Natural alpha Bisabolol

Chemical name	1-Methyl-4(1,5-dimethyl-1-hydroxyhex-4(5)-enyl)-cyclohex-1-ene; 6-Methyl-2-(4-methyl-3-cyclohexen-1-yl)-5-hepten-2-ol
CAS no.	23089-26-1
EINECS no.	245-423-3
INCI name	Bisabolol
INN:	Levomenol p, (-) - alpha bisabolol (9734-s)
CTFA	Bisabolol
Synomys:	(L)-alpha-Bisabolol (-)-alpha-Bisabolol
CN-code	2906 1900

KYOWA
Kyowa Hakko Europe GmbH
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SPECIFICATION

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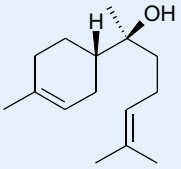
Chemical Structure:	
Empirical formula:	$C_{15}H_{26}O$
Molecular weight:	222.36
Appearance:	Clear and viscous liquid
Color:	Colorless to pale yellow
Odor:	Pleasant and sweet, a delicate floral note
Refraction index (20° C):	1.493 to 1.497
Optical rotation:	-55 to -58 (at 20° C)
Solubility:	Natural alpha-Bisabolol is completely soluble in alcohols, soluble in ethyl alcohol, isopropyl alcohol, natural oil, synthetic oil and mineral oil. Insoluble in water and glycerine. Clear aqueous solutions can be obtained by using solubizer agents.
Density (20° C):	0.920 to 0.940
Purity (GLC):	min. 95 %

Origin:	The natural alpha-Bisabolol is obtained by destillation from the candeia tree which is native in the southeast area of Brazil

Other Physico-Chemical Properties

Stability:

Natural alpha-Bisabolol is very well compatible with usual cosmetic raw materials and in the end products very stable during storage. No color change is observed and alpha-Bisabolol is not diffusing through the nowadays usual packaging materials such as polyethylene, polypropylene and polyester. Alpha-Bisabolols are stable in cosmetic formulations in the pH range of 3 to 11.

Storage and packaging

Storage:	10°C-25°C, humidity and light keep in an inert environment
Standard Packaging:	Plastic canister with 5 kg, 10 kg or 20 kg
Expiry Date:	In unopened original packaging and under adequate storage conditions minimum 2 years after production date

Benefits of topical application

Chamomile is known to the consumer as a multiactive medicinal plant in traditional medicine. Natural alpha-Bisabolol, which is also described as (-)-alpha-bisabolol, is present in essential oil of the chamomile flower in concentrations of about 50%. It is an optically active, monocyclic sesquiterpen-alcohol. Natural alpha-Bisabolol can be economically also obtained from other plants, e.g. from the candeia tree for it, native in the south east area of Brazil.

Other alpha-Bisabolol isomers are found when alpha bisabolol is produced synthetically. Synthetic alpha-Bisabolol, also described as (+/-)-alpha-Bisabolol is a racemic mixture and possesses according to Marti only about 50% of the effectivity of the naturally occurring component. Bisabolol is applied in cosmetics for their soothing, anti-irritating, wound healing, antibacterial and deodorizing properties.

1. **Anti-inflammation**
   Multiple animal experiments showed that natural alpha-Bisabolol reduces inflammations. In different models to measure inflammatory reactions, such as erythema suppression after UV light exposure or reduction of edema development natural Bisabolol was shown to work.
   In one study the back-skin of volunteers was treated with 0.1 to 1% Bisabolol solutions in ethanol. Pure ethanol was applied as control. Afterwards the skin was exposed to different doses of UV light. All concentrations of Bisabolol were effective as they increased the UV light dose necessary to produce an erythema. 0.1 to 0.5% natural Bisabolol is effective to prevent UV light erythema.
   Further more, erythemas were treated with 0.1 to 1% Bisabolol solutions and the disappearance of the erythema was measured compared to a control treatment. Natural Bisabolol speeded up the erythema disappearance by 20%.

2. **Promotes wound healing**
   Chamomile extracts have been known since a long time for their wound healing properties; however, experiments with isolated Bisabolol are scarce. In one experiment with guinea pigs skin was injured with hot olive oil. The healing time of the burn lesions was significantly reduced by alpha-Bisabolol by nearly 25%.

3. **Antibacterial activity**
   Alpha-Bisabolol is a sesquiterpenalcohol with a tertiary alcohol group. Bisabolol has microbiostatic properties, especially against gram positive bacteria (staphaureus, staph. epidermidis, corynebacteria, etc.) and fungi (trichophyton species, Candida albicans) where it shows a similar effectiveness compared to comparable primary and secondary structures.

4. **Deodorizing activity**
   The deodorizing effect of alpha Bisabolol is largely determined by its antibacterial activity. The bacteria species staphylococcus epidermidis and corynebacteria play a major role in the breakdown of human sweat, which leads to the generation of the strongly smelling substances.

Many studies show that alpha-Bisabolol applied topically in concentrations of 0.1 to 0.5% reduce inflammation, which promotes the healing of wounds. By its antibacterial activity alpha-Bisabolol contributes to deodorizing. Thus, alpha-Bisabolol is an ideal cosmetic active ingredient for formulation that care for and protect physically, chemically or biologically challenged skin. Examples are its application in after-shave products, sun care, after sun, baby care, lip-protectors, tooth pastes and all formulations for sensitive skin. Other components of a formulation may exert an additive or synergistic or inhibiting effect.

Safety:

a) **Animal tests:**
Acute oral toxicity:
rat: > 15.000 mg/kg;
mouse: >15.000 mg/kg

Subacute toxicity:
rat: 6 weeks 1 ml per day, per kg animal,
no toxic effects were observed
Dog: 2 weeks 1 ml per day per kg animal,
no toxic effects observed

Skin irritation:
undissolved natural Bisabolol to the skin of rabbits, evaluation according to Draize: non irritating

Irritation of the mucus membranes:
pure Bisabolol to rabbits eyes, according to Draize: slightly irritating

Phototoxicity:
mouse: up to 4.6 ml/kg mouse no phototoxic effect was observed

Photosensitising:
guinea pig: 15% bisabolol solution in ethanol: no effect

Teratogenicity:
rat: oral administration of up to 500 mg/kg: no effect

b) **Human skin patch test:**
50 subjects, pure Bisabolol during 24h: no significant changes of the skin, thus is considered as non irritating. According to all this data (-)-alpha-Bisabolol can be practically regarded as non toxic, thus making it an ideal cosmetic ingredient.

Recommended Application (%):

Tooth paste:	0,05
Skin cleanser:	0,05
Baby's skin cleanser:	0,10
Hair treatment:	0,10
Skin care body:	0,20
Skin care treatment:	0,20
Acne treatment:	0,10
Moisturizing cream:	0,20
Cleanser lotion:	0,15
Facial fitness:	0,20
Sunscreen:	0,20
After sun gel:	0,25
Hand and body moisturizer:	0,20
After-shave:	0,20

Literature:
H. Eggensperger: Multiaktive Wirkstoffe für Kosmetika. Verlag für chemische Industrie, H. Ziolkowsky GmbH, Augsburg, 1995, p. 34-59
M. E. Marti: Seifen, Öle, Fette, Wachse 117, 626 (1991)

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