ENZ ©

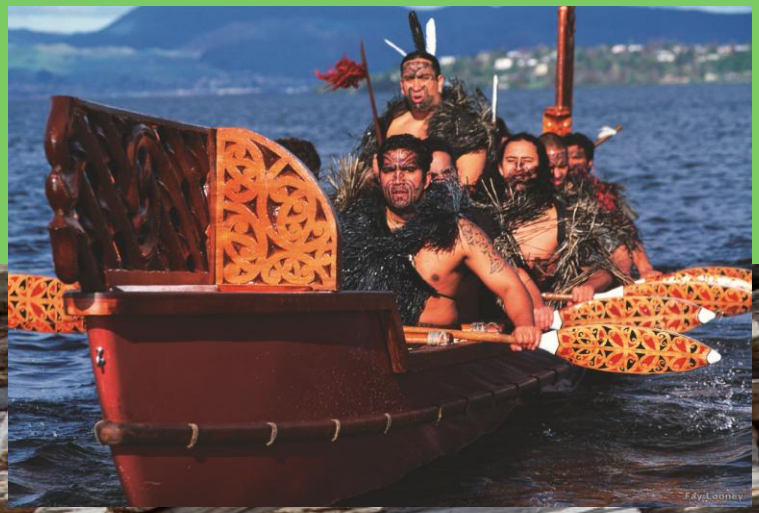
Essentially New Zealand

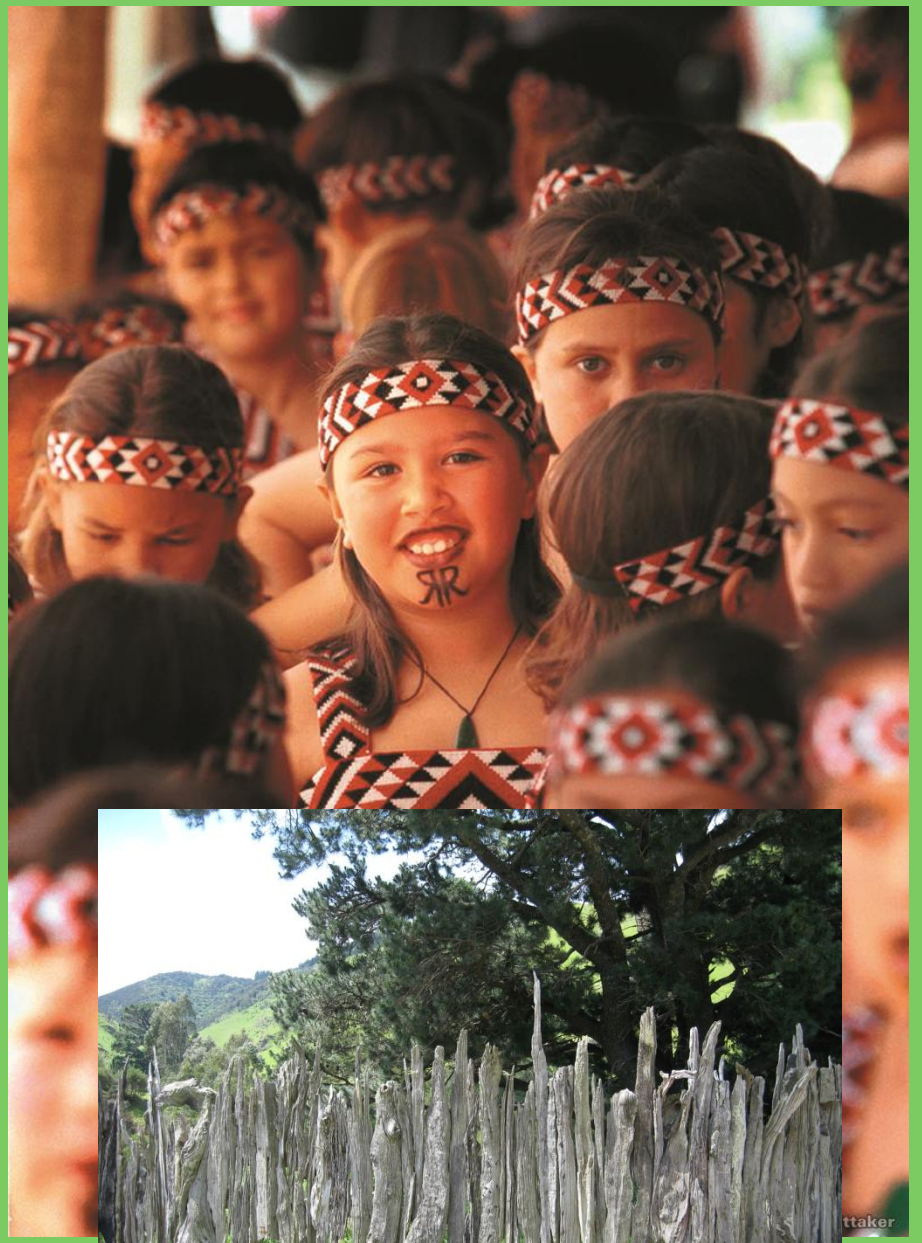
TOTAROL™

Organic & Natural Ingredient

from

New Zealand





Introduction

Scientist Gary B. Evans and a Research Team of Industrial Research Limited, Lower Hutt, New Zealand, a New Zealand Government owned Research Institute conducted research on the Totara tree as the scientists were intrigued by the fact that Totara Wood used for Maori carvings, canoes and fortifications as well as being used as building materials by the early European Settlers seemed to survive all environmental attacks and was virtually unblemished after hundreds of years of use.

They aimed to find out what was behind this incredible hardiness!

There was also research conducted by Professor Isao Kubo of the University of California, Berkley and it was eventually established that the Totara tree develops a defence mechanism after about 150 to 200 years of growth, which makes it immune against bacterial attacks and environmental influences.

This defence mechanism is the substance **Totarol™** which the tree produces and stores in its core!

IRL INDUSTRIAL RESEARCH LIMITED
Te Tauihu Pūtaiao

Totarol™ is a potent antibacterial, antimicrobial, antioxidant and anti-inflammatory compound extracted from recycled totara wood such as fence posts, tree stumps and old house piles of which there is a abundant supply in New Zealand!

Maori Name: Totara

Common Name: Totara

Botaical Name: *Podocarpus totara*

TOTARA TREE

What Does It Look Like?

The Totara is one of the majestic forest canopy trees. A mature Totara tree reaches up to 30 metres, although this takes over 100 years. The leaves are 2.5cm long, narrow at both ends and are dull brownish-green. They are stiff and prickly to touch. Totara is also recognised by the distinctive bark, which flakes off in thick brown slabs. Like all podocarps, Totara trees have cones - male and female cones grow on separate trees. In autumn the female trees produce tiny green seeds which grow on top of the distinctive juicy red base. This is particularly attractive to birds.

Where Does It Grow?

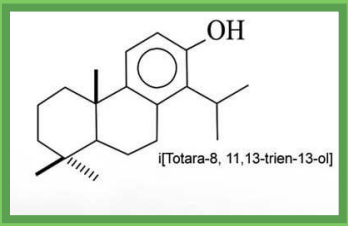
