Preparations

Proprietary Preparations (details are given in Part 3)

Belg.: Debrisan†; ***Ger.:*** Debrisorb†; ***Hong Kong:*** Debrisan†; ***Hung.:*** Crupodex†; ***Irl.:*** Debrisan†; ***Ital.:*** Debrisan; ***Mex.:*** Debrisan†; ***Pol.:*** Acudex; ***S.Afr.:*** Debrisan; ***UK:*** Debrisan†; ***USA:*** Debrisan.

Multi-ingredient: ***UK:*** Zuidex; ***USA:*** Deflux.

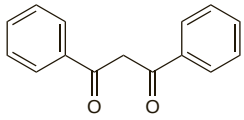
Dibenzoylmethane

Dibenzoilmetano. 1,3-Diphenyl-1,3-propanedione.

Дибензоилметан

$C_{15}H_{12}O_2$ = 224.3.

CAS — 120-46-7.



Profile

Dibenzoylmethane is a sunscreen (p.1576) with actions similar to those of avobenzone (p.1589). It is effective against UVA light (for definitions, see p.1580).

Preparations

Proprietary Preparations some preparations are listed in Part 3.

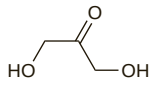
Dihydroxyacetone

DHA; Dihidroxiacetona; Ketotriose. 1,3-Dihydroxypropan-2-one.

Дигидроксиацетон

$C_3H_6O_3$ = 90.08.

CAS — 96-26-4.



NOTE. DHA is also used as a synonym for docosahexaenoic acid (p.1362).

Pharmacopoeias. In *US.*

USP 31 (Dihydroxyacetone). A white to off-white crystalline powder. The monomeric form is freely soluble in water, in alcohol, and in ether; the dimeric form is freely soluble in water, soluble in alcohol, and sparingly soluble in ether. A 5% solution in water has a pH between 4.0 and 6.0. Store at a temperature of 8° to 15° in airtight containers.

Adverse Effects and Precautions

Skin irritation from dihydroxyacetone occurs rarely; rashes and allergic dermatitis have been reported. Contact with eyes, abraded skin, and clothing should be avoided.

Uses and Administration

Application to the skin of preparations containing dihydroxyacetone slowly produces a brown coloration similar to that caused by exposure to the sun, probably due to a reaction with the amino acids of the skin.

A single application may give rise to a patchy appearance; progressive darkening of the skin results from repeated use until a point is reached when the maximum effect is achieved. If the treatment is stopped the colour starts to fade after about 2 days and disappears completely within 8 to 14 days as the external epidermal cells are lost by normal attrition.

Preparations usually contain 5% of dihydroxyacetone and have been used to camouflage vitiligo (see Pigmentation Disorders, p.1582) or to produce an artificial suntan. Some preparations include sunscreens since the pigmentation produced gives no protection against sunburn.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg.: Autohelios†; Eurocolor Sin Sol; Ikx Autobronceante; Leche Autobronceadora†; Lelco sin Sol; ***Austral.:*** Le Tan Fast Extra Dark†; Le Tan Fast Self Tan†; Vitadye; ***Braz.:*** Autohelios; ***Chile:*** Fotoprotectores; Leche Autobronceadora Cara Y Cuerpo; Neutrogena Bronceador; ROC Minesol Bronze; Sans Soleil Skin Ceuticals†; ***Malaysia:*** Vitadye†; ***Mex.:*** Dermacrom; ***USA:*** Chromelin Complexion Blender.

Multi-ingredient: ***Arg.:*** Fotosol Ultra Autobronceante; Polysianes Autobronceante; ***Austral.:*** Le Tan Fast Plus†; ***Braz.:*** Sunmax Autobronzeador; ***UK:*** ViTicolor; ***USA:*** QT.

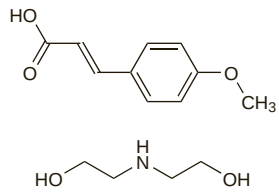
Diolamine Methoxycinnamate

Diolamine *p*-Methoxycinnamate *(pINNM)*; DEA-Methoxycinnamate; Diethanolamine Methoxycinnamate; Diolamina metoxicinnamato; Diolamine Méthoxycinnamate; Diolaminum Metoxicinnamatum. *p*-Methoxycinnamic acid compound with 2,2′-iminodiethanol (1:1).

