water (DC) or (2) BPO 5% both applied BID	**1 Global assessment**: Better improvement in DC group; IGA response rate 62.2% DC and 50.0% BPO; GEA response rate 47.3% DC versus 36.5% BPO **2 Acne lesion counts**: IL, NIL, and total lesion counts decreased significantly ($p < 0.0001$) for both groups, no between-group difference **3 Tolerability**: DC better tolerated than BPO with fewer AEs; AEs related to DC were very mild to mild in intensity while BPO AEs ranged from very mild to moderate in intensity

(Continues)

TABLE 3 (Continued)

Monotherapy		
Study/quality grade	**Methodology**	**Results related to clinical questions**
Capitanio et al.[28] **A**	**RCT, double-blind, vehicle controlled study, 8 weeks, *n* = 60** male patients with mild acne aged <25 years; product including seaweed derived oligosaccharide + zinc 0.1% versus vehicle (DC)	**2 Acne lesion counts**: NIL reduced from 48.2 to 19.7 in DC group versus 58.4 to 38.4 in vehicle group; IL reduced from 37.7 to 13.6 in DC group versus 42.6 to 20.3 in vehicle ($p < 0.01$) **4 Reduction in skin oiliness**: Sebum was decreased in both groups
Cestone et al.[29] **A**	**RCT, double-blind, placebo controlled split-face study, 8 weeks, *N* = 40** adult patients with 10–25 comedones per half face; product including acne RA-1,2 – photofilters + willow bark (Salix alba) + vitamins B3, C, E, + soy isoflavone (DC) versus placebo	**2 Acne lesion counts**: 35% decrease in comedones with DC ($p < 0.001$ vs. BL, p = NS vs. placebo) **4 Reduction in skin oiliness**: 7% reduction in TEWL; 24% reduction in sebum production ($p < 0.05$) with DC
Lee et al.[30] **A**	**RCT, double-blind, 8 weeks, *N* = 60** patients with mild acne cleanser with 5-aminolevulinic acid twice daily or control (DC)	**2 Acne lesion counts**: Mean IL decreased from 5.9 at BL to 4.1 at week 8 versus 4.8 to 4.5 in DC group, NIL decreased from 11.4 at BL to 7.4 versus 7.5 to 7.0 in DC group at week 8 ($p < 0.05$ vs. control for both)
Wang et al.[31] **A**	**RCT, double-blind, placebo-controlled split face study, 8 weeks, *n* = 35** Chinese patients with mild acne and PIH niacinamide + piroctone olamine + LHA + linoleic acid + procerad (DC)	**2 Acne lesion counts**: NIL significantly reduced by DC versus placebo ($p = 0.003$), IL reduced more in placebo group ($p < 0.0001$)
Angelova-Fischer et al.[32] **A**	**RCT, double-blind, vehicle controlled, 8 weeks, *n* = 60** with mild to moderate acne (10–25 papules on face); product with licochalcone A + l-carnitine + 1,2-decanediol • moisturizer (DC)	**2 Acne lesion counts**: Reduction in TLs greater in DC versus vehicle, −6.9 versus +1.4, p = NS between groups; active treatment reduced inflammatory lesions from BL ($p < 0.05$) vehicle did not (p = NS) **4 Reduction in skin oiliness**: Active treatment but not vehicle reduced sebum ($p < 0.01$)
Chan et al.[33] **A**	**RCT, double-blind, placebo controlled subjects aged 13–40, *n* = 164**; Oral lactoferrin + vitamin E + zinc (DC) versus placebo BID	**2 Acne lesion counts**: Significant median % reduction in TLs at week 10 (28.5%, $p < 0.0001$) versus placebo; reduction in NILs (32.5%, $p < 0.0001$) and Ils (44%, $p < 0.0001$) in DC group **4 Reduction in skin oiliness**: Sebum scores were improved by week 12
Lubtikulthum et al.[34] **B**	**Randomized, single blind clinical trial • *N* = 77, 12-week**, study herbal extract (HBE) versus 2.5% BPO in patients with moderate acne; SCAGEL Acne Spot – tea tree oil + mangosteen pericarp + onion extract + avandula + aloe vera + mulberry + 4% niacinamide (DC)	**2 Acne lesion counts**: Acne lesion counts reduced in both groups ($p < 0.001$) total lesions 40% lower with HBE and 46% lower with BPO **3 Tolerability**: Adherence better with herbal extract (p=0.002); tolerability slightly better in HBE group
Bhatia et al.[35] **C**	**Open-label single centre, 6-week, *N* = 25** patients with mild acne, test products used twice per day; Clarity MD • 1% salicylic acid + 10% glycolic acid + botanical ingredients (cleanser and treatment gel, DC)	**2 Acne lesion counts**: IL reduced by 98.5% at Week 6, NIL by 56% ($p < 0.0001$) with DC **3 Tolerability**: Good tolerability
Fabbrocini et al.[36] **C**	**Open-label, 60 days, *n* = 20 patients** with mild to moderate acne; 3% hydrogen peroxide + 1.5% salicylic acid + 4% D-panthenol (DC)	**2 Acne lesion counts**: NILs reduced by 95%, papules reduced by 68%, pustules reduced by 100% **3 Tolerability**: Excellent tolerability for 83% pts and good for 17%
Zheng et al.[37] **C**	**Open-label, split face, randomized, *n* = 31, 28 days**; salicylic acid 2% (DC) versus BPO 5%/Ada 0.1%	**2 Acne lesion counts**: DC had similar effects to 5% BPO + 0.1% ADA in reducing Ils (47.9% vs. 49.8%), NILs (43.1% vs. 42.7%) and TLs (44.1% vs. 45.6%; all $p > 0.05$) at day 28.
Saint-Jean et al.[38] **A**	**RCT, double-blind, split-face study, *n* = 32**, 2 cycles observational, 1 cycle intervention with to niacinamide + piroctone olamine + LHA + linoleic acid (DC) or placebo evaluating change in acne during pre-menstrual flare, mean age 24.5 years	**2 Acne lesion counts**: Significantly fewer inflammation lesions on DC side (7.6 vs. 9.4, $p = 0.01$) versus placebo **3 Tolerability**: Tolerability of Effaclar rated as good or excellent
Santos-Caetano et al.[39] **B**	**Randomized, evaluator blind, 21-day**, single centre parallel group study in mild to moderate acne (n = 133); reformulated BPO face wash 4% or 10% versus older BPO wash 10%	**3 Tolerability**: Dermatologist score of cutaneous irritation was reduced to a greater degree in reformulated BPO-treated patients versus older BPO wash

TABLE 3 (Continued)

