Technical Information

May 2005
Supersedes issue dated February 2004

Bisabolol

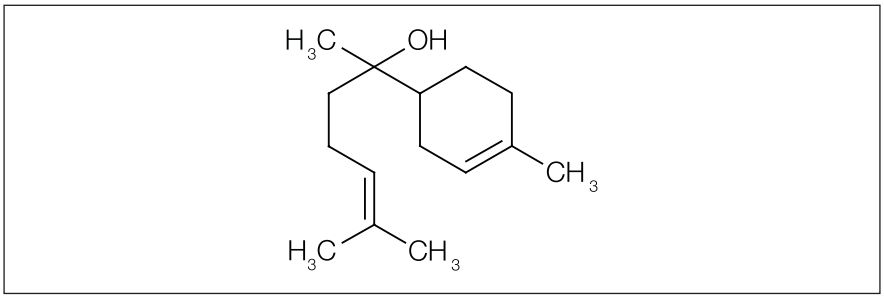
Active ingredient for the cosmetics industry.
Natural care for the skin.

cosmetic SOLUTIONS

- Hair Care
- Skin Care
- Oral Care

BASF
The Chemical Company

Structural formula



INCI name

Bisabolol

Synonyms

alpha-Bisabolol, Levomenol

Chemical name

1-Methyl-4 (1,5-dimethyl-1-hydroxyhex-4(5)-enyl)cyclohexene

Molecular formula

$C_{15}H_{26}O$

Molar mass

222.4 g/mol

CAS-No.

515-69-5

EINECS-No.

208-205-9

Description

Bisabolol is a clear, colorless to slightly yellowish liquid with a faint, floral, sweetish odor

Solubility

Bisabolol is soluble in ethanol, 2-propanol and in natural, mineral and synthetic fats and oils. It is insoluble in water and glycerol. Clear aqueous solutions can be prepared with the aid of solubilizers, e.g. Cremophor® CO 40

Product Line

Bisabolol rac.
is of synthetic origin. It contains the four isomers of alpha-Bisabolol which all occur in nature

Bisabolol nat.
is obtained from natural raw material. It is the (-)-alpha-Bisabolol isomer which is the active principle of the traditional medical plant chamomile (Matricaria chamomilla)

Specification

Bisabolol nat.		
Parameter	Specification Limits	Method
Appearance	Clear, colorless to slightly yellowish liquid	
Purity	Minimum 95%	05/0074.00
Optical Rotation $[a]_D^{20}$	– 58° to – 55°	05/0083.00
Refractive Index n_D^{20}	Minimum 1.493 Maximum 1.497	05/0059.00

Bisabolol rac.		
Parameter	Specification Limits	Method
Appearance	Clear, colorless to slightly yellowish liquid	
Purity	Minimum 85%	05/0074.00
Refractive Index n_D^{20}	Minimum 1.492 Maximum 1.498	05/0059.00

The main secondary components are farnesols.

Application

Bisabolol is the main active ingredient of the medical plant chamomile (Matricaria chamomilla) which is used in traditional medicine for hundreds of years.

Bisabolol protects and heals the skin from the effects of daily stress. It is a naturally occurring active ingredient that accelerates the healing process of skin. Bisabolol can be used with confidence in personal care formulations, especially in products for sensitive skin, baby care, after-shave, and after-sun application. Its added anti-inflammatory properties make it a truly versatile active ingredient for skin care products.

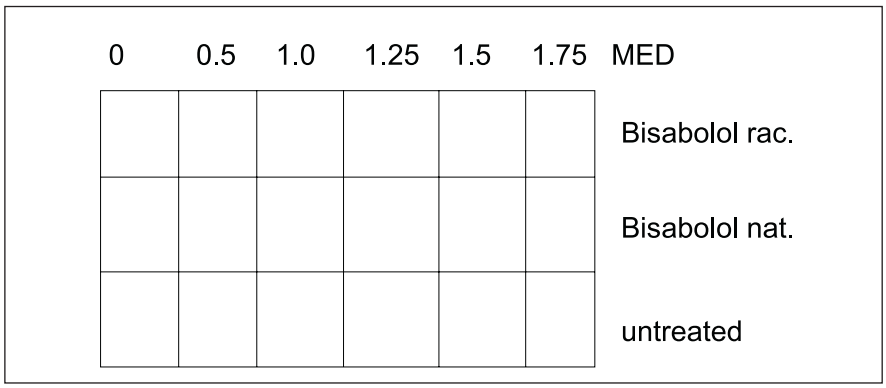
Stability and storage

If it is stored at around 20°C in the tightly sealed original containers, Bisabolol has a shelf life of at least 24 months.