The Totara is found in forests in both the North and South Islands, although it is most common in the northern half of the North Island. Also in mountain areas above 600 metres, Totara is replaced by the closely related Thin Barked Totara. The Totara is a particularly hardy tree and will grow in almost any soil and situation. It is tolerant of both wet and dry conditions and can withstand windy sites. Totara is a common sight in paddocks in Northland, where it survives because stock don't like to eat the prickly leaves.

Used To...

The huge Maori waka taua, capable of carrying 100 warriors, were often hollowed out from a single Totara log. Often the tree was chosen long before it was felled and the east side of the trunk cut at the base to make it easier to cut the tree down in the future. The Moari also used the wood for large carving and framing for whare (housing). The inner bark was used for roofing and for storage containers - the outer bark as a splint for fractured bones. A pointed Totara stick could be scraped on a slab of softer wood such as mahoe to make fire. Medicinally, the smoke was a cure for a skin complaint, and boiled bark was used to reduce a fever. A valued food, the Maori collected the bright red fruit which are sweet and juicy with a slightly piney flavour. Since European times, huge areas of Totara have been felled to supply general building timer, railway sleepers, telephone poles etc.

Did You Know?

After the Kauri, the Totara may be the longest living tree of the New Zealand forest - attaining an age of 1,000 and more years. The botanical name, Podocarpus totara, is an example of blending the old Latin names - Podocarpus - the the genus, with the Maori - Totara - for the species.



Totarol™

Marketed by Essentially New Zealand

Manufactured by Mende Biotech

Business Description

We have excelled in innovation and science to produce multi functional technology which has immense market potential.

Mende Biotech Limited is a bio-active research and development company focusing on synergetic plant bio-actives for use in the cosmetic, pharmaceutical, food and animal care industries. Mende's core competitive advantage is the application and manufacture of **Totarol™**

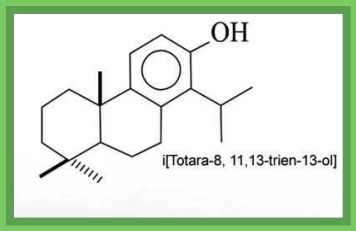
The Company has developed a series of bio-active compounds and associated technologies which work well over a wide range of applications including:

- Cosmetics
- Pharmaceutical
- Personal Care/Supplements
- Oral Care
- Wound Care
- Animal Care

Few organic, natural compounds and self-sustaining technologies have such a wide range of positive applications.

