Übersicht über relevante („wirksame“) Inhaltsstoffe

Wirknachweis und Literaturhinweise

Autoren

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DGKP Gerhard Kammerlander, Zertifizierter Wundmanager nach §64 GuKG, Geschäftsführung der Kammerlander Consulting Schweiz – des WFI – Wundmanagement Schweiz sowie des Wund Kompetnez Zentrums in Schönering bei Linz – A, Präsident der ARGE der zertifizierten Wundmanager-/innen nach §64 GuKG

A) Zu den gängigen Nomenklaturen (zitiert nach „Blue list“, Editio Cantor Verlag GmbH, 2000)

1. INCI:
Diese Bezeichnung bezieht sich auf die gemeinsame Nomenklatur für die Deklaration von Inhaltsstoffen auf Verpackungen von Kosmetik-Produkten. Die Abkürzung "INCI" steht für **I**nternational **N**omenclature **C**osmetic **I**ngredients (internationale Nomenklatur für kosmetische Inhaltsstoffe). Sie basiert auf einer Terminologie, die von COLIPA entwickelt wurde, um dem Bedarf nach einer wirklich internationalen Vorgehensweise Rechnung zu tragen. Dabei ist darauf hinzuweisen, daß sich Artikel 5a der EU-Kosmetik-Richtlinie auf die amerikanische Nomenklatur CTFA bezieht, die durch INCI als die korrekte Bezeichnung für die Nomenklatur ersetzt wurde. Ein INCI-Name kann mehrere Substanzen umfassen.
Bei kosmetischen Farbstoffen muß die CI-Nummer (**C**olour **I**ndex resp. Farbindex) oder der in Anhang IV der EU-Kosmetik-Richtlinie aufgeführte Name zur Deklaration der Inhaltsstoffe auf Verpackungen angegeben werden, wie es Artikel 6 (1) (g) der EU-Kosmetik-Richtlinie vorsieht. Die CI-Nummer wird somit zur INCI-Bezeichnung dieser Inhaltsstoffe.

2. IUPAC:
Darstellung der chemischen Bezeichnung und der IUPAC-Namen (**I**nternational **U**nion of **P**ure and **A**pplied **C**hemistry). Es wurden EINECS-Bezeichnungen aufgenommen, welche die IUPAC-Nomenklatur verwenden, oder Namen aus CAS (**C**hemical **A**bstracts **S**ervice), die eine eindeutige, geeignete Kennzeichnung des Inhaltsstoffes anbieten. Man hat beide kombiniert, um doppelte Angaben zu vermeiden. Bei pflanzlichen Inhaltsstoffen wird die botanische Bezeichnung nach Linné aufgeführt.

B) Zu den definierten Inhaltsstoffen

1. Besondere, hochwertige Inhaltsstoffe mit definiertem Wirkspektrum – Übersicht

- Aloe barbadensis: INCI: Aloe Barbadensis; IUPAC: Aloe vera, extract; emollient
  Aloe vera-Extrakt

- Ascorbyl palmitate: INCI: Ascorbyl Palmitate; IUPAC: 6-O-Palmitoylascorbic acid; emollients / solvents
  (L-) Ascorbinsäure (palmitat), Vitamin-C-Palmitat

- Arachis hypogea: INCI: Arachis Hypogea; IUPAC: Arachis hypogaea, fatty oil
  Erdnußöl,

- Bisabolol: INCI: Bisabolol; IUPAC: (R*, R*)-alpha, 4-Dimethyl-alpha-(4-methyl-3-pentyl)cyclohex-3-ene-1-methynol; additives
  Bisabolol

- Cera alba: INCI: Cera Alba; IUPAC: Beeswax; emollients / emulsifying agents / film formers
  Bienenwachs

- Ceramide: Ceramide 1, 1A, 2, 3; div. IUPAC-Bezeichnungen;
  Ceramide

- Daucus carota: INCI: Daucus Carota; IUPAC: Daucus carota, extract;
  Karottenöl

- Glycerin: INCI: Glycerin; IUPAC: Glycerol; denaturans / humectans / solvens
  Glycerin

- Panthenol: INCI: Panthenol; IUPAC: Dexpanthenol; antistatic agents
  Panthenol

- Prunus amygdalus dulcis: INCI: Prunus Amygdalus Dulcis; IUPAC: Prunus amygdalus dulcis, extract; emollients;
  (Süß-)Mandelöl

- Retinylpalmitate: INCI: Retinyl Palmitate; IUPAC: Retinyl Palmitate; additives
  Vitamin-A-Palmitat,

- Tocopheryl acetate: INCI: Tocopheryl Acetate; IUPAC: alpha-Tocopheryl acetate; antioxidans
  Vitamin-E-Acetat

- Urea: INCI: Urea; IUPAC: urea; antistatic agents / humectants;
  Harnstoff

2. Zu den Einzelsubstanzen

- **Aloe barbadensis**
  INCI: Aloe Barbadensis; IUPAC: Aloe vera, extract; emollient
  Aloe vera-Extrakt

Es findet ein gereinigter Auszug aus dem Pflanzenparenchym mit nachweislicher antientzündlicher Wirksamkeit Verwendung. Chemisch finden sich Eiweißbestandteile (verschiedene Aminosäuren) sowie Kohlehydrate. Aloe vera-Extrakt bindet Feuchtigkeit und ist damit ein bedeutender Feuchthaltefaktor. Konsekutiv können Dehydratationsfolgen gemindert werden. Die Haut erscheint elastischer und widerstandsfähiger.
Aloe vera gilt als ein geflügelter Begriff in der moderneren Kosmetik. Es ist in vielen höherwertigen Pflegepräparationen enthalten. Allergologisch ist es praktisch unbedenklich. Aloe vera wird häufig als besonders hochwertiger Inhaltsstoff definiert. Verschiedene als hochwertig eingestufte Kosmetika enthalten Aloe-vera-Extrakt. Sein Vorhandensein wird häufig plakativ-werbend dargestellt (der prozentuale Anteil im Produkt ist entscheidend).
Auch in neuester Zeit werden noch Inhaltsstoffe neu identifiziert und dann nach der Wirkung definiert. Damit erschließt sich eine Wirkung in ihrer wissenschaftlichen Erklärung oftmals erst nach Jahrzehnten der durchaus erfolgreichen Anwendung. So wurde erst 1996 ein C-Glucosyl-Chromon als aktive antiinflammatorische Substanz im Aloe-barbadensis-Auszug beschrieben, womit der bisher eher etwas "diffus" gefaßte antiinflammatorische Begriff wesentlich klarer zugeordnet werden konnte.