Диоламин Метоксисинамат

$C_{10}H_{10}O_3.C_4H_{11}NO_2$ = 283.3.

CAS — 56265-46-4.



Profile

Diolamine methoxycinnamate, a compounded substituted cinnamate, is a sunscreen (p.1576) with actions similar to those of octinoxate (p.1608). It is effective against UVB light (for definitions, see p.1580).

Preparations

Proprietary Preparations some preparations are listed in Part 3.

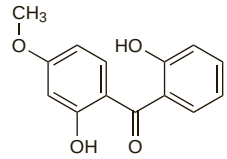
Dioxybenzone *(USAN, rINN)*

Benzofenon-8; Benzophenone-8; Dioxibenzona; Dioxybenzonum; NSC-56769. 2,2′-Dihydroxy-4-methoxybenzophenone.

Диоксибензон

$C_{14}H_{12}O_4$ = 244.2.

CAS — 131-53-3.



Pharmacopoeias. In *US.*

USP 31 (Dioxybenzone). A yellow powder. Practically insoluble in water; freely soluble in alcohol and in toluene. Store in airtight containers. Protect from light.

Profile

Dioxybenzone, a substituted benzophenone, is a sunscreen (p.1576) with actions similar to those of oxybenzone (p.1608). It is effective against UVB and some UVA light (for definitions, see p.1580).

Preparations

USP 31: Dioxybenzone and Oxybenzone Cream.

Proprietary Preparations some preparations are listed in Part 3.

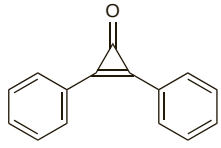
Diphencyprone

Difenciprona. 2,3-Diphenylcyclopropenone-1.

Дифенципрон

$C_{15}H_{10}O$ = 206.2.

CAS — 886-38-4.



Profile

Diphencyprone has been applied as a contact sensitiser for the treatment of alopecia. It has also been tried in warts.

Adverse effects. Diphencyprone is considered to lack serious adverse effects but some patients may not be able to tolerate the induced hypersensitivity reaction. There have been reports of generalised urticaria and dermographism, sometimes severe, following the use of diphencyprone.[1-5] In another case, a severe reaction of urticaria and dermographism, which lasted several months, occurred after the initial sensitisation dose.[6] Allergy to diphencyprone has been reported in medical and nursing staff in spite of taking protective precautions during its application.[7] A patient who received diphencyprone treatment for warts developed a widespread pruritic rash and palpitations due to ventricular extrasystoles.[1] Vitiligo has also been reported in patients treated with diphencyprone[8-10] and it has been suggested that this might be due to unmasking of subclinical vitiligo.[8,9] Erythema multiforme-like eruptions have been associated with the topical application of diphencyprone.[11,12]

1. Lane PR, Hogan DJ. Diphencyprone. *J Am Acad Dermatol* 1988; **19:** 364–5.
2. Tosti A, *et al.* Contact urticaria during topical immunotherapy. *Contact Dermatitis* 1989; **21:** 196–7.
3. Skrebova N, *et al.* Severe dermographism after topical therapy with diphenylcyclopropenone for alopecia universalis. *Contact Dermatitis* 2000; **42:** 212–15.
4. Francomano M, Seidenari S. Urticaria after topical immunotherapy with diphenylcyclopropenone. *Contact Dermatitis* 2002; **47:** 310–11.
5. Short KA, Higgins EM. Urticaria as a side-effect of diphencyprone therapy for resistant viral warts. *Br J Dermatol* 2005; **152:** 583–5.
6. Alam M, *et al.* Severe urticarial reaction to diphenylcyclopropenone therapy for alopecia areata. *J Am Acad Dermatol* 1999; **40:** 110–12.
7. Shah M, *et al.* Hazards in the use of diphencyprone. *Br J Dermatol* 1996; **134:** 1153.
8. Hatzis J, *et al.* Vitiligo as a reaction to topical treatment with diphencyprone. *Dermatologica* 1988; **177:** 146–8.
9. Duhra P, Foulds IS. Persistent vitiligo induced by diphencyprone. *Br J Dermatol* 1990; **123:** 415–16.
10. Henderson CA, Ilchyshyn A. Vitiligo complicating diphencyprone sensitization therapy for alopecia universalis. *Br J Dermatol* 1995; **133:** 496–7.
11. Perret CM, *et al.* Erythema multiforme-like eruptions: a rare side effect of topical immunotherapy with diphenylcyclopropenone. *Dermatologica* 1990; **180:** 5–7.
12. Oh C-W, *et al.* Bullous erythema multiforme following topical diphenylcyclopropenone application. *Contact Dermatitis* 1998; **38:** 220–1.