In-vivo study

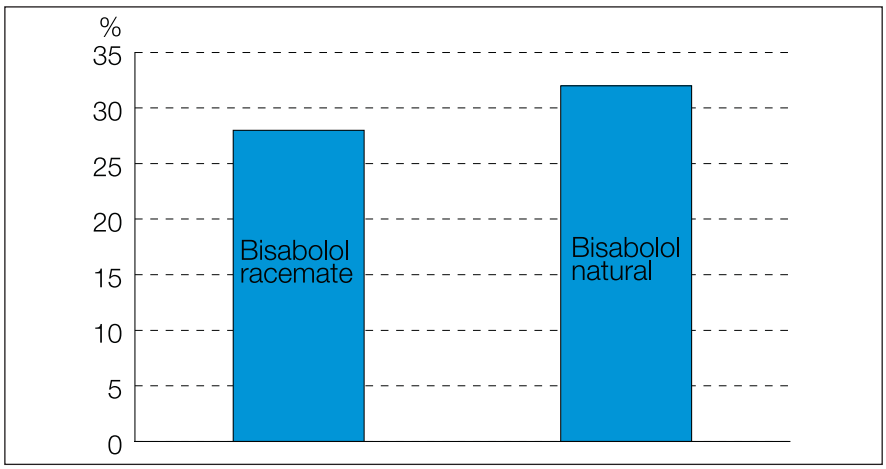
Inhibition of UV-induced erythema in double blind study

10 people (male and female, 25-59 years old) were treated with an o/w formulation that contained Bisabolol in 0,5% concentration. Both Bisabolol rac and Bisabolol nat were tested in their ability to prevent irritation caused by UV-radiation.
Prior to the study, the following pattern of 3 x 6 areas was marked on the back of each volunteer.



A total of 5 applications of the o/w formulation which contained Bisabolol rac or nat, respectively were give prior to UV-irradiation in the top and middle row of the pattern. (The bottom line remained untreated as control.)
This meant application of 2 mg/cm2 of finished formulation twice daily on day 1 and 2. On day 3 the fifth application was given followed by UV-exposure 20 min. later.
The UV-exposure was done in form of a step of light so the 6 columns on the back of each volunteer were exposed to the following doses of UV-light for each substance: 0; 0.5; 1.0; 1.25; 1.5; 1.75 MED.
The results were analyzed on day 5 exactly 48 hours after the UV-exposure. Thanks to the above mentioned pattern on the back of each of the 10 volunteers, 10 x 5 = 50 exposed areas could be analyzed for each compound and compared with untreated but UV-exposed areas. The results „better“, „same“, or „worse“ than untreated but equivalently exposed were analyzed statistically.

Results:
Percentage of UV-exposed areas which show less irritation compared with control after 48 hrs.:
Bisabolol rac: 28%
Bisabolol nat: 32%
(worse none, rest same as control)



Wilcoxon Test of matched pairs shows that the difference between Bisabolol rac and nat is statistically not significant ($p<0.5$).

Conclusion:
Both Bisabolol rac. and nat. are very effective active ingredients for inhibiting UV-induced erythema.
They are therefore perfectly suited for all kinds of skin-care products that protect the skin from daily stress.

Typical formulations

Shaving foam „Extra creamy“ **No. 07/00038**

	%	Ingredients	Supplier	INCI name
A	3.30	Stearic Acid	(27)	Palmitic Acid
	1.70	Myristic Acid	(44)	Myristic Acid
	0.50	Cremophor® A 6	(1)	Ceteareth-6, Stearyl Alcohol
	0.50	Cremophor® A 25	(1)	Ceteareth-25
	3.20	Triethanolamine Care	(1)	Triethanolamine
	2.00	Paraffin Oil, highly fluid		Mineral Oil
	1.00	Isopropylmyristate	(27)	Isopropyl Myristate
	0.50	Lanette O	(27)	Cetearyl Alcohol
B	7.40	Luviquat® Care	(1)	Polyquaternium-44
	5.00	1,2-Propylene Glycol Care	(1)	Propylene Glycol
	q.s.	Preservative		
	74.70	Water dem.		Aqua
C	0.20	Bisabolol rac.	(1)	Bisabolol
	q.s.	Perfume		

Production: Saponify phase A at about 80°C for one hour. Heat phase B to about 80°C and stir it into phase A whilst homogenizing.
Cool to about 40°C whilst stirring, add phase C and homogenize again.

Filling: 96% active ingredient
4% Propane/Butane 3.5 bar (20°C)

Properties: Viscosity: 1600 mPa·s Brookfield RVD VII+
pH value: 8.5

After shave balm **No. 07/00040**

	%	Ingredients	Supplier	INCI name
A	0.25	Pemulen TR-1	(6)	Acrylates/C10-30 Alkyl Acrylate Crosspolymer
	1.50	Vitamine E Acetate	(1)	Tocopheryl Acetate
	0.20	Bisabolol rac.	(1)	Bisabolol
	10.00	Miglyol 812	(11)	Carpylic/Capric Triglyceride
	0.20	Perfume “Round” 250 090”	(70)	Perfume
	1.00	Cremophor® CO 40	(1)	PEG-40 Hydrogenated Castor Oil
B	1.00	D-Panthenol USP	(1)	Panthenol
	15.00	Ethanol 96%		Alcohol
	5.00	Glycerin 87%	(20)	Glycerin
	0.05.	Tylose H 4000	(28)	Hydroxyethyl Cellulose
	65.72	Water dem.		Aqua
C	0.08	Sodium Hydroxide	(20)	Sodium Hydroxide

Production: Weigh out the components of phase A and mix them. Stir phase B into phase A whilst homogenizing and continue homogenizing for a while. Neutralize with phase C and homogenize again.