Monotherapy		
Study/quality grade	**Methodology**	**Results related to clinical questions**
Towersey et al.[40] **C**	**Single-centre, open-label, 84 days, *n* = 51** patients with mild to moderate truncal acne mean age 23 years; product including salicylic and 2%, zinc gluconate 0.2%, and LHA 0.05% (DC)	**2 Acne lesion counts**: IL reduced by 29.2% ($p < 0.005$) at 42 days and 48.2% at 84 days; NIL decreased by 64.0% ($p < 0.005$) at 84 days; total lesions decreased by 21.5% ($p < 0.05$) at Day 42 and −56.3% at Day 84 with DC **3 Tolerability**: Local tolerance was good
Kulthanan et al.[41] **A**	**RCT, double-blind, split-face, 12 weeks, *n* = 50**; (after treatment phase with A-BPO for 8 weeks); licochalcone A + L-carnitine + salicylic acid moisturizer (DC) versus vehicle	**5 Maintenance**: Significantly fewer acne lesions on DC-treated side compared to vehicle side at Week 12
Bettoli et al.[42] **C**	**Open-label, 12 months, *n* = 39** patients treated after oral isotretinoin with hydroxypinacolone retinoate (DC)	**5 Maintenance**: 6 patients (15.4%) had an acne relapse during the 12 months of DC management
Queille-Roussel[43] **C**	**Open-label, 2 months, *n* = 30** women ≥20 years enrolled within 1 month of discontinuing acne therapy with GEA grade 1–3 acne severity; once daily use of product including glycolic acid 3%, salicylic acid 1.5%, capryloyl salicylic acid/LHA 0.45% (DC)	**5 Maintenance**: Mean total lesion counts, NILs, and ILs reduced by ≥40% with DC; 90% judged their acne improved
Khammari et al.[44] **A**	**RCT, double-blind, placebo-controlled, 168 days, *n* = 100** patients with initially mild/moderate acne randomized into two groups BPO + placebo or BPO EoD + DC, then further randomized to niacinamide + piroctone olamine + LHA + linoleic acid (DC) or placebo ($n = 50$ each)	**5 Maintenance**: Acne lesions continued to decline after discontinuation of BPO in patients using DC; relapse occurred at 1.5 months after BPO in placebo group; significant difference DC versus placebo at study end ($p \leq 0.005$)

Note: Bold in methodology indicates key study design, duration, and patient numbers. Outcomes reported in the study are correlated here with the PICO question.

Abbreviations: A-BPO, adapalene-BPO; ADA, adapalene; AE, adverse event; BID, twice daily; BL, baseline; BPO, benzoyl peroxide; DC, dermocosmetic; EGCG, epigallocatechin-3-gallate; GAGS, global acne grading scale; GEA, Global Evaluation Acne grading scale; IL, inflammatory lesion; LHA, lipohydroxy acid; NIL, non inflammatory lesion; RA, retinoid acid; RCT, randomized controlled trial; SA, salicylic acid; TEWL, transepidermal water loss.

Reducing acne lesions

The next question was whether dermocosmetic monotherapy could be used in patients with milder forms of acne to reduce acne lesion counts. Literature review identified nine RCTs that included this endpoint along with nine non-RCTS deemed of lower quality.[20,21,25–40] There were collectively 784 patients in the dermocosmetic arms of these studies and 721 patients in the comparator or placebo groups. Five RCTs showed significantly superior reductions in acne lesion counts with dermocosmetics versus comparators; two RCTs had numerically but not statistically superior reductions; and two showed reductions comparable to BPO 2.5% and 5% and retinoic acid 0.025%.[20,26–33] Three of the lower quality studies reported significantly superior improvements in the acne lesion counts compared to placebo or comparators and the remainder had no comparator arms but reported reductions of 40%–95% in acne lesions.[21,25,34–40]

Improving tolerability

Tolerability was an outcome in seven studies: two RCTs and five low-quality studies that collectively included 229 patients in dermocosmetic groups and 175 in comparator groups.[22,26,27,34–36,38] In both RCTs, tolerability of the dermocosmetic was better than that of comparators (BPO and retinoic acid 0.025%).[26,27] In primarily open-label (four) and one split-face studies, use of dermocosmetics was associated with excellent or good tolerability and good adherence was reported in two studies.[22,34–36,38]

Reducing surface oil

Change in casual surface oil was an outcome in six RCTs and two non-RCTs deemed low quality studies involving collectively 362 patients managed with dermocosmetics and 261 patients in comparator or placebo groups.[8,22,26,28,29,32,33] The RCTs showed that use of dermocosmetics was associated with a reduction in skin oiliness that was statistically significant in two studies and numerically superior in three studies. The two low-quality studies showed numerical improvements in oiliness but not statistical differences.

Maintenance therapy

Four studies—two RCTs and two non-RCT low-quality studies—investigated use of dermocosmetics to maintain acne clearance after medical therapy.[41–44] In these studies, 165 patients were managed with dermocosmetics and 98

TABLE 4 Dermocosmetics used as adjunct to medical therapy: Studies included and results that related to clinical questions posed for GRADE evaluation.