Alopecia. Diphencyprone has been used as a contact sensitiser in the treatment of various forms of alopecia (p.1577) including areata, totalis, and universalis. Case series reports generally describe treatment of adults, but some groups have also included adolescents and children, and some have reported solely on treatment in children.[1,2]

Initial sensitisation is usually achieved by applying a 2% solution of diphencyprone in acetone to a small area of scalp, which may be repeated if necessary beneath plastic occlusion if adequate sensitisation is not produced. Thereafter, weaker concentrations are applied once weekly and gradually increased in strength to produce erythema and pruritus for 36 to 48 hours post-therapy. Concentrations that have been used vary between reports and the first treatment application may be as dilute as 0.00001%, with further applications gradually increased to up to 2%. Only one side of the scalp is treated until the optimum concentration is found, in order to prevent a widespread adverse reaction. Once hair regrowth has started on the treated side the applications may be extended to the entire scalp.[1-8] As well as erythema and pruritus, patients usually experience transient eczema and regional lymph node swelling.[2,5,7,8]

Hair regrowth may not start for several months,[4,6,8] and the required duration of therapy can vary considerably; at least 8 months of treatment may be required,[3,6] and up to 12 months[1,2] or more[4,6] has been reported. Not all patients will respond to treatment and reported response rates vary, although these have probably been influenced by the different definitions used for complete, partial, and no response. Overall, however, regrowth of hair can occur in up to about 70% of patients, with around half of these having complete regrowth.[1,4,6-8] Some reports have attempted to determine which factors might be associated with clinical response to diphencyprone. There is disagreement between studies but some possible unfavourable prognostic factors include extensive involvement,[4,6,8] younger age at onset,[8] longer disease duration before treatment,[5,7] and a history of atopic eczema.[4,7] The need for high diphencyprone concentrations and prolonged therapy have also been associated with a less favourable outcome.[8]

Despite these rates of response a significant number of patients will relapse, either during or after stopping treatment, and retreatment may be considered.[4,6,7] The time to relapse can be variable. Remission in a small group of complete responders ranged from 1 month to 2 years after stopping therapy.[4] Another group of patients who achieved total regrowth of hair were able to stop treatment with diphencyprone for a mean of 15 months without relapse[9] while a further group maintained satisfactory hair growth for a mean follow-up period of 19.8 months.[5]

1. MacDonald Hull S, *et al.* Alopecia areata in children: response to treatment with diphencyprone. *Br J Dermatol* 1991; **125:** 164–8.
2. Schuttelaar M-L, *et al.* Alopecia areata in children: treatment with diphencyprone. *Br J Dermatol* 1996; **135:** 581–5.
3. MacDonald Hull S, Cunliffe WJ. Successful treatment of alopecia areata using the contact allergen diphencyprone. *Br J Dermatol* 1991; **124:** 212–13.
4. Hoting E, Boehm A. Therapy of alopecia areata with diphencyprone. *Br J Dermatol* 1992; **127:** 625–9.
5. Gordon PM, *et al.* Topical diphencyprone for alopecia areata: evaluation of 48 cases after 30 months' follow-up. *Br J Dermatol* 1996; **134:** 869–71.