Kompaktinformation Aloe barbadensis

- feuchtigkeitsspendend-/bindend,
- hautberuhigend und entspannend,
- kühlend,
- juckreizsmindernd

Literatur:

1) Peroxidase activity in Aloe barbadensis commercial gel: probable role in skin protection.
   Esteban A, Zapata JM, Casano L, Martin M, Sabater B.
   Planta Med 2000 Dec;66(8):724-7
2) Antiinflammatory C-glucosyl chromone from Aloe barbadensis.
   Hutter JA, Salman M, Stavinoha WB, Satsangi N, Williams RF, Streeper RT, Weintraub ST.
   J Nat Prod 1996 May;59(5):541-3

- **Ascorbyl palmitate**
  INCI: Ascorbyl Palmitate; IUPAC: 6-O-Palmitoylascorbic acid; emollients / solvents
  (L-) Ascorbinsäure (palmitat), Vitamin-C-Palmitat

Bei Ascorbylpalmitat handelt es sich also um die stabilisierte Form des wasserlöslichen Vitamin C. Vitamin C ist eines der wichtigsten Redoxsysteme des menschlichen Organismus. In der Haut ist die besondere Rolle der Ascorbinsäure in ihrer Funktion für die Narbenbildung (Kollagensynthese durch Hydroxylierung der Aminosäure Prolin) begründet. Inwieweit extern zugeführtes Vitamin C bis in die Cutis vordringen kann, ist eher umstritten. Insgesamt ist jedoch der positive, stabilisierende und schädigungsminimierende Effekt in der epidermalen Struktur als gesichert zu betrachten.
Weiterhin in Diskussion ist natürlich auch das Stabilitätsverhalten von Vitamin C in diversen kosmetischen Zubereitungen.
Die Nachweisverfahren der modernen Labortechnik haben mittlerweile sehr hohe Zuverlässigkeit und damit auch methodische Verläßlichkeit erreicht. Daher kann einer hohen Zahl von Zubereitungen tatsächlich auch längerfristige Stabilität bescheinigt werden.

Kompaktinformation Ascorbyl palmitate

- Vitamin C-Derivat,
- optimal in Kombination mit Vitamin E als Radikalfänger,
- steht dem vorzeitigen Alterungsproszess der Haut entgegen,
- unterstützt die Hautregeneration

Literatur:

3) Acylated ascorbate stimulates collagen synthesis in cultured human foreskin fibroblasts at lower doses than does ascorbic acid.
Rosenblat G, Perelman N, Katzir E, Gal-Or S, Jonas A, Nimni ME, Sorgente N, Neeman I.
Connect Tissue Res 1998;37(3-4):303-11

4) Int J Pharm 2001 Jul 17;222(2):271-9
Stability of ascorbyl palmitate in topical microemulsions.
Spiclin P, Gasperlin M, Kmetec V.

5) J Pharm Biomed Anal 1998 Oct;18(1-2):213-7
Simultaneous HPLC determination of multiple components in a commercial cosmetic cream.
Sottofattori E, Anzaldi M, Balbi A, Tonello G.

6) J Pharm Biomed Anal 1997 Mar;15(6):795-801
Stability of vitamin C derivatives in solution and topical formulations.
Austria R, Semenzato A, Bettero A.

- **Arachis hypogea**
  INCI: Arachis Hypogea; IUPAC: Arachis hypogaea, fatty oil
  Erdnußöl

Wie alle natürlichen (pflanzlichen) Öle handelt es sich beim Erdnußöl um eine Substanz, welche im Rahmen der Substitution von Hautlipiden Verwendung findet. Dabei sind insbesondere diese mittelkettigen Fettgemische ein hochwertiger Ersatz bei Hauttrockenheitszuständen. Der Ausdruck „naturidentische Öle“, wie er in diesem Zusammenhang häufig benutzt wird, erscheint für den Nichtfachmann wohl eher verwirrend. Prinzipiell ist festzustellen, daß pflanzliche Öle generell in ihrer Struktur (ein- und mehrfach ungesättigte mittelkettige Fettsäuren) den in der menschlichen Haut vorkommenden Lipiden recht ähnlich sind. Somit ist auch die Substitutionswirkung recht gut und das Anwendungsgefühl erscheint angenehm. Pflanzliche Öle emulgieren schon spontan besser und haben ein günstigeres Spreitverhalten. Sie okkludieren weniger (weil sie kurzkettiger als fast alle Mineralöle sind) und penetrieren wegen der Kleinheit des Moleküls wesentlich effizienter. Im Gegensatz zu tierischen Fetten sind sie allergologisch praktisch als vollständig unbedenklich einzuschätzen. Tierisches Fett besitzt eine wesentlich höhere allergene Potenz, da die gleichzeitige molekulare Nähe zu humanen Lipiden (bei gleichzeitigem Vorliegen immunologisch relevanter Unterschiede) eine deutlich höhere und statistisch signifikante Sensibilisierungsrate ausmacht.

Kompaktinformation Arachis hypogea

- hochwertige natürliche Ölkomponente mit sehr guter Spreitung,
- reich an ein- und mehrfach ungesättigten mittelkettigen Fettsäuren

- **Bisabolol**
  INCI: Bisabolol; IUPAC: (R*, R*)-alpha, 4-Dimethyl-alpha-(4-methyl-3-pentyl)cyclohex-3-ene-1-methynol; additives
  Bisabolol

Bisabolol ist eine antientzündliche Substanz, deren Vorhandensein hauptsächlich die bekannte antiinflammatorische Wirksamkeit von echter Kamille begründet. Die jahrhundertealte empirische Kenntnis der Wirksamkeit wurde bereits mit Beginn der systematischen Erforschung extern einzusetzender Substanzen phytogener Herkunft objektiviert. Noch heute wird jener Effekt sowohl bei der Herstellung von kosmetischen Präparationen geschätzt und genutzt.
In den letzten Jahren stand die Erforschung der prinzipiellen Wirkmöglichkeit von Bisabolol-haltigen Externa im Interesse. Dabei gelang es, die Umwandlung zu aktiven Metaboliten zu beweisen und den Wirkmechanismus einer tatsächlichen antiphlogistischen Eigenschaft zu sichern.

Kompaktinformation Bisabolol

- Bisabolol ist antiphlogistisch (entzündungswidrig),
- beruhigt die Haut,
- leicht antibakteriell und
- leicht antimykotisch

Literatur:

7) Clin Ter 2000 Mar-Apr;151(2):77-80
Study of tolerance and efficacy of cosmetic preparations with lenitive action in atopic dermatitis in children
Grassi A, Palermi G, Paradisi M.

8) Arzneimittelforschung 1987 Jun;37(6):716-20
Absorption, distribution and metabolism of [14C]-levomenol in the skin
Hahn B, Holzl J.

9) Arzneimittelforschung 1969 Apr;19(4):615-6
On the inflammation inhibitory effect of (-)-alpha-bisabolol, an essential component of chamomilla oil]
Jakovlev V, von Schlichtegroll A

- **Cera alba**
  INCI: Cera Alba; IUPAC: Beeswax; emollients / emulsifying agents / film formers
  Bienenwachs

Bienenwachs wird bereits seit der klassischen Antike als Grundlage für Pflegepräparate verwendet. Einerseits hat es daher als "biologische, natürliche Grundlage" eine große Tradition. Andererseits ist es sehr akzeptiert auf der Grundlage des guten Verteilungsverhaltens und der angenehmen Pflegeeigenschaften.
Tatsächliche wissenschaftliche Auseinandersetzungen mit dem Verhalten von Bienenwachs hat nach Lage der Literatur kaum stattgefunden. Es existiert lediglich eine Arbeit, welche die barriereprotektive und irritationsmindernde Wirkung von Bienenwachs als Grundlage in Kombination mit weiteren bekannten und die epidermale Regeneration verbessernden Substanzen beschreibt.

Kompaktinformation Cera alba

- hochwertiger Stabilisator, Konsistenzgeber, rückfettend

Literatur:

10) Contact Dermatitis 1998 Mar;38(3):155-8
Evaluating skin-protective materials against contact irritants and allergens. An in vivo screening human model.
Zhai H, Willard P, Maibach HI.