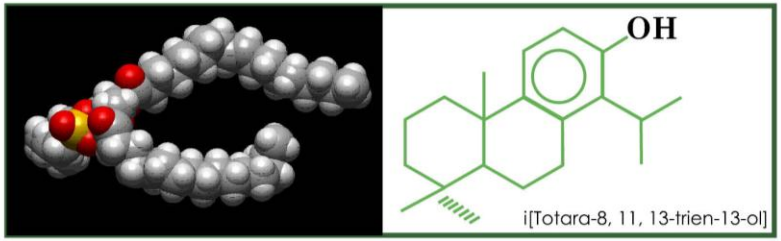
The company has a patented and unique technology for the extraction of **Totarol™** its main product, and Mende Biotech is the only commercial supplier worldwide.

Totarol™



Essentially New Zealand markets and supplies Totarol™ to companies worldwide as a raw ingredient, the main customer presently being the L'Oreal group of companies.

Mende Biotech Limited has been in business for more than a decade and has been recognised with a number of National awards. The company is the undisputed leader in the development of new natural compounds from laboratory to market in New Zealand.



Essentially New Zealand

Reinhard Hueber joined Doug Mende in 2001 to become a 50% shareholder in Mende Biotech Ltd and at the same time founded the Marketing Company Essentially New Zealand in order to introduce the new ingredient **Totarol™** to the world markets.

After attending several international trade fairs and going through the various registration processes in the European Union, the big break through came in 2008 when L'Oreal, the largest cosmetics conglomerate in the world became a regular customer for **Totarol™**.

In 2007 **Totarol™** achieved registration on the L'Oreal 'Approved Ingredients Portfolio' which is a reference for all brand members within the L'Oreal group. It allows marketers and formulation specialists within the various L'Oreal group brands to use the listed ingredients as replacements for existing ingredients or as a basis for new product developments.

In addition to the L'Oreal success, the company already has a fast growing range of cosmetic and therapeutic companies worldwide that is supplied with **Totarol™**. Many other companies are currently undertaking evaluation research into possible use of **Totarol™** in their product ranges, including two of the biggest world brands.

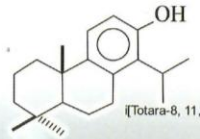
Mende Biotech has a considerable amount of regular customers for **Totarol™** in New Zealand and several other domestic companies are considering using **Totarol™** as an ingredient in their products.

Totarol™ is now also registered in the ingredients portfolios of about thirty companies worldwide. The main buying markets are in the European Union (EU), Australia, Korea, USA, China and Taiwan but there are also many other companies around the world that are currently evaluating and testing **Totarol™** with the prospect of incorporating it into their products.

Totarol™

The world's new natural active

Totarol™ is a natural extract from Totara heartwood, enriched in the aromatic diterpenoid, totarol: $C_{20}H_{30}O$



(Totara-8, 11,13-trien-13-ol)

Totarol™ is extracted from recycled Podocarpus Totara heartwood using a novel supercritical extraction process. Totarol™ has no taste and minimal aroma. **Totarol™** has been extensively tested at independent laboratories to demonstrate bioactivity, safety and product composition. **Totarol™** has now been registered in Europe for use in cosmeceuticals.

Totarol™ has potent anti-bacterial activity in both, gram positive and gram negative bacteria as well as possessing potent anti-oxidant properties.

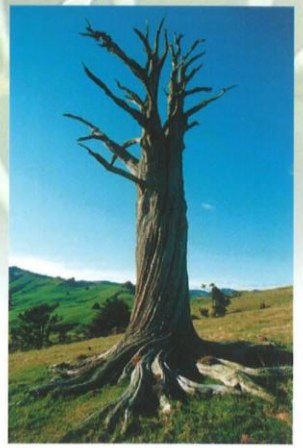
Examples of product applications developed:

Oral Care products:
Totarol™ possesses potent antibacterial activity against Streptococcus mutans, the major cariogenic organisms present in dental plaque. **Totarol™** has been combined in proprietary blends with other bioactive natural products to give a broad spectrum antimicrobial toothpaste and mouthwash, which is also active against gingivitis and periodontal disease.

Acne Solution:
Totarol™ exhibits potent anti-bacterial activity against a number of gram positive bacteria. Among the active compounds isolated, **Totarol™** showed the most potent activity against Propionibacterium acnes. Combining **Totarol™** with Testosterone 5a-Reductase Inhibitor, the formulation shows a 80% successful treatment rate.

Product ranges further developed by partner companies including a Teenage cosmetic and health range, adult cosmetic range, baby care range and a pet range, all with **Totarol™** as the main active.

Totarol™ powder can be dissolved in any oil of your choice by heating it up to a prescribed temperature.