Adjunct therapy		
Study	**Methodology**	**Results related to clinical questions**
Khammari et al.[44] **A**	**RCT, double-blind, 12 weeks plus additional 12 week maintenance phase, *n* = 100** patients with initially mild/moderate acne, randomized into two groups BPO + placebo or BPO EoD + DC, then further randomized to niacinamide + piroctone olamine + LHA + linoleic acid (DC) or placebo ($n = 50$ each) for 12 weeks (DC maintenance)	Mean efficacy and tolerability (46% and 48% had good/excellent tolerability) were similar in the treatment phase **1 Improving tolerability**: tolerability scores decreased in maintenance phase with DC but increased with placebo (p = NS) **4 Enhancing Efficacy**: In the maintenance phase, IL and NIL acne lesions continued to decrease with DC versus an increase in the placebo group regardless of which group they were in during the treatment phase ($p < 0.05$ for ILs)
Dreno et al.[45] **A**	**RCT, 12 weeks, *n* = 197**, mild to moderate acne treated with ADA-BPO with or without NP lotion skincare (DC)	**2 Improving barrier function/oiliness**: trend towards reduced sebum production (sebumeter) in DC group; improved skin hydration (corneometry) in DC versus ADA-BPO alone ($p < 0.001$) **3 Improving adherence/QoL/satisfaction**: Patients were more satisfied with DC regimen versus ADA-BPO along for comfort and improving skin texture ($p < 0.05$) **4 Enhancing efficacy**: DC regimen associated with significantly greater reductions in total and NIL counts ($p < 0.05$); trend towards clinically relevant better global score in DC group
Cannizzaro et al.[47] **A**	**RCT, *n* = 27**, isotretinoin treatment period + 6 months, patients treated with isotretinoin 0.5–1.0 mg/kg/day + 8% omega ceramides and niacinamide (DC) or placebo BID	**1 Improving tolerability**: DC cream reduced xerosis and skin irritation compared with placebo **3 Improving adherence/QoL/satisfaction**: patients using DC + isotretinoin had better adherence than those using placebo
Chularojanamontri et al.[48] **A**	**RCT, double-blind, vehicle controlled, *n* = 120, 8 weeks**, patients aged 18 or older with mild to moderate acne randomized to ADA, ADA + moisturizer containing lichocalcone A, L-carnitine, and 1,2-decanediol (DC), or ADA + placebo	**1 Improving tolerability**: mean global worst score was significantly lower with DC + adapalene versus adapalene alone ($p = 0.048$) and lower (p = NS) versus adapalene + placebo **2 Improving barrier function/oiliness**: DC group had increased skin hydration (corneometer and TEWL) while other two groups lost hydration **4 Enhancing efficacy**: mean IL decreased by Week 2 in adapalene + DC group compared with increases (flares) in the other two groups; significantly fewer total ($p = 0.028$) and IL ($p < 0.003$) at Week 8 in moisturizer group; reductions in IL only significant at Week 8 in adapalene group, and no significant changes in total, IL, or NIL in adapalene + placebo group
Tan et al.[49] **A**	**RCT, single-blind, controlled, *n* = 120, 12 weeks**, patients with mild to moderate acne treated for **first 4 weeks** with ADA-BPO once daily overnight, ADA-BPO once daily for 3 h, ADA-BPO + moisturizer (DC) once daily or ADA-BPO every other night	**1 Improving tolerability**: significantly more patients treated with ADA-BPO + DC had no worsening of dryness or scaling (64.3% vs. 26.7%, $p < 0.005$) versus ADA-BPO once daily **3 Improving adherence/QoL/satisfaction**: there was a higher proportion of patients 'not bothered at all' by side effects in DC group versus ADA-BPO once daily (48.1% vs. 30.8%, p = NS) **4 Enhancing efficacy**: trend towards greater reductions in IL at week 12 with DC versus once daily (−72% vs. −66%)
Draelos et al.[44] **B**	**RCT, single-blind, *n* = 91, 12 weeks**, patients aged 13–40 with moderate acne and oily skin treated with ADA-BPO QD alone or ADA-BPO with ceramide containing cleanser (BID) and moisturizer (QD, DC)	**1 Improving tolerability**: ceramide-containing DC regimen reduced dryness, erythema and scaling induced by ADA-BPO ($p < 0.05$) **2 Improving barrier function/oiliness**: DC regimen associated with improved barrier function and TEWL values **4 Enhancing efficacy**: DC regimen resulted in significantly greater reductions in IL versus ADA-BPO alone ($p < 0.05$)
Schorr et al.[50] **B**	**Randomized, investigator-blinded, *n* = 35, 4 weeks**, subjects 18 or older with healthy skin who applied tretinoin 0.05% once daily to the whole face plus a dermacontrol moisturizer to one-half of the face (DC)	**1 Improving tolerability**: addition of DC improved tolerability versus tretinoin alone; 42.9% had global worsening scores that improved in the DC group versus 8.5% of those in tretinoin only group ($p < 0.05$); cutaneous tolerability was also better with DC, with significant differences for erythema, scaling, and dryness ($p < 0.05$) **2 Improving barrier function/oiliness**: Skin hydration increased on DC side but stayed same or decreased on tretinoin side, with significant differences at Weeks 1 and 3 ($p < 0.05$) **3 Improving adherence/QoL/satisfaction**: subjects preferred the DC side versus tretinoin at week 4 ($p < 0.05$)

TABLE 4 (Continued)

Adjunct therapy		
Study	**Methodology**	**Results related to clinical questions**
Karamon et al.[44] **C**	**Open-label, 4 weeks, *n* = 43** patients with primarily mild–moderate acne (38/43 pts), sensitive skin, and cutaneous irritation at baseline who were treated with ADA-BPO + cream and cleanser containing Bixa Orellana seed extract, niacinamide, panthenol and Aqua Posae Filiformis BID (DC)	**1 Improving tolerability**: composite skin sensitivity score improved at Days 14 (35%) and 28 (81% reduction from baseline, $p < 0.001$) with DC; all patients were better able to tolerate ADA-BPO and lesion counts/acne severity were reduced in DC group **3 Improving adherence/QoL/satisfaction**: There was a 44% reduction in CADI score ($p < 0.0001$) in patients treated with ADA-BPO + DC
Del Rosso et al.[51] **C**	**Open-label, 8 weeks, *n* = 77**, Patients 9 or older with mild or moderate acne (20 = 50 IL, 30–100 NIL) treated with ADA-BPO + dermacontrol skincare regimen including foam cleanser and moisturizer (DC)	**1 Improving tolerability**: less skin irritation compared to Phase 2/3 study results at Week 8 with DC **2 Improving barrier function/oiliness**: reduced photographic skin shininess scores, significantly by Week 8 ($p < 0.05$) with DC **3 Improving adherence/QoL/satisfaction**: 87.9% of patients agreed or strongly agreed they were overall satisfied with treatment
Monfrecola et al.[52] **C**	**Open-label, 12 week, *n* = 40** acne patients treated with UV-selective face cream containing *salix alba*, 1,2-decanediol, soy isoflavones and vitamins B_3, C and E + medical treatment (DC)	**1 Improving tolerability**: cream + usual medical treatment decreased tolerability scores for pruritus, erythema and dryness ($p < 0.05$); also a 63% decrease in mean tolerability score from baseline ($p < 0.05$) with DC **2 Improving barrier function/oiliness**: 29% reduction in TEWL at 3 months with DC **3 Improving adherence/satisfaction**: patients self-reported better adherence compared to the same time of year prior to using DC
Zeichner et al.[53] **C**	**Open-label, 12 week, *n* = 20** patients aged 13–49 with mild to moderate acne who used clindamycin/BPO plus a hydrating cleanser and ceramide-containing moisturizer in the morning and cleanser/moisturizer + tretinoin 0.05% every other night for 2 weeks then every night (DC)	**1 Improving tolerability**: the majority of patients reported scores of 0/1 for cutaneous tolerability parameters (95% at Week 4) with DC
Li et al.[24] **B**	**Single-blind, randomized, *N* = 67** patients with mild to moderate acne treated with moisturizer BID with salicylic acid, linoleic acid, nicotinamide and piroctone olamine; moisturizer (DC) + BPO QD; or BPO alone	**1 Improving tolerability**: all groups had good tolerability but tolerability was better in DC group (p = NS) **4 Enhancing efficacy**: better clearance of comedones in groups containing DC versus BPO alone; however, DC alone was associated with lower and slower clearance rate of all lesions; at day 56, the DC + BPO group had highest clearance rate
DuBois et al.[55] **C**	**Open-label, 16 weeks, *n* = 50**, moderate or severe acne in patients with skin of colour (types IV–VI) treated with ADA-BPO once daily plus skincare regimen (oil control foam wash and oil control moisturizer, DC)	**3 Improving adherence/QoL/satisfaction**: 77% of patients were satisfied or very satisfied with treatment; QoL improved throughout study for all subjects, proportion of those reporting 'no effect at all' of acne on QoL increased from 16% of patients at baseline to 55% at Week 16 **5 Reducing PIH**: 87% patients had a good or excellent results in Global Assessment of Improvement of PIH; in addition, 60% of patients had a rating of 'none' or 'very mild' at Week 16 with a mean decrease in PIH of 27%
Hayashi et al.[56] **C**	**Open-label, 4 weeks, *n* = 100** patients aged 16–35 with acne of any severity (≤50 comedones on half face) treated with ADA or ADA plus heparinoid moisturizer (DC)	**3 Improving adherence/QoL/satisfaction**: lower adherence in ADA group versus ADA + DC group (70% vs. 100%) at 4 weeks
Kantikosum et al.[57] **A**	**Double-blind, split face, 28 day study, *N* = 25** in patients with mild acne treated with a moisturizer containing 7% glycolic acid + 1% salicylic acid + 2% gluconolactone + 0.05% licochalcone A (DC) mixed with ADA versus ADA alone	**4 Enhancing efficacy**: Reduction in IL was comparable between groups
Polakova et al.[58] **B**	**Randomized, single-blind, 56 days, *n* = 111**, randomized to a cream with bakuchiol, ginkgo biloba extract, and mannitol (DC) versus vehicle (all patients were treated with ADA)	**4 Enhancing efficacy**: 56% versus 50% decrease in NIL, 62.7% versus 41.5% decrease in IL for DC plus ADA group versus ADA + vehicle ($p < 0.05$)