- **Ceramide**
  Ceramide 1, 1A, 2, 3; div. IUPAC-Bezeichnungen;
  Ceramide,

Ceramide sind Ester längerkettiger Omega-Hydroxy-Fettsäuren und der Linolensäure. Es wurden bisher sechs Subgruppen dieser Substanzen nachgewiesen. Ceramide sind hinsichtlich ihrer Wirkungsweise unter physiologischen Bedingungen sowie bezüglich der Problematik eines Defizites gut untersucht. Sie tragen nachweislich eine grundsätzliche Rolle für Erhaltung bzw. Wiederherstellung der Hautwiderstandsfähigkeit. Bei verschiedenen pathologischen Hautzustandsbildern der Xerosis cutis (trockene Haut), so namentlich beim atopischen Ekzem und der Alterssebostase, sind sie nachweislich in ihrer Konzentration vermindert. Recht umfassende Versuche haben belegt, daß Substitution durch lokale Anwendung möglich ist. Klinisch-empirisch scheint eine Konzentration im Promilleberich ausreichend zu sein.

Kompaktinformation Ceramide

- hochwertige Fettkomponente,
- bindet Feuchtigkeit,
- hautberuhigend und entspannend

Literatur:

11) Acta Derm Venerol. 1998 78 (1): 27-30: Ceramide and cholesterol composition of the skin of patients with atopic dermatitis.
DiNardo A, Wertz P, Gianetti A, Seidenari S

12) Arch Dermatol Res. 1996 288: 765-770
Stratum corneum lipids: the effect of ageing and the seasons.
Rogers J, Harding, C, Mayo A, Banks J, Rawlings A

- **Daucus carota**
  INCI: Daucus Carota; IUPAC: Daucus carota, extract;
  Karottenöl,

Bei Karottenöl handelt es sich um eine allgemein für Pflegeprodukte relativ häufig verwendete, besonders von "biologischen" Produkten explizit ausgelobte Mischung aus verschiedenen kurz- bis mittelkettigen Fettsäuren, welche unterschiedliche Konzentrationen an Vitaminen bzw. Provitaminen enthält. Relevant wird dabei insbesondere und erwartungsgemäß ß-Carotin. Die tatsächliche Wirkung auf die Barrierefunktion der Haut ist, wenn sie denn überhaupt weitergehend erforscht wurde, nicht publiziert. Das Karottenfarbstoff enthaltende Ölgemisch wirkt gleichfalls natürlich färbend. Dieser Farbstoff wird allergologisch als unbedenklich betrachtet.

Kompaktinformation Daucus carota

- reich an kurz- bis mittelkettigen Fettsäuren,
- reich an Vitaminen-/ Provitamin
- besonders reich an ß-Carotin (Pro-Vitamin A)

- **Glycerin**
  INCI: Glycerin; IUPAC: Glycerol; denaturans / humectans / solvens
  Glycerin

Glycerin gilt als der klassische nicht eiweißbasierte Feuchthalter in Hautpflegezubereitungen. Seine diesbezügliche Wirksamkeit wurde bereits sehr früh in der wissenschaftlichen Auseinandersetzungen mit Externagrundlagen und Pflegepräparationen herausgestellt. Dabei war insbesondere die deutlich verbesserte Geschmeidigkeit der Haut, wie sie nach regelmäßiger Anwendung glycerinhaltiger Zubereitungen auffällig wird, im Mittelpunkt des Interesses zu sehen.
Jüngste Forschungen befassen sich mit dem kombinierten Effekt der Hydradationsverbesserung sowie der Stabilisierung der Barrierefunktion der Epidermis unter der Applikation von Glycerin. Mittlerweile ist tatsächlich der wissenschaftliche Nachweis beider Eigenschaften, welche unabhängig voneinander generiert werden, gelungen. Dabei wurde nachgewiesen, daß die Verbesserung der Barrierefunktion tatsächlich als regulatorische Beeinflussung stattfindet und nicht ein bloßer "Nebeneffekt" der Feuchthaltefunktion zu sehen ist. Diese Tatsache unterstreicht die besondere Bedeutung des Glycerins nochmals. Klinisch-empirisch scheint auch eine 3-5 % Konzentration ausreichende Wirksamkeit im Sinne der temporären Wasserspeicherung bei exzellenter Verträglichkeit zu gewährleisten.

Kompaktinformation Glycerin

- Feuchtigkeitsspender,
- Teil des Natural Moisturizing Factors (NMF),
- leicht antibakteriell,
- leicht rückfettend,
- fördert die Geschmeidigkeit der Haut,
- verstärkt die Barrierefunktion der Haut

Literatur:

13) Dermatology 1998;197(1):18-24
Opposing effects of glycerol on the protective function of the horny layer against irritants and on the penetration of hexyl nicotinate.
Bettinger J, Gloor M, Peter C, Kleesz P, Fluhr J, Gehring W.

14) Acta Derm Venereol 1999 Nov;79(6):418-21
Glycerol accelerates recovery of barrier function in vivo.
Fluhr JW, Gloor M, Lehmann L, Lazzerini S, Distante F, Berardesca E.

15) J Dermatol Sci 1999 Jan;19(1):48-52
Plasticising effect of water and glycerin on human skin in vivo.
Pedersen LK, Jemec GB.

- **Panthenol**
  INCI: Panthenol; IUPAC: Dexpanthenol; antistatic agents
  Panthenol

Dexpanthenol hat im Rahmen seiner Funktion als Vorstufe des Vitamin B5 folgerichtig Provitamincharakter. Als relevanter Bestandteil des Coenzym A ist es mithin an wesentlichen regenerativen Stoffwechselprozessen des Hautorganes beteiligt.
In einer Vielzahl klinischer Studien und Anwendungsbeobachtungen ist der Nutzen von topisch appliziertem Dexpanthenol überprüft worden. Insgesamt läßt sich ein sehr positiver Effekt von Dexpanthenol auf die Wirksamkeit der epidermalen Barrierefunktion postulieren. Der transepidermale Wasserverlust läßt sich minimieren, die Hydradation der Epidermis verbessert sich. Regenerative Potenzen der Epidermis werden gesteigert.
Klinisch-empirisch scheint auch eine 3-5 % Konzentration ausreichend zu sein.

Kompaktinformation Panthenol

- Feuchtigkeitsspender,
- Teil des Natural Moisturizing Factors (NMF),
- leicht antibakteriell,
- leicht rückfettend,
- fördert die Geschmeidigkeit der Haut,
- verstärkt die Barrierefunktion der Haut

Literatur:

16) Hautarzt 2000;51 Suppl Regenerat:1-4
Dexpanthenol for dry skin. Regeneration of damaged permeability barrier of the skin

17) Arzneimittelforschung 2000 Jul;50(7):659-63
Effect of topically applied dexpanthenol on epidermal barrier function and stratum corneum hydration. Results of a human in vivo study.
Gehring W, Gloor M.

- **Prunus amygdalus dulcis**
  INCI: Prunus Amygdalus Dulcis; IUPAC: Prunus amygdalus dulcis, extract; emollients;
  (Süß-)Mandelöl,

Bei Mandelöl handelt es sich um einen beinahe schon klassischen Inhaltsstoff hochwertiger Hautpflege, ein langkettiges pflanzliches Öl hohen Fettcharakters. Aufgrund dieser ausgeprägten Rückfettung sehr beliebt in Zubereitungen hohen Fettgehaltes. Dabei stellt Mandelöl eine sehr hochwertige Alternative zum Einsatz von mineralischen Ölen dar. Die Verwendung von Mandelöl wird daher gern als Qualitätsmaß insbesondere bei der Herstellung von Pflegepräparaten hohen Fettcharakters bemüht. Die subjektiv sehr positiv imponierenden Eigenschaften wurden aus der Tradition der frühen Hautpflegepräparate übernommen. Wissenschaftliche Auseinandersetzung mit der Substanz selbst hat in moderner Zeit jedoch nicht mehr stattgefunden.