Essentially New Zealand Limited is the international sales and marketing representative of Mende-Biotech Limited and all inquiries should be directed to our company:

Contact Details:

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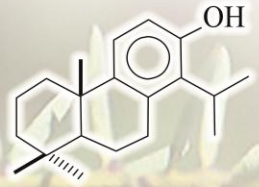
P: +64-9-4860 623
F: +64-9-4863 846
E: info@essentiallynz.com

Totarol™

The world's new natural active

Totarol™ is extracted by Super Critical Extraction process using new technologies to extract a solid powder.

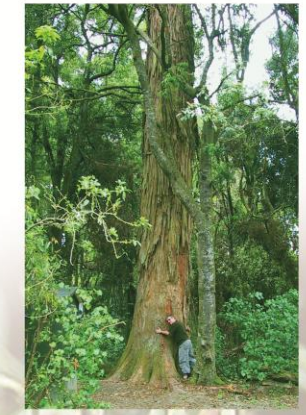
The raw material for processing is derived from a native New Zealand tree Podocarpus totara and there is an abundant supply of recycled wood available.



Totarol™ is an organic natural extract, which is an aromatic Diterpenoid: C20H30O.

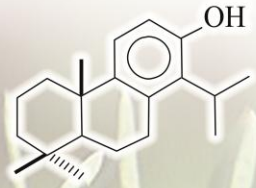
Totarol™

The world's new natural active



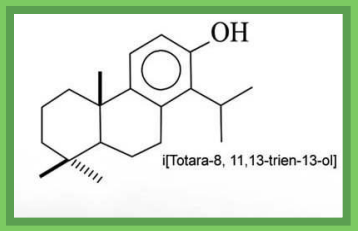
Totarol™ is a naturally occurring plant extract with potent anti-bacterial and anti-oxidant properties.

The raw material for processing is derived from a native New Zealand tree Podocarpus totara and there is an abundant supply of recycled wood available.



The most abundant source of Totarol™ is the heartwood of New Zealand's Totara tree.

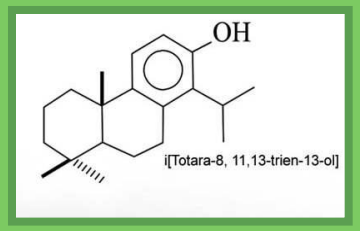
Totarol™



Technology

Totarol™ is an aromatic diterpenoid with chemical formula C20H30O. Totarol™ is a natural extract from heartwood of the Totara tree. Totara (Podocarpus totara) is a Podocarpus species unique to New Zealand. The timber of Totara is renowned for its resilience against rotting. The native Maori used it for carving and for war canoes; the early European settlers used Totara as wharf piles, fence posts and foundation blocks. The durability stems from the anti-bacterial activity of Totarol™. Totarol™ can be extracted from the dead wood, negating the need to cut down live trees. Although Totarol™ can be extracted from other Podocarpus (e.g. rimu), some trees in the cypress family (cypress, juniper, thuja) and from rosemary, it is most abundant in Totara. It is extracted by supercritical extraction – the process uses high pressure carbon dioxide under specific temperature, pressure and gas flow conditions to extract Totarol™ from powdered Totara deadwood.

Totarol™

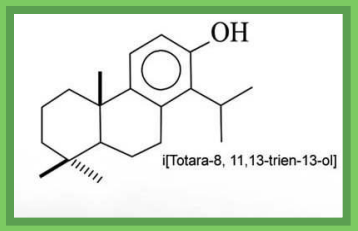


Technology

Totarol™ has broad-spectrum antibacterial properties. It is active against *Staphylococcus aureus*; (including methicillin-resistant, epidemic, community and multi-drug-resistant strains), *Streptococcus mutans, Streptococcus pneumoniae* (penicillin-resistant), *Streptococcus ancomyc* (erythromycin-resistant), *Enterococcus faecalis* (high-level-gentamicin-resistant), *Enterococcus faecalis* (ancomycin-resistant), *Salmonella menston, Eschericia coli, Enterobacter aerogenes, Pseudomonas aeruginosa, Bacillus subtilis, Brevibacterium ammoniagenes* and *Propionibacterium acnes.*

Totarol™ has other properties that open up other potential uses e.g. Beta-amino alcohol derivatives of Totarol™ have demonstrated antiplasmodial properties that have no cross-resistance with chloroquine and activity against *Mycobacterium tuberculosis*.