(Continues)

TABLE 4 (Continued)

Adjunct therapy		
Study	**Methodology**	**Results related to clinical questions**
Wanitphakdeedecha et al.[59] **B**	**Randomized, split-face, vehicle-controlled, 10 weeks, *N* = 29** patients with acne of any severity, 4 PDT sessions with or without once daily moisturizer containing lichocalcone A, L-carnitine, 1,2-decanediol and salicylic acid (DC) or vehicle	**4 Enhancing efficacy**: Patients in the DC group had faster reduction of lesions ($p = 0.01$ for IL, $p = 0.001$ for NIL) and greater reductions of NILs at all evaluations ($p < 0.005$) and after the fourth treatment for IL ($p = 0.036$) **5 Reducing PIH**: Melanin index decreased significantly with DC at 1 month after 4th PDT session ($p = 0.015$)

Note: Bold in methodology indicates key study design, duration, and patient numbers. Outcomes reported in the study are correlated here with the PICO question.

Abbreviations: ADA, adapalene; ADA-BPO, adapalene/benzoyl peroxide; BID, twice daily; BPO, benzoyl peroxide; CADI, Cardiff acne disability index; DC, dermocosmetic; IL, inflammatory lesions; NIL, non-inflammatory lesions; PDT, photodynamic therapy; PIH, post-inflammatory hyperpigmentation; QD, once daily; QOL, quality of life; TEWL, transepidermal water loss; UV, ultraviolet.

with non-active vehicle. In the controlled trials, use of dermocosmetics was associated with both a persistent reduction in visible acne lesions after prescription therapy or maintained acne clearance; differences were significant versus placebo/comparator.[41,44,45] In the uncontrolled open-label study which used dermocosmetics after oral isotretinoin therapy, 12 months of dermocosmetics sustained clearance in the majority (84.6%) of subject.[42]

Dermocosmetics as adjuncts (adjunctive care)

Improving tolerability

Acne medications—both topical and systemic—can cause cutaneous irritation along with other adverse events.[15,46] The impact of adjunctive dermocosmetic use on acne treatment-related irritation and/or adverse events was evaluated in five RCTs and five additional lower quality studies (Table 3).[24,44,47–53] The 10 studies included 433 subjects in dermocosmetics groups and 303 in comparator and/or placebo groups. In RCTs, addition of dermocosmetics to acne treatments (adapalene, benzoyl peroxide [BPO], adapalene-BPO, clindamycin/BPO, isotretinoin and tretinoin) significantly improved cutaneous tolerability (erythema, dryness and scaling). The lower quality studies agreed that addition of dermocosmetics to medical therapies (adapalene-BPO, tretinoin 0.05%, 'regular acne therapy' and topical retinoid + clindamycin/BPO) improved tolerability.

Reducing surface oil

A total of six studies (two RCTs and four lower quality) assessed the effect of dermocosmetic use on casual surface oil of the skin and barrier function as reflected by skin hydration and transepidermal water loss (TEWL).[44,45,48,50,52,54] There were more patients managed with a dermocosmetic ($n = 315$) versus placebo or comparator ($n = 225$). As shown in Table 3, the RCTs showed a statistically significant improvement in skin hydration on corneometry and a trend towards reducing sebum (sebumeter) with adjunctive dermocosmetics versus prescription therapy alone. Three lower quality reported a decrease in superficial skin oiliness ranging from 17% to 47.3%, and all differences between adjunctive dermocosmetics groups and prescription therapy alone were statistically significant in favour of the adjunctive arms. Further, there was a 10.8%–29% mean reduction in TEWL, which was reported to be statistically significant in two studies.[44,45,48,50,52,54]

Improving adherence

The impact of dermocosmetic use on treatment adherence, quality of life (QoL) and/or patient satisfaction with treatment was evaluated in three[47] RCTs and eight lower quality studies with results and study details shown in Table 3.[44,45,47,49–52,55,56] These studies included 438 patients treated with adjunctive dermocosmetics and 253 in control or placebo groups. The results indicate patients in the adjunctive treatment groups uniformly had better adherence, reported improvements in quality of life and were well satisfied with their acne treatment. In part, this may be due to the fact that treatment was easier to initiate due to improved tolerability; in turn, this may have allowed patients to remain on therapy for an adequate period of time to see clinical improvements.

Improving clinical outcomes

Five RCTs and four lower quality studies included evaluation of whether adjunctive use of dermocosmetics could enhance efficacy and lead to improved clinical outcomes.[24,44,45,48,49,57–59] These studies involved 414 patients managed with dermocosmetics and 538 with placebo/vehicle or comparator. The effects on efficacy and clinical outcomes statistically significantly improved with use of dermocosmetics in three of the RCTs with trends towards better outcomes in the remaining two RCTs (Table 3).

TABLE 5 Summary of key recommendations and statements.[a]

Monotherapy
Recommendation 1: Regular use of dermocosmetics with acne-targeting ingredients (see text) **may be recommended to improve global acne severity** in patients with milder forms of acne; the evidence quality is low-moderate but shows a positive trend, which agrees with our clinical experience.
Recommendation 2: Regular use of dermocosmetics with acne-targeting ingredients (see text) **may be recommended to reduce acne lesions** in patients with milder forms of acne; the evidence quality is low moderate but shows a positive trend, which agrees with our clinical experience.
Recommendation 3: In mild acne, regular dermocosmetic use with acne targeting ingredients (see text) provides **good tolerability and should be recommended** as this may translate to improved adherence to treatment, as demonstrated by low quality of evidence and our clinical experience.
Recommendation 4: In mild acne, regular use of demoscosmetics containing ingredients aimed at **reducing casual surface oil** (see text) in patients with oily skin types, **may be considered** as suggested by a low-moderate quality of evidence and our clinical experience.
Recommendation 5: Regular use of dermocosmetics with acne-targeting ingredients (see text) **may be useful as maintenance therapy** and may be recommended to minimize the appearance of new lesions after use of acne prescription therapy, as suggested by a low quality of evidence.
Adjunct to medical therapy
Recommendation 1: Regular use of adjunctive dermocosmetic therapy (see text for ingredients of interest) **can be recommended to improve the tolerability** of topical and systemic acne therapeutics with the potential for irritation, based on low-moderate quality of evidence and clinical experience.
Statement 2: Regular use of adjunctive dermocosmetics with active ingredients (see text) **may reduce casual oil on the surface of the skin or have a positive effect on barrier function**, including improvements in skin hydration and decreased transepidermal water loss, is suggested by a low-quality evidence base. However, the positive benefit agrees with our clinical experience.
Recommendation 3: A positive effect of regular dermocosmetic use on **treatment adherence** with prescription acne products, particularly with oral or topical retinoids, due to improved tolerability is supported by a low-moderate quality of evidence; use of dermocosmetics in this setting **can be recommended**.
Statement 4: Low-quality evidence and our clinical experience suggests regular dermocosmetic use (with moisturizing ingredients) from initiation of and throughout an acne treatment regime **may have the potential to result in improved clinical outcomes**.
Statement 5: In patients with darker skin tones suffering from acne, post-inflammatory hyperpigmentation is very common. Under these conditions, to control acne and post-inflammatory hyperpigmentation, topical retinoids treatment should be the first line. Dermocosmetics with active ingredients (see text) **can help prevent and treat post-inflammatory hyperpigmentation** in combination with daily sun protection.