Kompaktinformation Prunus amygdalus dulcis

- hochwertige langkettige Fettsäuren
- hoher Rückfettungscharakter
- besonders gut geeignet bei trockener bis sehr trockener Haut

- **Retinylpalmitate**
  INCI: Retinyl Palmitate; IUPAC: Retinyl Palmitate; additives
  Vitamin-A-Palmitat,

Die aktive Form des Vitamin A ist ein wesentlicher regulatorischer Bestandteil der Epidermis. Die führende Funktion stellt die regulative und, im Falle einer Schädigung, normalisierende Wirkung auf die Keratinisierung dar. Eine direkte Beeinflussung der DNA-Synthese wurde nachgewiesen. Jenseits der therapeutischen Wirkung der Anwendung der aktiven Form des Vitamin A bei verschiedenen Formen von Erkrankungen des proliferativ-hyperkeratotischen Formenkreises wird die Vorform des bioaktiven Moleküles, eben Retinylpalmitat, schon längere Zeit in kosmetischen Präparationen eingesetzt. Mittlerweile wurde im Tiermodell der Nachweis erbracht, daß tatsächlich die biologisch aktive Form der Vitamin-A-Säure aus den mittels Pflegezubereitungen applizierten Formen synthetisiert wird. Dementsprechend kann der reparative und sogen. "Anti-aging-Effekt" wohl tatsächlich postuliert werden. Klinisch-empirisch scheint eine 0,5 – 1% Konzentration ausreichend zu sein.

Kompaktinformation Retinylpalmitate

- Vitamin A unterstützt die Epithelisierung,
- stabilisiert die Epidermis
- verringert die Faltentiefe,
- normalisiert die Melaninbildung bei leichten Pigmentstörungen,
- verbessert die natürlichen Hautfunktionen,
- mindert den Alterungsprozess der Haut

Literatur:

18) Pharm Res 1994 Aug;11(8):1155-9
Characterization of esterase and alcohol dehydrogenase activity in skin. Metabolism of retinyl palmitate to retinol (vitamin A) during percutaneous absorption.
Boehnlein J, Sakr A, Lichtin JL, Bronaugh RL.

- **Tocopheryl acetate**
  INCI: Tocopheryl Acetate; IUPAC: alpha-Tocopheryl acetate; antioxidans
  Vitamin-E-Acetat,

Insgesamt sind all die antioxidativ wirksamen Substanzen (Vitamine, Provitamine und andere Antioxidantien) wohl am besten in ihrem Zusammenwirken als "antioxidatives Netzwerk" zu sehen, welches einen teils additiven, teils komparativen Wirkmechanismus beschreibt. Allerdings, so haben neueste Arbeiten ergeben, ist die höchste Effektivität unter all diesen diesbezüglich anwendungsüblichen Substanzen augenscheinlich dem Vitamin E zuzuweisen. Die Wirksamkeit der Substanz nach lokaler Applikation ist bewiesen; es existieren differente Applikations- bzw. Vehikelformen, welche die Aufnahme und Wirksamkeit einerseits sowie die Tiefe der Penetration grundlegend beeinflussen. Spezielle Darreichungsformen mit Verpackung des Tocopherolacetates in liposomale Träger scheinen besonders hohe Effektivität zu gewährleisten. Klinisch-empirisch scheint eine 1 - 2% Konzentration ausreichend zu sein.

Kompaktinformation Tocopheryl acetate

- Vitamin E glättet das Hautoberflächenrelief,
- steigert das Feuchthaltevermögen der Haut,
- Entzündungen werden gehemmt,
- Vitamin E (Depotform) wird abgespalten und ist deshalb länger verfügbar,
- ist entzündungshemmend (Radikalfänger),
- beschleunigt die Regeneration der Haut.

Literatur:

19) J Cosmet Sci 2001 May-Jun;52(3):155-61
Direct evidence for bioconversion of vitamin E acetate into vitamin E: an ex vivo study in viable human skin.
Baschong W, Artmann C, Hueglin D, Roeding J.

20) Curr Probl Dermatol 2001;29:26-42
The antioxidant network of the stratum corneum.
Thiele JJ, Schroeter C, Hsieh SN, Podda M, Packer L.

21) J Invest Dermatol 2001 Nov;117(5):1212-7
Aging- and photoaging-dependent changes of enzymic and nonenzymic antioxidants in the epidermis and dermis of human skin in vivo.
Rhie Ge GE, Shin MH, Seo JY, Choi WW, Cho KH, Kim KH, Park KC, Eun HC, Chung JH.

- **Urea**
  INCI: Urea; IUPAC: urea; antistatic agents / humectants;
  Harnstoff,

Harnstoff war das erste große Molekül des Humanstoffwechsels, welches auf rein synthetischem Wege dargestellt werden konnte. Synthetischer Harnstoff ist dem natürlichen hundertprozentig identisch und entspricht damit vollkommen dem natürlichen Hauptanteil des Eiweißkomplexes am Natural Moisturizing Factor NMF. Die Anwendung von Harnstoff zur Verbesserung des Feuchtigkeitsbindungsvermögens der Haut ist eine alte, überaus bewährte und exzellent dokumentierte Methode. Die ausgezeichnete Rückfeuchtung geht mit einer konsekutiven (also per se volumeninduzierten) Verdickung der Epidermis einher: irreversible keratoplastische Wirkung. Eine Dosis-Wirkungs-Beziehung bezüglich des Effektes ist nicht sicher bewiesen. Es gibt weiterhin Vermutungen, daß eine Schwellenkonzentration existieren könnte, jenseits derer eine gesicherte pharmakologische Wirkung erst eintreten würde. Diese pharmakologische Wirkung ist jedoch eine keratolytische / antihyperkeratotische und an hohe Substanzkonzentrationen gebunden; allerdings sind diese Konzentrationen mit definitiv bewiesener therapeutischer Wirkung (10 % bzw. 12%) nicht großflächig verträglich. Klinisch-empirisch scheint auch eine 3-5 % Konzentration ausreichende Wirksamkeit im Sinne der temporären Wasserspeicherung bei exzellenter Verträglichkeit zu gewährleisten.

Kompaktinformation Urea

- Feuchtigkeitsspender,
- Teil des Natural Moisturizing Factors (NMF),
- leicht antibakteriell,
- juckreizmindernd,
- entschuppend

Literatur:

22) Kosmet Med 1998;3: 164-7
Harnstoff – ein wichtiger Wirkstoff in der Dermatotherapie.
Tausch IP, Hughes-Formella B, Schölermann A, Rippke F.

23) Contact Dermatitis 1997 May;36(5):256-60
Barrier recovery and influence of irritant stimuli in skin treated with a moisturizing cream.
Loden M.

24) Z Hautkr 1981 Mar 1;56(5):282-300
Formation and treatment of pathologic scars--clinical and micromorphologic investigations
Kerl H, Aubock L, Bayer U.