Totarol™

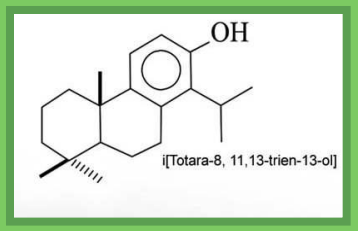


Totarol™ Registrations

REACH (European Union)
EC # 479-590-0

BioGro New Zealand
#5033 (includes USDA/NOP)

Totarol™



Milestones

2004 **NZ patent** #530834 filed for “A method of extracting Totarol and/or a product containing Totarol

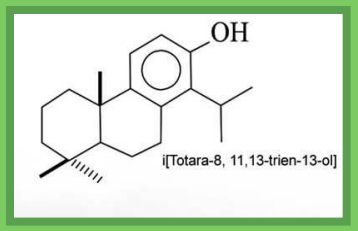
2007 **Totarol™** achieved registration on the L’Oreal ‘Approved Ingredients Portfolio’

2008 **L’Oreal** became a regular customer

2010 Co-developed a certified organic, natural preservative system

2011 Finished Metritis trials and developed mastitis treatment for dairy cows

Totarol™



Patent Extract

Title:

A METHOD OF EXTRACTING TOTAROL AND/OR A PRODUCT CONTAINING TOTAROL

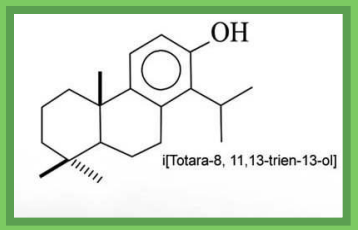
Document Type and Number:

WIPO Patent Application WO/2005/073154

Kind Code:

A1

Totarol™



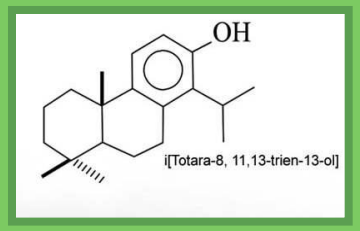
Patent Extract

Abstract:

A process for producing a totarol-containing extract from suitable plant material is described. The process utilises a near-critical fluid as the extraction solvent. The process is particularly applicable to the extraction of totarol from Totara wood. The totarol-containing extract has activity against both Gram-positive and Gram-negative bacteria. The extract is produced free of solvent residues and is, therefore, suitable for use in pharmaceutical, nutraceutical, cosmetic, cosmeceutical and other formulations.

JP08040923	NUTRIENT-SUPPLYING AGENT
JP06107539	TYROSINASE INHIBITOR
WO/209/009417	PHARMACEUTICAL COMPOSITIONS AND METHODS OF PREVENTING, TREATING, OR INHIBITING INFLAMMATORY DISEASES, DISORDERS, OR CONDITIONS OF THE SKIN, AND DISEASES, DISORDERS, OR CONDITIONS ASSOCIATED WITH COLLAGEN DEPLETION

Totarol™



Patent Extract

Inventors:
Mende, Douglas Anthony
(PO Box 54, Greytown, NZ)

Catchpole, Owen John
(7/248 Willis Street, Wellington, NZ)

Application Number:
PCT/NZ2005/000008

Publication Date:
August 11, 2005

Filing Date:
January 28, 2005

Assignee:
Mende, Douglas Anthony
(PO Box 54, Greytown, NZ)

Catchpole, Owen John
(7/248 Willis Street, Wellington, NZ)

International Classes:
A61K31/05; ***A61K8/97***; ***A61Q19/00***

Attorney, Agent or Firm:
Adams, Matthew D.
(A J Park, 6th Floor Huddart Parker Building
Post Office Square, P O Box 94, Wellington 6015, NZ)

BioGro New Zealand
Certificate of Compliance

This operator **Mande Biotech Limited**
154 Belvedere Road
Carterton
New Zealand

BioGro No **5033**

First Certified from 26 March 2008

is certified by BioGro New Zealand Ltd to produce the listed products to the requirements of the following standards:

			BioGro IFOAM		BioGro Export			
ID	Location	Scope	BioGro Conversion	BioGro Organic Standards	NZFSA Technical Rules: Europe	NZFSA Technical Rules: Taiwan	USDA NOP	Canada Organic Regime
CO1	154 Belvedere Road	Totarol™		X	X	X	X	
CO2	154 Belvedere Road	Export of Totarol™		X	X	X	X	

Date of Issue 04 June 2010
Certification Valid from 01 April 2010

Certificate Number # 1 of 1
Certification Valid to 31 March 2011

Certification Committee .....

Director .....

The above named licensee is licensed to apply or direct the application of the BioGro Certification trademark provided the product has been produced in accordance with the BioGro Organic Standards by the licensee or under the licensee's supervision at the location named in this certificate. While all due care and skill was exercised in carrying out this assessment, BioGro New Zealand Ltd accepts responsibility only for proven gross negligence. This is not a legal document and cannot be used as such. This certificate remains the property of BioGro New Zealand Ltd to whom it must be returned if required.