[a]The Delphi process allows participants to change wording as they feel appropriate. In our group, 'can' was perceived to be a stronger word than 'may' and 'recommended' stronger than 'considered/useful'. 'May have the potential' and 'can help to prevent' were included because the data were quite thin but we had the opinion from our clinical experience that they would be beneficial. The ranking used for wording was (1) should be recommended, (2) can be recommended, (3) may be recommended, (4) may be considered, (5) may be useful, (6) may have the potential, (7) can help prevent.

Benefits included greater reductions in both inflammatory and non-inflammatory lesions, reduced acne flares, maintenance of effects (with continued lesional decreases) after medical therapy was discontinued and a trend towards clinically relevant better global scores.[44,45,48,49,57–59]

Improving pigmentation problems

In an open-label study of 50 patients with Fitzpatrick skin phototypes IV–VI, DuBois et al. reported that addition of an oil-control skincare regimen (foam wash and moisturizer with SPF30) improved quality of life, with the response of acne having 'no effect' increasing from 16% at baseline to 55% at Week 16.[55] Additionally, Wanitphakdeedecha et al. reported a significant improvement in melanin index in patients treated with a moisturizer plus four sessions of PDT in a randomized, split-face study.[59] Our clinical experience in addition to these data suggest that it is reasonable to utilize dermocosmetics that can help control and reduce PIH in acne patients with darker skin phototypes who are at risk for acne-associated excess pigmentation. This may be particularly beneficial for patients with a tendency for excoriation, which is a significant modifiable risk factor for PIH.[60]

DISCUSSION

It is our considered opinion that dermocosmetics can and should be integrated into acne management. There is an increasing database of studies suggesting that dermocosmetics can have a positive impact in the management of acne. This article presents recommendations for use of dermocosmetics as adjunct to medical therapies for acne. Figure 2 presents a practical clinical algorithm for integrating dermocosmetics into the acne management approach.

Overall trends in outcomes suggest that dermocosmetics can be useful as monotherapy in milder forms of acne, with evidence showing a positive benefit in global assessment, acne lesion reductions, tolerability, reducing oiliness on the surface of the skin, with additional positive effects on the skin barrier function, as well as maintaining skin clearance post acne medication. These outcomes align with the panel members' clinical experience. When used as adjuncts, dermocosmetics can also enhance therapy by additive effects and improving tolerability. These conclusions and recommendations may also be beneficial for other healthcare professionals managing milder forms of acne.

Pigmentation problems are very important for a substantial group of acne patients. In a large study ($n = 324$) of Asian patients from seven countries, more than half of

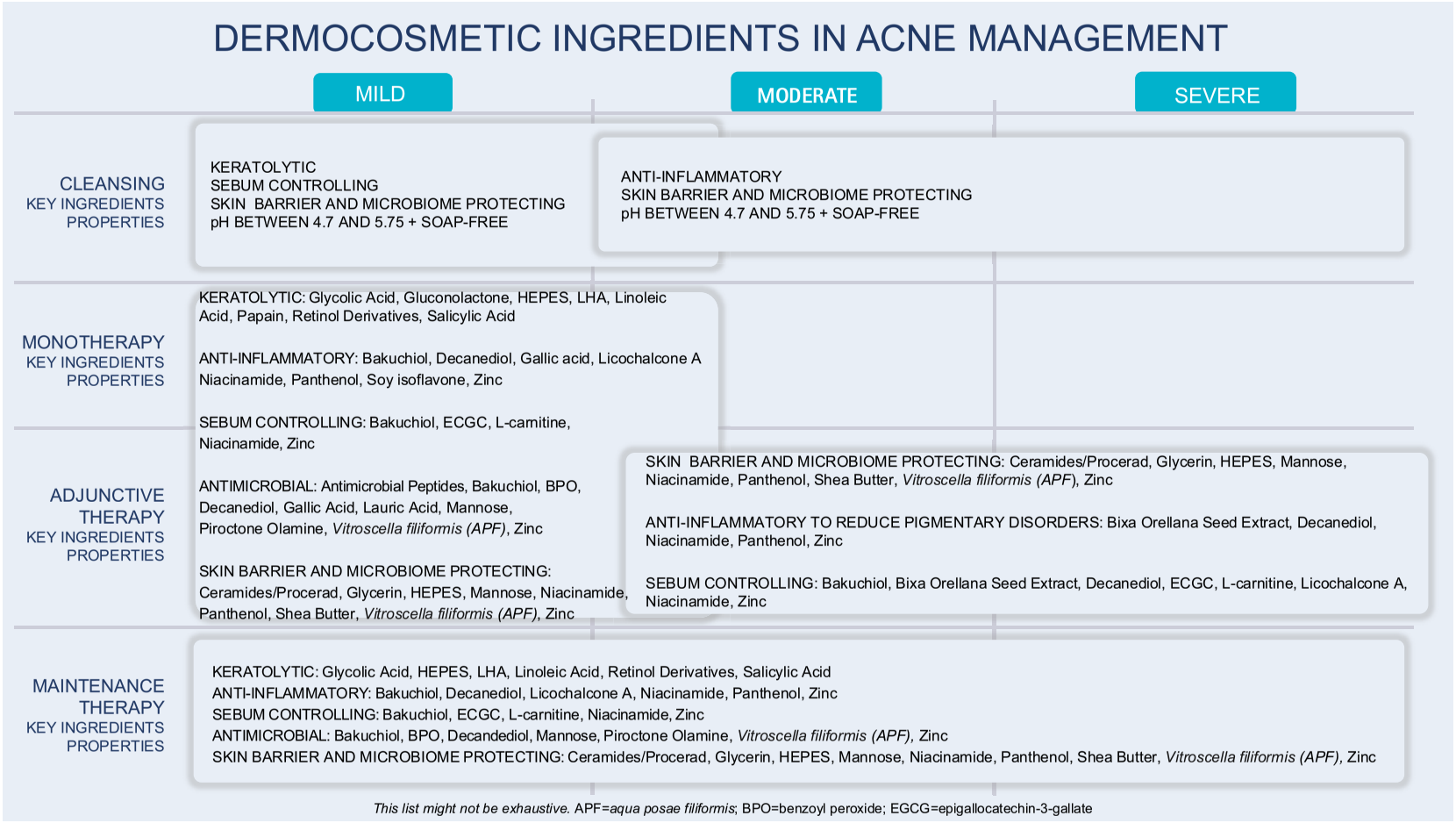

FIGURE 2 Algorithm for use of dermocosmetics in acne management. Figure is descriptive to highlight the action of ingredients found in dermocosmetics. BPO is a cosmetic/over-the-counter product in most countries.