3. Abstracts zu den Literaturangaben

1) Planta Med 2000 Dec;66(8):724-7

Peroxidase activity in Aloe barbadensis commercial gel: probable role in skin protection.

Esteban A, Zapata JM, Casano L, Martin M, Sabater B.

Departamento de Biologia Vegetal, Universidad de Alcala, Alcala de Henares, Madrid, Spain.

A basic peroxidase (EC 1.11.1.7) (pl around 9.0) has been identified in commercial gel of Aloe barbadensis. In vivo, the activity is localised in the vascular system of inner aqueous leaf parenchyma. Some relevant properties of this basic peroxidase of Aloe have been investigated in leaf extract and in commercial gel where it is notably stable. The acid optimum pH (5.0) for activity and the low KM for H2O2 (0.14 mM) suggest that, when topically applied, Aloe peroxidase may scavenge H2O2 in skin surface.

PMID: 11199129 [PubMed - indexed for MEDLINE]

2) J Nat Prod 1996 May;59(5):541-3

Antiinflammatory C-glucosyl chromone from Aloe barbadensis.

Hutter JA, Salman M, Stavinoha WB, Satsangi N, Williams RF, Streeper RT, Weintraub ST.

Department of Pharmacology, Research Imaging Center, University of Texas Health Science Center at San Antonio, 78284-7760, USA.

A new antiinflammatory agent identified as 8-[C-beta-D-[2-O-(E)-cinnamoyl]glucopyranosyl]-2- [(R)-2-hydroxypropyl]-7-methoxy-5-methylchromone (1) has been isolated from Aloe barbadensis Miller. At a dose of 200 microg/mouse ear, 1 exhibited topical antiinflammatory activity equivalent to 200 microg/ear of hydrocortisone. There was no reduction in thymus weight caused by treatment with 1 for any of the doses tested, while 200 microg/ear of hydrocortisone resulted in a 50% decrease in thymus weight.

PMID: 8778246 [PubMed - indexed for MEDLINE]

3) Connect Tissue Res 1998;37(3-4):303-11

Acylated ascorbate stimulates collagen synthesis in cultured human foreskin fibroblasts at lower doses than does ascorbic acid.

Rosenblat G, Perelman N, Katzir E, Gal-Or S, Jonas A, Nimni ME, Sorgente N, Neeman I.

Department of Food Engineering and Biotechnology, Technion-Israel Institute of Technology, Haifa.

Acylated derivatives of ascorbic acid were found to be active in a number of biochemical and physiological processes. In the present study we investigated the effects of 6-O-palmitoyl ascorbate on collagen synthesis by cultured foreskin human fibroblasts. Our observations indicate a marked stimulatory effect on collagen synthesis by 6-O-palmitoyl ascorbate in the concentration range of 5-20 microM, while the synthesis stimulated by ascorbic acid was maximal at concentrations of 20-100 microM. Cells treated with 10 microM palmitoyl ascorbate for 36 h exhibited a production of collagen threefold greater than those in the presence of 10 microM ascorbic acid, and it was about the same as in cells treated with 100 microM ascorbic acid. By 48 h differences were not significant. Acylated ascorbate impaired vitality of the treated fibroblasts at concentrations exceeding 20 microM in media supplemented with 0.5% FCS. However, most of the cytotoxic effect was neutralized by FCS at a concentration of 10%. The resistance of acylated ascorbate against oxidative degradation as well as the role of free radicals in the modulation of collagen synthesis by ascorbic acid and by its derivatives is discussed.

PMID: 9862229 [PubMed - indexed for MEDLINE]

4) Int J Pharm 2001 Jul 17;222(2):271-9

Stability of ascorbyl palmitate in topical microemulsions.

Spiclin P, Gasperlin M, Kmetec V.

Faculty of Pharmacy, University of Ljubljana, Askerceva 7, 1000, Ljubljana, Slovenia.

Ascorbyl palmitate and sodium ascorbyl phosphate are derivatives of ascorbic acid, which differ in stability and hydro-lipophilic properties. They are widely used in cosmetic and pharmaceutical preparations. In the present work the stability of both derivatives was studied in microemulsions for topical use as carrier systems. The microemulsions were of both o/w and w/o types and composed of the same ingredients. The stability of the less stable derivative ascorbyl palmitate was tested under different conditions to evaluate the influence of initial concentration, location in microemulsion, dissolved oxygen and storage conditions. High concentrations of ascorbyl palmitate reduced the extent of its degradation. The location of ascorbyl palmitate in the microemulsion and oxygen dissolved in the system together significantly influence the stability of the compound. Light accelerated the degradation of ascorbyl palmitate. In contrast, sodium ascorbyl phosphate was stable in both types of microemulsions. Sodium ascorbyl phosphate is shown to be convenient as an active ingredient in topical preparations. In the case of ascorbyl palmitate, long-term stability in selected microemulsions was not adequate. To formulate an optimal carrier system for this ingredient other factors influencing the stability have to be considered.

PMID: 11427357 [PubMed - indexed for MEDLINE]

5) J Pharm Biomed Anal 1998 Oct;18(1-2):213-7

Simultaneous HPLC determination of multiple components in a commercial cosmetic cream.

Sottofattori E, Anzaldi M, Balbi A, Tonello G.

Dipartimento di Scienze Farmaceutiche, Genova, Italy.

A high-performance liquid chromatographic method for the simultaneous determination of magnesium ascorbyl phosphate (I), imidazolidinylurea (II), a mixture of methyl-(III), ethyl-(IV), propyl-(V), butyl-(VI) parabens dissolved in phenoxyethanol, and ascorbyl palmitate (VII), was studied by using a cyano-propyl column and a methanol gradient at 220 and 240 nm. Calibration curves were found to be linear in the 0.05-5 mg ml(-1) range (compounds I, II, VII) and 0.9-160 mg ml(-1) (compounds III-VI). Linear regression analysis of the data demonstrates the efficacy of the method in terms of precision and accuracy. An extraction method is developed and validated in order to apply this chromatographic method to a commercial cosmetic cream. The precision of this method, calculated as the relative standard deviation (RSD) of the recoveries (1.57-2.21%) was excellent for all compounds I-VII.

PMID: 9863960 [PubMed - indexed for MEDLINE]

6) J Pharm Biomed Anal 1997 Mar;15(6):795-801

Stability of vitamin C derivatives in solution and topical formulations.

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The stability of ascorbic acid, ascorbyl palmitate and magnesium ascorbyl phosphate (VC-PMG) in both standard solutions and topical formulations was investigated by direct RP-HPLC analysis after sample dilution with a suitable aqueous-organic solvent mixture. The results showed that, whereas the two vitamin C derivatives were more stable than ascorbic acid, the ascorbyl esters showed significant differences. Esterification with palmitic acid in 6 position did not prevent hydrolysis of the molecule, either in solution or in emulsion; only the special preparation of products with high viscoelastic properties was able to reduce the typical behaviour of this compound. Conversely, the introduction of the phosphoric group in 2 position protected the molecule from break-up of the enediol system, confirming VC-PMG as a very stable derivative of vitamin C that may be easily used in various types of cosmetic products.