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RN 2010-01

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www.nutrizeal.com

nutrizeal
Nutraceutical innovation and manufacture

CERTIFICATE OF ANALYSIS

PRODUCT: TOTAROL™ (BioGro Organic Certified)

Batch No: TT/01/09A

Manufacture Date: January 2009

Date of Analysis: 22 January 2009

Amount : 382 kg

Produced for: Mende Biotech Limited

Product Analysis:

Property	Specification	Unit	Method	Result
Appearance	Yellow Powder			Pass
Appearance of Solution	<0.30 at 400nm <0.05 at 500nm <0.05 at 600nm	Absorbance	CFR_Totarol01	Pass
Volatiles	0 - 2	% w/w	CFR_Totarol02	1.85
Totarol as Totarol + Totarol hemiacetal	50 - 85	% w/w	CFR_Totarol03	70.8
Totarol related compounds	15 - 50	% w/w	CFR_Totarol03	15.0
Total impurities	0-35	% w/w	CFR_Totarol03	14.2

Details of sampling regimes and testing frequencies and methods are available upon request from Nutrizeal Ltd. I certify that testing has been conducted such that this certificate is a true representation of the product to which it applies.

Amended Mend270109Coa to include impurities as requested by the customer
Amended 26/11/09 to include BioGro Organic Certified)

Signed: _____
Hamish Tijsen, **Compliance Manager**

Date of Issue: 26 November 2009

Material Safety Data Sheet

1. Identification of the substance/preparation and of the company/undertaking

Identification of the substance or preparation

Trade name

Totarol

Use of the substance/preparation

Cosmetics

Company/undertaking identification

Address

Wolfgang Deh
Lamontstrasse 8
81679
München

Telephone no.	++49 89 213 299 66
Fax no.	++49 89 211 076 21

Details on the importer

Address

Mende Biotech Ltd.
154 Belvedere Road
Carterton 5713, New Zealand

2. Hazards identification

Classification

R53	May cause long-term adverse effects in the aquatic environment.
R43	May cause sensitisation by skin contact.

Hazard symbols

Xi	Irritant

R phrases

43	May cause sensitisation by skin contact.
53	May cause long-term adverse effects in the aquatic environment.

3. Composition / information on ingredients

Chemical characterization

2-Phenanthrenol, 4b,5,6,7,8,8a,9,10-octahydro-4b,8,8-trimethyl-1-(1-methylethyl)-, (4bS-trans)- (9CI), 50 – 85 %

Substance / product identification

CAS no.	511-15-9
Molecular weight	286.44
Formula	C20 H30 O

4. First aid measures

General information

In case of persisting adverse effects consult a physician. Change contaminated, saturated clothing.

After inhalation

Remove affected person from the immediate area. Ensure supply of fresh air.

After skin contact

Wash off immediately with soap and water. Consult a doctor if skin irritation persists.

After eye contact

Separate eyelids, wash the eyes thoroughly with water (15 min).

After ingestion

Seek medical advice immediately. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.

5. Fire-fighting measures

Suitable extinguishing media

Foam; Carbon dioxide; Dry chemical extinguisher; Water spray jet

Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases

In the event of fire, the following can be released:
Carbon dioxide (CO_2)
Carbon monoxide (CO)

Special protective equipment for fire-fighters

Use self-contained breathing apparatus. Wear protective clothing.

6. Accidental release measures

Personal precautions

Refer to protective measures listed in sections 7 and 8. Ensure adequate ventilation. Avoid dust formation.

Environmental precautions

Do not discharge into the drains/surface waters/groundwater.

Methods for cleaning up/taking up

Pick up mechanically. When picked up, treat material as prescribed under heading "Disposal considerations".

7. Handling and storage

Handling

Advice on safe handling

Provide good ventilation of working area (local exhaust ventilation if necessary).

Advice on protection against fire and explosion

Keep away from sources of heat and ignition.

Storage

Requirements for storage rooms and vessels

Store product in closed containers. Always keep in containers of same material as the original one.

Advice on storage assembly

None known

Further information on storage conditions

Keep container tightly closed and dry in a cool, well-ventilated place.

8. Exposure controls / personal protection

Exposure limit values

N O N E

Personal protective equipment

Respiratory protection

If workplace exposure limits are exceeded, a respiration protection approved for this particular job must be worn. In case of dust formation, take appropriate measures for breathing protection in the event workplace threshold values are not specified.

Respiratory filter (part): P1 (EN 143)

Hand protection

In case of intensive contact wear protective gloves (EN 374). Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product . Before use, the protective glove should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement

of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.

Appropriate Material	***nitrile***	
Material thickness	>	0,3mm
Breakthrough time	>	480min.
Appropriate Material	***rubber***	
Material thickness	>	0,5mm
Breakthrough time	>	240min.

Eye protection
Safety glasses (EN 166)

Skin protection
Clothing as usual in the chemical industry.

General protective and hygiene measures
Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Wash hands before breaks and after work. Have eye wash fountain available. Do not inhale dust.