patients with acne and PIH had experienced it for >1 year and 22% reported having it for >5 years.[60] Additionally, 32% of subjects reported that they were more bothered by PIH than their acne lesions.[60] This aligns with our clinical experience, therefore we included the few studies that exist in the literature despite the level of evidence being low. While not included in the main group of publications reviewed by this group due to the original studies being conducted >10 years prior, recent review articles have discussed the photoprotective benefits of niacinamide and its potentially favourable impact on PIH.[61,62] In addition, a recent bench study showed that niacinamide was able to downregulate melanogenesis.[63]

There were some limitations of this study as dermocosmetic ingredients/products were grouped to assess effect as a category. In addition, only one assessor evaluated studies and the estimate of effect size was done via general narrative due to heterogeneity of studies. The studies were evaluated using a modified GRADE system to enable a standardized approach appreciating that many of the studies had not been conducted using robust methodology. Studies were frequently of low quality, and/or were conducted over a relatively short duration (8 weeks or less) which may not be enough time to adequately evaluate effects on acne. Many studies were underpowered as they recruited a limited number of participants hence preventing statistical analysis required to show effects. The Delphi process may be considered limited in that individual voters interpret statements according to their experience. Additionally, as many cosmeceuticals contain many compounds often in unknown concentrations it is unclear whether certain compounds or certain concentrations are relevant—or whether some compounds may even impair the function of others. Therefore, the results stated can only be reached with certainty with a certain specific cosmeceutical. However, given the positive trends seen in the studies identified, the clinical consensus provided through this Delphi and the proliferation of available dermocosmetics, it is important for dermatologists to take the lead in understanding how these products can and should be used in acne management.

In conclusion, the panel of experts recommend the use of dermocosmetics with acne-targeting ingredients as monotherapy for the milder forms or in maintenance, and as adjunctive care to either complement medical treatment mode of action or to improve their tolerability. Cleansers and sunscreen are also an important part of acne skincare.

ACKNOWLEDGEMENTS

The authors wish to thank L'Oreal Active Cosmetics for providing funding for medical writing support from Valerie Sanders, Sanders Medical Writing.

FUNDING INFORMATION

The study and medical writing support from Sanders Medical Writing were funded by L'Oreal Active Cosmetics.

CONFLICT OF INTEREST STATEMENT

Prof Thiboutot has served as advisor/consultant for La Roche-Posay, Biofrontera and Novartis; Prof Layton has served as advisor, consultant and/or investigator for research (funded to institution) for Galderma, Glaxo Smith Kline and Origimm and has received honoraria for unrestricted educational events from Almirall, Beiersdorf, Galderma, La Roche-Posay, Leo Pharma, L'Oreal, Mylan, Novartis, Origimm and Proctor & Gamble, Sanofi; Dr Traore and Dr Kurokawa have no conflicts of interest to report; Dr Gontijo has served as a consultant to La Roche Posay; Dr Troielli has served as a consultant/received honoraria from Beiersdorf, Galderma, La Roche Posay and L'Oreal; Dr Ju has nothing to declare; Pr Dreno has served as consultant/received honoraria from Bristol Meyers Squibb, Almirall, Galderma, La Roche Posay, Pierre Fabre and Bioderma.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no data sets were generated or analysed during the current study.

ORCID

Ibrahima Traore https://orcid.org/0000-0002-6669-3802
Patricia Troielli https://orcid.org/0000-0002-3070-3917
Brigitte Dreno https://orcid.org/0000-0001-5574-5825

REFERENCES

1. Zaenglein AL. Acne vulgaris. N Engl J Med. 2018;379:1343–52.
2. Halvorsen JA, Stern RS, Dalgard F, Thoresen M, Bjertness E, Lien L. Suicidal ideation, mental health problems, and social impairment are increased in adolescents with acne: a population-based study. J Invest Dermatol. 2011;131:363–70.
3. Yazici K, Baz K, Yazici AE, Köktürk A, Tot S, Demirseren D, et al. Disease-specific quality of life is associated with anxiety and depression in patients with acne. J Eur Acad Dermatol Venereol. 2004;18:435–9.
4. Hosthota A, Bondade S, Basavaraja V. Impact of acne vulgaris on quality of life and self-esteem. Cutis. 2016;98:121–4.
5. Gieler U, Gieler T, Kupfer JP. Acne and quality of life - impact and management. J Eur Acad Dermatol Venereol. 2015;29(Suppl 4):12–4.
6. Marson J, Bhatia N, Graber E, Harper J, Lio P, Tlougan B, et al. Supplement article: the role of epidermal barrier dysfunction and cutaneous microbiome dysbiosis in the pathogenesis and management of acne vulgaris and rosacea. J Drugs Dermatol. 2022;21:SF3502915–F35029114.
7. Lain E, Andriessen AE. Choosing the right partner: complementing prescription acne medication with over-the-counter cleansers and moisturizers. J Drugs Dermatol. 2020;19(11):1069–75.
8. Draelos ZD. The effect of a daily facial cleanser for normal to oily skin on the skin barrier of subjects with acne. Cutis. 2006;78:34–40.
9. Araviiskaia E, Lopez Estebaranz JL, Pincelli C. Dermocosmetics: beneficial adjuncts in the treatment of acne vulgaris. J Dermatolog Treat. 2021;32:3–10.
10. Marson J, Baldwin H. Supplement article: dysbiosis, (barrier) dysfunction, and dermatoses: a chicken-and-egg dilemma. J Drugs Dermatol. 2022;21(9):SF3502913–F3502914.
11. Hwang BK, Lee S, Myoung J, Hwang SJ, Lim JM, Jeong ET, et al. Effect of the skincare product on facial skin microbial structure and biophysical parameters: a pilot study. Microbiology. 2021;10:e1236.
12. Bouslimani A, da Silva R, Kosciolek T, Janssen S, Callewaert C, Amir A, et al. The impact of skin care products on skin chemistry and microbiome dynamics. BMC Biol. 2019;17:47.
13. Varcin M, Knapen C. Focus on: cosmeceuticals - definitions, regulations and a review of the market. PMFA News. 2016;3.