PMID: 9172105 [PubMed - indexed for MEDLINE]

7) Clin Ter 2000 Mar-Apr;151(2):77-80

Study of tolerance and efficacy of cosmetic preparations with lenitive action in atopic dermatitis in children

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PURPOSE: In AD (atopic dermatitis), the barrier function of skin is impaired, causing dryness and vulnerability: the first-end point to achieve is restoring skin's function to avoid relapses. Our aim was to assess tolerability and effecacy of two cosmetics with moisturizing and lenitive action in subjects affected by AD. PATIENTS AND METHODS: We used a topical preparation (product A) and a new formulation of it (product B) containing glycyrrhetinic acid, alpha-bisabolol, squalene, oryzanol and hohoba-oil. Product B was then compared with a third one (product C), also based on

glycyrrhetinic acid and bisabolol. 30 subjects, aged between 4 months and 16 years, were included in the study (13 girls and 17 boys), suffered from mild-moderate AD, not treated with steroids. Patients were treated twice a day for 21 days, as follows: 12 product A (Decortil lipocrema IDI Farmaceutici); 9 product B (Decortil crema, IDI Farmaceutici); 9 product B on the right and product C (Lichtena AI crema UCB Pharma) on the left. We also did: photografic documentation, SCORAD Index, evaluation of objective (erythema, exudation, excoriation, dryness) and subjective (itching and burning) simptomatology (scoring 0-3) and physiopatological cutaneous tests as TEWL (Trans Epidermal Water Loss), corneometry and pHmetry at beginning and at end of treatment. RESULTS: All groups improved both clinically and instrumentally. Corneometry increased, TEWL lowed and pH turned to normality. CONCLUSIONS: Product A is better for restoring cutaneous physiology, B resulted more efficient in rehydration, in acute phase and as emollient agent, whereas C has more lenitive action.

PMID: 10876973 [PubMed - indexed for MEDLINE]

8) Arzneimittelforschung 1987 Jun;37(6):716-20

Absorption, distribution and metabolism of [14C]-levomenol in the skin

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The purpose of the present investigations was to study the cutaneous absorption of sesquiterpenic alcohol, the major active principle of chamomile. For these investigations 14C-labelled levomenol ((-)-6-methyl-2-(4-methyl-3-cyclohexen-1-yl)-5-hepten-2-ol; (-)-alpha-bisabolol) was prepared by biochemical incorporation of [14C]-acetate into the molecule. 5 h after topical application of the radiolabelled substance onto nude mice half of the radioactivity was found in the skin. The other part was measured in tissue and organes. 90% of this radioactivity was analysed as intact levomenol. To demonstrate the distribution of the substance in the skin a part of this tissue was cutted into horizontal slices by a cryotome. From the slices autoradiograms were produced. The densitometric measuration showed that there was a fast penetration of levomenol into the skin. 5 h after the topical application the substance was displaced from outermost to innermost areas. From these results a fast cutaneous absorption and a long therapeutical effect of the antiphlogistic and spasmolytic levomenol in the skin can be expected.

PMID: 3663271 [PubMed - indexed for MEDLINE]

9) Arzneimittelforschung 1969 Apr;19(4):615-6

On the inflammation inhibitory effect of (-)-alpha-bisabolol, an essential component of chamomilla oil

Jakovlev V, von Schlichtegroll A.

PMID: 5819162 [PubMed - indexed for MEDLINE]

10) Contact Dermatitis 1998 Mar;38(3):155-8

Evaluating skin-protective materials against contact irritants and allergens. An in vivo screening human model.

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2 acute irritants and 1 allergen were selected: sodium lauryl sulfate (SLS) representative of irritant household and occupational contact dermatitis, the combination of ammonium hydroxide (NH4OH) and urea to simulate diaper dermatitis, and Rhus to evaluate the effect of model protective materials. The putative protective materials and vehicle were applied to both ventral forearms of 10 subjects in each group, according to a randomized code. Test materials were spread over a marked 2.0 cm2 area, massaged in, allowed to dry for 30 min, and reapplied with another 30 min drying period. The model irritants and allergen were then applied (0.025 ml) to an Al-test occlusive patch, which in turn was placed for 24 h over each of the 8 designated sites. Inflammation was scored according to a clinical scale 72 h post-application. Paraffin wax plus Acetulan in cetyl alcohol, and beeswax plus Acetulan in cetyl alcohol, markedly ($p < 0.001$) suppressed SLS irritation. Paraffin wax plus beeswax in cetyl alcohol, and Acetulan in cetyl alcohol reduced NH4OH and urea irritation ($p < 0.05$), paraffin wax in cetyl alcohol significantly ($p < 0.01$) decreasing Rhus allergic contact dermatitis. This model, provides an easy approach to screening protectants. Its clinical significance requires comparison with an open rather than an occluded challenge.

PMID: 9536408 [PubMed - indexed for MEDLINE]

11) Acta Derm Venereol 1998 Jan;78(1):27-30

Ceramide and cholesterol composition of the skin of patients with atopic dermatitis.

Di Nardo A, Wertz P, Giannetti A, Seidenari S.

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Atopic dermatitis skin tends to be easily irritated and appears dry. These clinical peculiarities correspond to impaired barrier function and to increased transepidermal water loss (TEWL) values. A few studies suggest that a reduced amount of total ceramides (especially of ceramide 1) is responsible for functional abnormalities of the skin of atopic dermatitis patients. The aim of this study was to analyze the relationship between epidermal lipids and barrier impairment in the skin of patients with atopic dermatitis. The quantity of ceramides, cholesterol sulphate and free cholesterol of 47 patients with atopic dermatitis and 20 age- and sex-matched healthy subjects was assessed by cyanoacrylate stripping and thin layer chromatography. Capacitance and TEWL were recorded at the same site of the lipid sample. In patients with atopic dermatitis, the levels of ceramide 1 and 3 were significantly lower and values of cholesterol significantly higher with respect to healthy subjects. Moreover, the CER/CH ratio was significantly lower with respect to normal skin. Patients with active

signs of eczema also had higher TEWL values and lower capacitance values. By contrast, patients with no active signs of atopic dermatitis had a normal barrier function and intermediate values of ceramides and cholesterols, when compared to patients with atopic dermatitis with active lesions and normal subjects. The quantity of ceramide 3 was significantly correlated with TEWL impairment. These findings suggest that a decrease in ceramides in the stratum corneum is involved in barrier impairment in atopic dermatitis skin. Our data confirm those of other authors and support the view that impaired metabolism of ceramides may be the cause of dry skin and impaired barrier function in atopic dermatitis.

PMID: 9498022 [PubMed - indexed for MEDLINE]

12) Arch Dermatol Res 1996 Nov;288(12):765-70

Stratum corneum lipids: the effect of ageing and the seasons.

Rogers J, Harding C, Mayo A, Banks J, Rawlings A.

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Stratum corneum lipids play a predominant role in maintaining the water barrier of the skin. In order to understand the biological variation in the levels and composition of ceramides, ceramide 1 subtypes, cholesterol and fatty acids, stratum corneum lipids collected from tape strippings from three body sites (face, hand, leg) of female Caucasians of different age groups were analysed. In addition, we studied the influence of seasonal variation on the lipid composition of stratum corneum from the same body sites. The main lipid species were quantified using high-performance thin-layer chromatography and individual fatty acids using gas chromatography. Our findings demonstrated significantly decreased levels of all major lipid species, in particular ceramides, with increasing age. Similarly, the stratum corneum lipid levels of all the body sites examined were dramatically depleted in winter compared with spring and summer. The relative levels of ceramide 1 linoleate were also depleted in winter and in aged skin whereas ceramide 1 oleate levels increased. The other fatty acid levels remained fairly constant with both season and age, apart from lignoceric and heptadecanoic acid which showed a decrease in winter compared with summer. The decrease in the mass levels of intercellular lipids and the altered ratios of fatty acids esterified to ceramide 1, are likely to contribute to the increased susceptibility of aged skin to perturbation of barrier function and xerosis, particularly during the winter months.