9. Physical and chemical properties

General information

Form	solid
Colour	light brown

Important health, safety and environmental information

Changes in physical state

Type	Boiling point	
Value	>	400° C
Pressure	1013	hPa
Type	Decomposition temperature	
Value	94° C	

Vapour pressure

Value	0,000000076	Pa
Reference temperature	25° C	
Method	92/69/EEC, A.4	

Solubility in water

Value	<	0,37mg/l
Reference temperature	20° C	

Octanol/water partition coefficient (log Pow)

Value	>	6,1
Reference temperature	25° C	

Flammability :

Flammability	not flammable
Method	92/69/EEC, A.10

10. Stability and reactivity

Materials to avoid
None known

Hazardous decomposition products
No hazardous decomposition products known.

Thermal decomposition

Value	94° C

11. Toxicological information

Acute toxicity

Acute oral toxicity

LD50	>	2000mg/kg
Species	rat	
Method	96/54/EEC, B.1 tris	

Acute dermal toxicity

LD50	>	2000mg/kg
Method	92/69/EEC, B.3	

Acute inhalational toxicity

Remarks	No data available.

Irritant/corrosive effects

Irritant effect on skin

Species	rabbit
Duration of exposure	4h
Evaluation	non-irritant
Method	OECD 404

Irritant effect on eyes

Species	rabbit
Evaluation	non-irritant
Method	OECD 405

Sensitisation

Evaluation	sensitizing

Effects after repeated or prolonged exposition (subacute, subchronic, chronic)

Route of exposure	oral
Species	rat
Duration of exposure	28d
NOAEL	
Value	100mg/kg/d
Method	96/54/EEC, B.7

Mutagenicity

Species	Salmonella typhimurium
Value	negative
Method	2000/32/EC, Annex 4D

Reproduction toxicity

Remarks	No data available.

Carcinogenicity

Remarks	No data available.

12. Ecological information

Ecotoxicity

Fish toxicity

Remarks	No data available.

Daphnia toxicity

EC50	>100mg/l
Species	Daphnia magna
Duration of exposure	48h
Method	92/69/EEC, C.2
NOEC	>10mg/l
Species	Daphnia magna
Duration of exposure	48h

Algae toxicity

Remarks	No data available.

Bacteria toxicity

Remarks	No data available.

Persistence and degradability

Biodegradability	
Value	18%
Duration of exposure	28day(s)
Method	92/69/EEC C.4-D
Evaluation	not readily degradable

Other adverse effects
Do not discharge product unmonitored into the environment.

13. Disposal considerations

Product

Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

Packaging

Residuals must be removed from packaging and when emptied completely disposed of in accordance with the regulations for waste removal. Incompletely emptied packaging must be disposed of in the form of disposal specified by the regional disposer.

14. Transport information

Other information (chapter 14.)

The product is not defined under national/international road, rail, sea and air transport regulations as a hazardous material.

15. Regulatory information

Labelling in accordance with EC directives

The product is classified and labelled in accordance with EC Directive 67/548/EC.

Warning - substance not yet fully tested

2-Phenanthrenol, 4b,5,6,7,8,8a,9,10-octahydro-4b,8,8-trimethyl-1-(1 methylethyl)-, (4bS-trans)- (9CI)

Hazard symbols

Xi Irritant

R phrases

43 May cause sensitisation by skin contact.

53 May cause long-term adverse effects in the aquatic environment.

S phrases

24 Avoid contact with skin.

37 Wear suitable gloves.

61 Avoid release to the environment. Refer to special instructions / Safety data sheets.

Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances

Remarks Annex I, part 1 + 2: not mentioned. With regard to possibly appropriate decomposition products see Chapter 10.