14. Saint-Leger D. 'Cosmeceuticals'. Of men, science and laws. Int J Cosmet Sci. 2012;34:396–401.
15. Dreno B, Thiboutot D, Gollnick H, Finlay AY, Layton A, Leyden JJ, et al. Large-scale worldwide observational study of adherence with acne therapy. Int J Dermatol. 2010;49:448–56.
16. Araviiskaia E, Dreno B. The role of topical dermocosmetics in acne vulgaris. J Eur Acad Dermatol Venereol. 2016;30:926–35.
17. Dalkey N, Helmer O. An experimental application of the Delphi method to the use of experts. Manag Sci. 1963;9:195–204.
18. Shahmoradi Z, Iraji F, Siadat AH, Ghorbaini A. Comparison of topical 5% nicotinamid gel versus 2% clindamycin gel in the treatment of the mild-moderate acne vulgaris: a double-blinded randomized clinical trial. J Res Med Sci. 2013;18:115–7.
19. Khodaeiani E, Fouladi RF, Amirnia M, Saeidi M, Karimi ER. Topical 4% nicotinamide vs. 1% clindamycin in moderate inflammatory acne vulgaris. Int J Dermatol. 2013;52:999–1004.
20. Yoon JY, Kwon HH, Min SU, Thiboutot DM, Suh DH. Epigallocatechin-3-gallate improves acne in humans by modulating intracellular molecular targets and inhibiting *P. acnes*. J Invest Dermatol. 2013;133:429–40.
21. Kozan A, Guner RY, Akyol M. A retrospective assessment and comparison of the effectiveness of benzoyl peroxide; the combination of topical niacinamide, gallic acid, and lauric acid; and the combination of benzoyl peroxide and erythromycin in acne vulgaris. Dermatol Ther. 2020;33:e13534.
22. Villani A, Annunziata MC, Cinelli E, Donnarumma M, Milani M, Fabbrocini G. Efficacy and safety of a new topical gel formulation containing retinol encapsulated in glycospheres and hydroxypinacolone retinoate, an antimicrobial peptide, salicylic acid, glycolic acid and niacinamide for the treatment of mild acne: preliminary results of a 2-month prospective study. G Ital Dermatol Venereol. 2020;155:676–9.
23. Dall'Oglio F, Fabbrocini G, Tedeschi A, Donnarumma M, Chiodini P, Micali G. Licochalcone A in combination with salicylic acid as fluid based and hydroxy-complex 10% cream for the treatment of mild acne: a multicenter prospective trial. Clin Cosmet Investig Dermatol. 2019;12:961–7.
24. Li W, Yu Q, Shen Z, Zhang L, Zhang W, Li C. The efficacy and safety of a cream containing octyl salicylic acid,salicylic acid, linoleic acid, nicotinamide and piroctone olamine combined with 5% benzoyl peroxide in the treatment of acne vulgaris: a randomized controlled study. Chin Med J. 2022;135:1381–2.
25. Veraldi S, Barbareschi M, Guanziroli E, Bettoli V, Minghetti S, Capitanio B, et al. Treatment of mild to moderate acne with a fixed combination of hydroxypinacolone retinoate, retinol glycospheres and papain glycospheres. G Ital Dermatol Venereol. 2015;150:143–7.
26. Wongtada C, Prombutara P, Asawanonda P, Noppakun N, Kumtornrut C, Chatsuwan T. Distinct skin microbiome modulation following different topical acne treatments in mild acne vulgaris patients: a randomized, investigator-blinded exploratory study. Exp Dermatol. 2023;32:906–14.
27. Dal Belo SE, Kanoun-Copy L, Lambert C, Cornillon C, Muller B, Jouni H, et al. Efficacy of a multitargeted, salicylic acid-based dermocosmetic cream compared to benzoyl peroxide 5% in acne vulgaris: results from a randomized study. J Cosmet Dermatol. 2023;23:891–7.
28. Capitanio B, Sinagra JL, Weller RB, Brown C, Berardesca E. Randomized controlled study of a cosmetic treatment for mild acne. Clin Exp Dermatol. 2012;37:346–9.
29. Cestone E, Michelotti A, Zanoletti V, Zanardi A, Mantegazza R, Dossena M. Acne RA-1,2, a novel UV-selective face cream for patients with acne: efficacy and tolerability results of a randomized, placebo-controlled clinical study. J Cosmet Dermatol. 2017;16:265–70.
30. Lee HJ, Kim JY, Park KD, Lee WJ. Randomized controlled double-blind study of a cleanser composed of 5-aminolevulinic acid and peptides on mild and moderate acne vulgaris. J Cosmet Dermatol. 2020;19:1745–50.
31. Wang X, Zhaoxia L, Dan Z, Li L, Seite S. A double-blind, randomized, placebo controlled clinical trial evaluating the efficacy and safety of a new formulation in acneic patients with risks of post-inflammatory hyperpigmentation. Presented at the *Eur Acad Dermatol Venereol Annual Meeting*, Amsterdam, Netherlands, 2014.
32. Angelova-Fischer I, Rippke F, Fischer TW, Neufang G, Zillikens D. A double-blind, randomized, vehicle-controlled efficacy assessment study of a skin care formulation for improvement of mild to moderately severe acne. J Eur Acad Dermatol Venereol. 2013;27(Suppl 2):6–11.
33. Chan H, Chan G, Santos J, Dee K, Co JK. A randomized, double-blind, placebo-controlled trial to determine the efficacy and safety of lactoferrin with vitamin E and zinc as an oral therapy for mild to moderate acne vulgaris. Int J Dermatol. 2017;56:686–90.
34. Lubtikulthum P, Kamanamool N, Udompataikul M. A comparative study on the effectiveness of herbal extracts vs 2.5% benzoyl peroxide in the treatment of mild to moderate acne vulgaris. J Cosmet Dermatol. 2019;18:1767–75.
35. Bhatia AC, Jimenez F. Rapid treatment of mild acne with a novel skin care system containing 1% salicylic acid, 10% buffered glycolic acid, and botanical ingredients. J Drugs Dermatol. 2014;13:678–83.
36. Fabbrocini G, Panariello L. Efficacy and tolerability of a topical gel containing 3% hydrogen peroxide, 1.5% salicylic acid and 4% D-panthenol in the treatment of mild-moderate acne. G Ital Dermatol Venereol. 2016;151:287–91.
37. Zheng Y, Yin S, Xia Y, Chen J, Ye C, Zeng Q, et al. Efficacy and safety of 2% supramolecular salicylic acid compared with 5% benzoyl peroxide/0.1% adapalene in the acne treatment: a randomized, split-face, open-label, single-center study. Cutan Ocul Toxicol. 2019;38:48–54.
38. Saint-Jean M, Khammari A, Seite S, Moyal D, Dreno B. Characteristics of premenstrual acne flare-up and benefits of a dermocosmetic treatment: a double-blind randomised trial. Eur J Dermatol. 2017;27:144–9.
39. Santos-Caetano JP, Gfeller CF, Mahalingam H, Thompson M, Moore DJ, Vila R, et al. Cosmetic benefits of a novel biomimetic lamellar formulation containing niacinamide in healthy females with oily, blemish-prone skin in a randomized proof-of-concept study. Int J Cosmet Sci. 2020;42:29–35.
40. Towersey L, Correia P, Fajgenbaum Feiges M, Euzébio Gonçalves Junior J, Sant'Anna B, Kerob D, et al. Assessment of the benefit of a deep cleansing gel containing salicylic acid 2%, zinc gluconate 0.2% and lipohydroxy acids 0.05% in patients with mild to moderate truncal acne: results from an exploratory study. Clin Cosmet Investig Dermatol. 2023;16:119–23.
41. Kulthanan K, Trakanwittayarak S, Tuchinda PC, Chularojanamontri L, Limphoka P, Varothai S. A double-blinded, randomized, vehicle-controlled study of the efficacy of moisturizer containing licochalcone a, decanediol, L-carnitine, and salicylic acid for prevention of acne relapse in Asian population. Biomed Res Int. 2020;2020:2857812.
42. Bettoli V, Zauli S, Borghi A, Toni G, Ricci M, Bertoldi AM, et al. Efficacy and safety of a 12-month treatment with a combination of hydroxypinacolone retinoate and retinol glycospheres as maintenance therapy in acne patients after oral isotretinoin. G Ital Dermatol Venereol. 2017;152:13–7.
43. Queille-Roussel C, LeFloc'h C, Le Dantec G, Cathelineau AC, Dreno B, Kerob D. Ultra-concentrated tri-acid complex serum as maintenance therapy in adult female acne. J Eur Acad Dermatol Venereol. 2023;37:e840–e841.
44. Khammari A, Demessant-Flavigny AL, Kerob D, Seite S, Dreno B. A salicylic acid-based dermocosmetic is effective as an adjunct to benzoyl peroxide for mild to moderate acne and as monotherapy in maintenance post benzoyl peroxide. J Drugs Dermatol. 2023;22:1172–7.
45. Dreno B, Khammari A, Duhamel K, Delva C, Kerob D. A dermocosmetic associated with a fixed combination of adapalene 0.1% and benzoyl peroxide 5% helps to protect the skin barrier in mild to moderate acne. San Francisco, CA: American Academy of Dermatology; 2021.
46. Tripathi SV, Gustafson CJ, Huang KE, Feldman SR. Side effects of common acne treatments. Expert Opin Drug Saf. 2013;12:39–51.
47. Cannizzaro MV, Dattola A, Garofalo V, del Duca E, Bianchi L. Reducing the oral isotretinoin skin side effects: efficacy of 8% omega-ceramides, hydrophilic sugars, 5% niacinamide cream compound in acne patients. G Ital Dermatol Venereol. 2018;153:161–4.