Properties: Viscosity: 6000 mPa·s Brookfield RVD VII+
pH value: 7.0

Pre shave **No. 07/00044**

	%	Ingredients	Supplier	INCI name
A	81.70	Ethanol		Alcohol
	3.00	Vitamine E Acetate	(1)	Tocopheryl Acetate
	1.00	Bisabolol rac.	(1)	Bisabolol
	0.20	Perfume		
	0.10	Menthol	(20)	Menthol
	4.00	Luvitol® EHO	(1)	Cetearyl Ethylhexanoate
	2.00	Eutanol G	(27)	Octyldodecanol
	2.00	Miglyol 812	(11)	Caprylic/Capric Triglyceride
	2.00.	D-Panthenol USP	(1)	Panthenol
	2.00	Whitch Hazel Distillate	(212)	Hamamelis Virginiana (Whitch Hazel) Distillate
	2.00	Jojoba Oil		Simmondsia Chinensis (Jojoba) Oil

Production: Weigh out the components of phase A and dissolve them clearly.

Skin conditioning gel with vitamins **No. 62/00099**

	%	Ingredients	Supplier	INCI name
A	4.00	Cremophor® CO 410	(1)	PEG-40 Hydrogenated Castor Oil
	15.00	Ethanol		Alcohol
	0.10	Bisabolol rac.	(1)	Bisabolol
	0.50	Vitamin E Acetate	(1)	Tocopheryl Acetate
	q.s.	Perfume		
B	3.00	D-Panthenol USP	(1)	Panthenol
	0.60	Carbopol 940	(6)	Carbomer
	76.40	Water, dem.		Aqua dem.
C	0.80	Triethanolamine Care	(1)	Triethanolamine

Production: Dissolve phase A clearly.
Allow phase B to swell and neutralize it with phase C. Stir phase A into the neutralized phases B + C and homogenize.

Properties: Viscosity: 57600 mPa·s Brookfield RVD VII+
pH value: 7.7

Deostick transparent **No. 63/00017**

	%	Ingredients	Supplier	INCI name
A	3.00	Cremophor® A 25	(1)	Ceteareth-25
	3.00	Cremophor® CO 40	(1)	PEG-40 Hydrogenated Castor Oil
	0.20	Bisabolol rac.	(1)	Bisabolol
	1.00	Vitamin E Acetate	(1)	Tocopheryl Acetate
	3.00	Perfume		
	5.00	Sodium Stearate C1	(44)	Sodium Stearate
	0.50	Irgasan DP 300	(12)	Triclosan
	15.00	Glycerin 87%	(20)	Glycerin
	60.00	1,2-Propylene Glycol Care	(1)	Propylene Glycol
	9.30	Water dem.		Aqua

Production: Weigh out the components of phase A and melt them.
Cast the melted mixture into appropriate moulds.

Properties: pH value: 9.0

Suppliers

1. **BASF Aktiengesellschaft**
   67056 Ludwigshafen, Germany
   Tel. 49 621 60-0
   Fax: 49 621 60-42525

6. **Noveon Inc.**
   9911 Brecksville Road, Cleveland OH 44141-3247, USA
   Tel.: 1 216 447-5000

10. **Bärlocher GmbH**
    Freisinger Straße 1, 85716 Unterschleißheim, Germany
    Tel.: 089 14373-0
    Fax: 089 14373-312

11. **Sasol Germany GmbH**
    Paul Baumann-Strasse 1, D-45764 Marl, Germany
    Phone: 49 2365 49-4863
    Fax: 49 2365 49-6935

12. **Ciba Geigy AG**
    79664 Wehr/Baden, Germany
    Tel.: 07762 82-0

17. **Dragoco Gerberding & Co. GmbH**
    Dragocostraße; 37601 Holzminden, Germany
    Tel.: 05531 970
    Fax: 05531 971391

20. **Merck KGaA**
    Frankfurter Straße 250; 64293 Darmstadt, Germany
    Tel.: 49 6151 72-7869
    Fax: 49 6151 728333

27. **Cognis Deutschland GmbH**
    Care Chemicals
    Henkelstr. 67 or Postfach 130164, 40551 Düsseldorf, Germany
    Tel.: 49 211 9740-0
    Fax: 49 211 798-4008

28. **Clariant GmbH - Functional Chemicals Division, Personal Care**
    65926 Frankfurt/Main, Germany
    Tel.: 49 69 305 44291
    Fax: 49 69 305 89129

Note

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May 2005

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