PMID: 8950457 [PubMed - indexed for MEDLINE]

13) Dermatology 1998;197(1):18-24

Opposing effects of glycerol on the protective function of the horny layer against irritants and on the penetration of hexyl nicotinate.

Bettinger J, Gloor M, Peter C, Kleesz P, Fluhr J, Gehring W.

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BACKGROUND: It is known that glycerol in an oil-in-water emulsion has a protective effect against irritating substances. OBJECTIVE: To answer the question: is the protection effect of glycerol based on a regenerative process? METHODS: Upon irritation by either tape stripping or acetone treatment, we applied glycerol to the skin surface under an occlusive dressing to create transepidermal water movement. As a control we used water under the occlusive dressing on the contralateral forearm. After 5 h we compared the barrier function using biological tests. RESULTS: A significant improvement of the protective barrier function was observed in the glycerol-treated areas, as shown by the alkali resistance and by the irritant effect of dimethyl sulfoxide (DMSO) as well as sodium lauryl sulfate. Surprisingly, at the same time penetration of hexyl nicotinate improved on the glycerol-treated areas. A direct physicochemical protection effect on the surface of the skin was ruled out in additional studies using NaOH and DMSO. CONCLUSIONS: Under the given conditions glycerol leads to a more rapid reconstitution of the protective skin barrier and initiates a regenerative skin protection. In contrast to that, it is acting as a penetration enhancer.

PMID: 9693180 [PubMed - indexed for MEDLINE]

14) Acta Derm Venereol 1999 Nov;79(6):418-21

Glycerol accelerates recovery of barrier function in vivo.

Fluhr JW, Gloor M, Lehmann L, Lazzerini S, Distante F, Berardesca E.

Department of Dermatology, Stadt. Klinikum Karlsruhe, Germany.

Two studies were performed to evaluate the influence of glycerol on the recovery of damaged stratum corneum barrier function. Measurements of transepidermal water loss and capacitance were conducted in a 3-day follow-up after tape stripping (study 1) and a 7-day follow-up after a barrier damage due to a repeated washing with sodium lauryl sulphate. In study 1 a faster barrier repair (transepidermal water loss) was monitored in glycerol-treated sites. Significant differences between glycerol open vs. untreated and glycerol occluded vs. untreated were observed at day 3. Stratum corneum hydration showed significantly higher values in the sites treated with glycerol+occlusion, compared with all other sites. In study 2 a faster barrier repair was seen in glycerol-treated sites, with significant differences against untreated and base-treated sites 7 days after the end of the treatment. Stratum corneum hydration showed highest values in the glycerol treated sites after 3 days of treatment. Glycerol creates a stimulus for barrier repair and improves the stratum corneum hydration; stratum corneum hydration is not strictly related to barrier homeostasis and can be optimized by different mechanisms and pathways. The observed effects were based on the modulation of barrier repair and were not biased by the humectant effect of glycerol. As the glycerol-induced recovery of barrier function and stratum corneum hydration were observed even 7 days after the end of treatment, glycerol can be regarded as a barrier stabilizing and moisturizing compound.

15) J Dermatol Sci 1999 Jan;19(1):48-52

Plasticising effect of water and glycerin on human skin in vivo.

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Application of water and glycerin is known to influence skin mechanics. The kinetics of these processes are of great interest. A study was performed to show the immediate changes in skin-mechanics. A Dermaflex machine (R) was used to study 23 healthy volunteers. Water or glycerin was applied to the flexorside of the forearm, and readings were made after 3, 6, 9, 12 and 15 min. Regional untreated skin served as baseline. In agreement with earlier studies both substances influenced hysteresis. Water caused a significant increase in hysteresis after 12 and 15 min of hydration ($P<0.01$). Glycerin caused significantly increased hysteresis after 3 min ($P<0.05$) and the effect continued to the end of the observation period. No significant differences were seen in the distensibility. The onset of action is rapid for both substances, and the effects are therefore supposed to take place in the outermost layers of epidermis. The effect of glycerin on the hysteresis is more rapid in onset than that of water. Comparing the permeability coefficients, the effect on the mechanical properties of the skin does not appear to be determined by the permeability coefficients as water has a higher permeability coefficient but induces smaller changes than glycerin. Water alone does not appear to be the optimal plasticiser of human skin and other substances soluble in both water and lipids may have an even greater influence on skin mechanics in vivo.

PMID: 9890375 [PubMed - indexed for MEDLINE]

16) Hautarzt 2000;51 Suppl Regenerati:1-4

Dexpanthenol for dry skin. Regeneration of damaged permeability barrier of the skin

PMID: 10689596 [PubMed - indexed for MEDLINE]

17) Arzneimittelforschung 2000 Jul;50(7):659-63

Effect of topically applied dexpanthenol on epidermal barrier function and stratum corneum hydration. Results of a human in vivo study.

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In a randomized, double-blind, placebo-controlled study the effect of topical dexpanthenol (CAS 81-13-0) formulated in two different lipophilic vehicles on epidermal barrier function in vivo was carried out. Seven days' treatment with

dexpanthenol improved stratum corneum hydration and reduced transepidermal water loss. Active treatment was statistically different from the vehicle control on both measures. Our results suggest that topical dexpanthenol formulated in either lipophilic vehicle stabilizes the skin barrier function.

PMID: 10965426 [PubMed - indexed for MEDLINE]

18) Pharm Res 1994 Aug;11(8):1155-9

Characterization of esterase and alcohol dehydrogenase activity in skin. Metabolism of retinyl palmitate to retinol (vitamin A) during percutaneous absorption.

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Retinyl palmitate, a widely used ingredient in cosmetic products, is promoted for its beneficial effects on the appearance of skin. Previous studies suggest that enzymes are available in skin to metabolize this ingredient during skin absorption. Esterase activity hydrolyzes retinyl palmitate to retinol (vitamin A), which is oxidized in many tissues to retinoic acid primarily by alcohol dehydrogenase. The activities of esterase and alcohol dehydrogenase were characterized in hairless guinea pig skin by using flow-through diffusion cells and radiolabeled model compounds (methyl salicylate and benzyl alcohol) previously shown to be metabolized by these enzymes. Methyl salicylate was hydrolyzed by esterase to a greater extent in viable skin than in nonviable skin. Glycine conjugation of salicylic acid and benzoic acid occurred only in viable skin. The metabolism of methyl salicylate and benzyl alcohol occurred to a greater extent in male guinea pig skin than in female guinea pig skin. The percutaneous absorption of both radiolabeled compounds was similar in viable and nonviable skin. About 30 and 18% of topically applied retinyl palmitate were absorbed from an acetone vehicle by hairless guinea pig skin and human skin, respectively. Less than 1% of the applied dose of this lipophilic compound diffused from skin into the receptor fluid. Retinol was the only detectable metabolite of retinyl palmitate in both hairless guinea pig and human skin. In human skin, 44% of the absorbed retinyl palmitate was hydrolyzed to retinol. The use of retinyl palmitate in cosmetic formulations may result in significant delivery of retinol into the skin.