48. Chularojanamontri L, Tuchinda P, Kulthanan K, Varothai S, Winayanuwattikun W. A double-blinded, randomized, vehicle-controlled study to access skin tolerability and efficacy of an anti-inflammatory moisturizer in treatment of acne with 0.1% adapalene gel. J Dermatolog Treat. 2016;27:140–5.
49. Tan J, Bissonnette R, Gratton D, Kerrouche N, Canosa JM. The safety and efficacy of four different fixed combination regimens of adapalene 0.1%/benzoyl peroxide 2.5% gel for the treatment of acne vulgaris: results from a randomised controlled study. Eur J Dermatol. 2018;28:502–8.
50. Schorr ES, Sidou F, Kerrouche N. Adjunctive use of a facial moisturizer SPF 30 containing ceramide precursor improves tolerability of topical tretinoin 0.05%: a randomized, investigator-blinded, split-face study. J Drugs Dermatol. 2012;11:1104–7.
51. Del Rosso JQ, Gold M, Rueda MJ, Brandt S, Winkelman WJ. Efficacy, safety, and subject satisfaction of a specified skin care regimen to cleanse, medicate, moisturize, and protect the skin of patients under treatment for acne vulgaris. J Clin Aesthet Dermatol. 2015;8:22–30.
52. Monfrecola G, Capasso C, Russo G, Fabbrocini G. UV-selective face cream (Acne RA-1,2) in acne patients: clinical study of its effects on epidermal barrier function, sebum production, tolerability and therapy adherence. G Ital Dermatol Venereol. 2018;153:26–32.
53. Zeichner JA, Patel RV, Haddican M, Wong V. Efficacy and safety of a ceramide containing moisturizer followed by fixed-dose clindamycin phosphate 1.2%/benzoyl peroxide 2.5% gel in the morning in combination with a ceramide containing moisturizer followed by tretinoin 0.05% gel in the evening for the treatment of facial acne vulgaris. J Drugs Dermatol. 2012;11:748–52.
54. Del Rosso JQ, Brandt S. The role of skin care as an integral component in the management of acne vulgaris: part 2: tolerability and performance of a designated skin care regimen using a foam wash and moisturizer SPF 30 in patients with acne vulgaris undergoing active treatment. J Clin Aesthet Dermatol. 2013;6:28–36.
55. DuBois J, Ong GCW, Petkar G, Almeida LMC, Chavda R, Kerrouche N, et al. Patient-reported outcomes in acne patients with skin of color using adapalene 0.3%-benzoyl peroxide 2.5%: a prospective real-world study. J Drugs Dermatol. 2019;18:514.
56. Hayashi N, Kawashima M. Study of the usefulness of moisturizers on adherence of acne patients treated with adapalene. J Dermatol. 2014;41:592–7.
57. Kantikosum K, Chongpison Y, Chottawornsak N, Asawanonda P. The efficacy of glycolic acid, salicylic acid, gluconolactone, and licochalcone a combined with 0.1% adapalene vs adapalene monotherapy in mild-to-moderate acne vulgaris: a double-blinded within-person comparative study. Clin Cosmet Investig Dermatol. 2019;12:151–61.
58. Polakova K, Fauger A, Sayag M, Jourdan E. A dermocosmetic containing bakuchiol, Ginkgo biloba extract and mannitol improves the efficacy of adapalene in patients with acne vulgaris: result from a controlled randomized trial. Clin Cosmet Investig Dermatol. 2015;8:187–91.
59. Wanitphakdeedecha R, Tavechodperathum N, Tantrapornpong P, Suphatsathienkul P, Techapichetvanich T, Eimpunth S, et al. Acne treatment efficacy of intense pulsed light photodynamic therapy with topical licochalcone a, l-carnitine, and decanediol: a spilt-face, double-blind, randomized controlled trial. J Cosmet Dermatol. 2020;19:78–87.
60. Abad-Casintahan F, Chow SK, Goh CL, Kubba R, Hayashi N, Noppakun N, et al. Frequency and characteristics of acne-related post-inflammatory hyperpigmentation. J Dermatol. 2016;43:826–8.
61. Snaidr VA, Damian DL, Halliday GM. Nicotinamide for photoprotection and skin cancer chemoprevention: a review of efficacy and safety. Exp Dermatol. 2019;28(Suppl 1):15–22.
62. Madaan P, Sikka P, Malik DS. Cosmeceutical aptitudes of niacinamide: a review. Recent Adv Antiinfect Drug Discov. 2021;16:196–208.
63. Brito S, Baek JM, Cha B, Heo H, Lee SH, Lei L, et al. Nicotinamide mononucleotide reduces melanin production in aged melanocytes by inhibiting cAMP/Wnt signaling. J Dermatol Sci. 2022;106:159–69.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Thiboutot D, Layton AM, Traore I, Gontijo G, Troielli P, Ju Q, et al. International expert consensus recommendations for the use of dermocosmetics in acne. J Eur Acad Dermatol Venereol. 2024;00:1–15. https://doi.org/10.1111/jdv.20145