PMID: 7971717 [PubMed - indexed for MEDLINE]

19) J Cosmet Sci 2001 May-Jun;52(3):155-61

Direct evidence for bioconversion of vitamin E acetate into vitamin E: an ex vivo study in viable human skin.

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For better stability, vitamin E is commonly used as the non-active esterified pro-drug. Such esters are postulated to be hydrolyzed to the free active form by skin-related esterases. So far, successful conversion of esterified vitamin E to free vitamin E

(tocopherol) has been mainly delineated from observed biological effects. Quantitative evidence in human skin is poor. In vitro and in vivo studies on human and animal skin have proved ambiguous. Formulation-based effects may have added to this controversy. In the present study, comparable amounts of vitamin E acetate (i) in oil (Mygliol-812N), (ii) surfactant-solubilized in water, (iii) encapsulated in liposomes, or (iv) encapsulated in Nanotopes were applied to human skin mounted in modified Franz-perfusion chambers that permit emulation of both open or occlusive conditions. The distribution of vitamin E(total) (vitamin E acetate + vitamin E) was assessed on the skin surface, in the horny layers, and in the underlying skin by high-pressure liquid chromatography (HPLC), with a recovery higher than 90%. Vitamin E acetate in Mygliol deposited exclusively on the surface and in the stratum corneum. In contrast, solubilized or encapsulated vitamin E acetate deposited also in the underlying skin. Nanotopes performed best, followed by liposomes and solubilized vitamin E acetate. Non-occlusive application favored deposition in the skin relative to occlusive application. Conversion of vitamin E acetate to vitamin E was not observed on the skin surface or in the horny layers, while in the underlying skin up to 50% of the vitamin E(total) was deacetylated.

PMID: 11413495 [PubMed - indexed for MEDLINE]

20) Curr Probl Dermatol 2001;29:26-42

The antioxidant network of the stratum corneum.

Thiele JJ, Schroeter C, Hsieh SN, Podda M, Packer L.

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Many studies have demonstrated beneficial health effects of topical antioxidant application; however, the underlying mechanisms are not well understood. To better understand the protective mechanism of oxogenous anti-oxidants, it is important to clarify the physiological distribution, activity and regulation of antioxidants. Also, the generation of ROS by the resident and transient microbial flora and their interaction with cutaneous antioxidants appears to be of relevance for the redox properties of skin. Our studies have demonstrated that alpha-tocopherol is, relative to the respective levels in the epidermis, the major antioxidant in the human SC, that alpha-tocopherol depletion is a very early and sensitive biomarker of environmentally induced oxidation and that a physiological mechanism exists to transport alpha-tocopherol to the skin surface via sebaceous gland secretion. Furthermore, there is conclusive evidence that the introduction of carbonyl groups into human SC keratins is inducible by oxidants and that the levels of protein oxidation increase towards outer SC layers. The demonstration of specific redox gradients within the human SC may contribute to a better understanding of the complex biochemical processes of keratinization and desquamation. Taken together, the presented data suggest that, under conditions of environmentally challenged skin or during prooxidative dermatological treatment, topical and/or systemic application of antioxidants could support physiological mechanisms to maintain or restore a healthy skin barrier. Growing experimental evidence should lead to the development of more powerful pharmaceutical and cosmetic strategies involving antioxidant formulations to prevent UV-induced carcinogenesis and photoaging as well as to modulate desquamatory skin disorders.

PMID: 11225199 [PubMed - indexed for MEDLINE]

21) J Invest Dermatol 2001 Nov;117(5):1212-7

Aging- and photoaging-dependent changes of enzymic and nonenzymic antioxidants in the epidermis and dermis of human skin in vivo.

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This is a comprehensive study of the changes in major antioxidant enzymes and antioxidant molecules during intrinsic aging and photoaging processes in the epidermis and dermis of human skin in vivo. We show that the activities of superoxide dismutase and glutathione peroxidase are not changed during these processes in human skin in vivo. Interestingly, the activity of catalase was significantly increased in the epidermis of photoaged (163%) and naturally aged (118%) skin (n = 9), but it was significantly lower in the dermis of photoaged (67% of the young skin level) and naturally aged (55%) skin compared with young (n = 7) skin. The activity of glutathione reductase was significantly higher (121%) in naturally aged epidermis. The concentration of alpha-tocopherol was significantly lower in the epidermis of photoaged (56% of young skin level) and aged (61%) skin, but this was not found to be the case in the dermis. Ascorbic acid levels were lower in both epidermis (69% and 61%) and dermis (63% and 70%) of photoaged and naturally aged skin, respectively. Gluta thione concentrations were also lower. Uric acid did not show any significant changes. Our results suggest that the components of the antioxidant defense system in human skin are probably regulated in a complex manner during the intrinsic aging and photoaging processes.

PMID: 11710935 [PubMed - in process]

22) Contact Dermatitis 1997 May;36(5):256-60

Barrier recovery and influence of irritant stimuli in skin treated with a moisturizing cream.

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Moisturizers are used daily by many people to alleviate symptoms of clinically and subjectively dry skin. Recent studies suggest that certain ingredients in creams may accelerate the recovery of a disrupted barrier and decrease the skin susceptibility to irritant stimuli. In the present single-blind study, a moisturizing cream was tested for its influence both on barrier recovery in surfactant-damaged skin and on the susceptibility of normal skin to exposure to the irritant sodium lauryl sulphate (SLS). Parameters measured were transepidermal water loss (TEWL) and skin corneometer values, indicating degree of hydration. Treatment of surfactant-damaged skin with the test cream for 14 days promoted barrier recovery, as observed as a decrease in TEWL. Skin corneometer values also normalized more rapidly during the treatment. In normal skin, use of the test cream significantly reduced TEWL after 14 days of

treatment, and irritant reactions to SLS were significantly decreased. Skin corneometer values increased after only 1 application and remained elevated after 14 days. In conclusion, the accelerated rate of recovery of surfactant-damaged skin and the lower degree of SLS-induced irritation in normal skin treated with the test cream may be of clinical relevance in attempts to reduce contact dermatitis due to irritant stimuli.

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Formation and treatment of pathologic scars--clinical and micromorphologic investigations

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The results of treatment with Calmurid and Calmurid-HC in patients with hypertrophic scars and keloids of various causes are reported. Histochemical and ultrastructural investigations were performed in individual cases before and after treatment. The following results were found: 1. In the context of keloid prophylaxis and scar care, application of Calmurid and Calmurid-HC has proved very effective. The results of treating hypertrophic scars with urea preparations are also to be evaluated optimistically. 2. The local treatment with Calmurid or Calmurid-HC generally does not have a substantial influence on cosmetically disturbing keloids. However, the skin becomes smoother, more elastic and more resistant under Calmurid or Calmurid-HC therapy; a reduction in the size of the keloid mass is observed only in individual cases. 3. In short, the results are consistent with those which can be obtained with other external preparations which are specially recommended for treatment of scars and keloids. Success of treatment is especially dependent on the age of the lesion. 4. Disturbances in glycosaminoglycan (GAG) and collagen metabolism as well as enzyme defects are the most significant factors in the pathogenesis of pathological scars. The histochemical and electron microscopic studies reveal (of course with the necessary caution in the interpretation) that Calmurid and Calmurid-HC show an effect on distribution of GAG and on the enzyme pattern of the fibroblasts. The preparations may possibly affect the disturbed processes of collagen and GAG synthesis. The reduction of the mast cells in keloids and hypertrophic scars under Calmurid treatment is noteworthy.

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