16. Other information

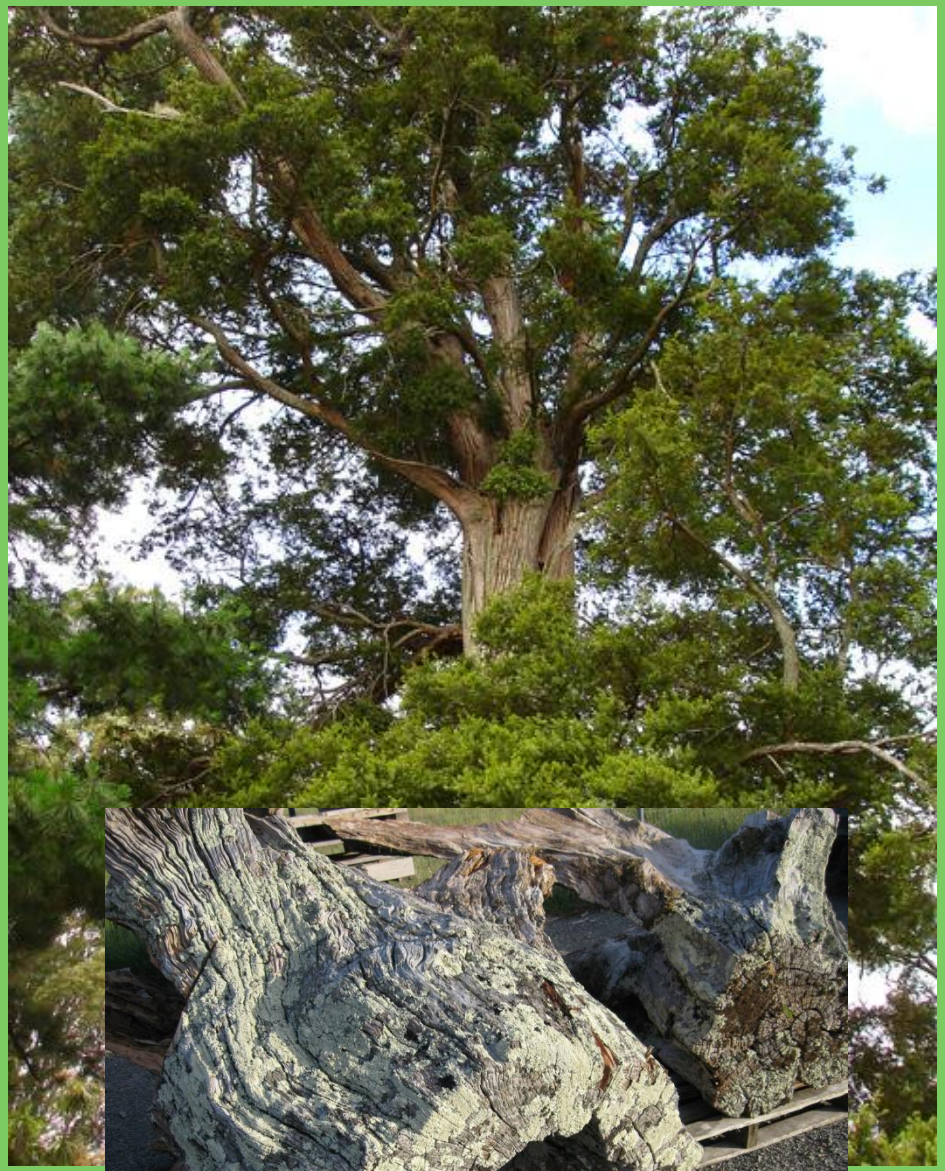
Sources of key data used to compile the data sheet:

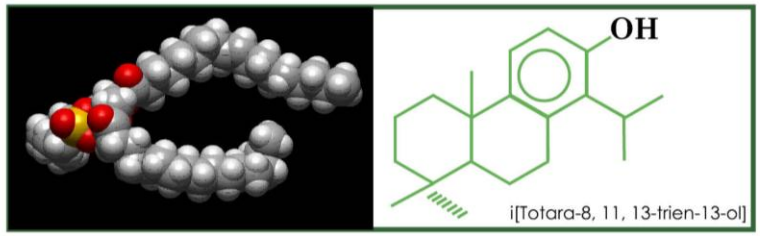
- EC Directive 67/548/EC resp. 99/45/EC as amended in each case.
- Regulation (EC) No 1907/2006 (REACH) as amended in each case.
- EC Directives 2000/39/EC, 2006/15/EC as amended in each case.
- National Threshold Limit Values of the corresponding countries as amended in each case.
- Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
- The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

Department issuing safety data sheet

Ciba Spezialitätenchemie AG
Klybeckstrasse 15
CH-4002 Basel
Tel.: 0041/ 61 63 62 03 1; Fax: 0041 / 61 63 68 60 1

This information is based on our present state of knowledge. However, it should not constitute a guarantee for any specific product properties and shall not establish a legally valid relationship.





Technical Data and Reports

Because **Totarol™** has so many applications, a lot of data and research has been assembled to help answer people's queries.

Records and reports of all available work are available on a special science website **www.docs.totarol.com** and can be accessed by contacting Essentially New Zealand for logon and password access.

Totarol Extraction Processes

Mende Biotech Ltd extracts **Totarol™** from recycled Podocarpus totara wood using a new super critical extraction technology developed by IRL and Mende Biotech Ltd.

Totarol™ can be extracted from totara wood by solvent extraction but there are big differences between the end products of this process and the **Totarol™** extracted by the super critical extraction process Mende Biotech has developed.

The testing of the super critical extracted **Totarol™** revealed gram negative activity that did not occur in the product extracted by the solvent extraction method.

The solvent method of **Totarol™** extraction also yields a completely different set of impurities in the end product.

It has taken a lot of work to develop the super critical extraction process for **Totarol™**. When the company started trying to extract **Totarol™** several years ago using a solvent extraction method, they derived a completely different compound which had a completely different and inferior make up and range of properties to the later super critical extracted **Totarol™**.

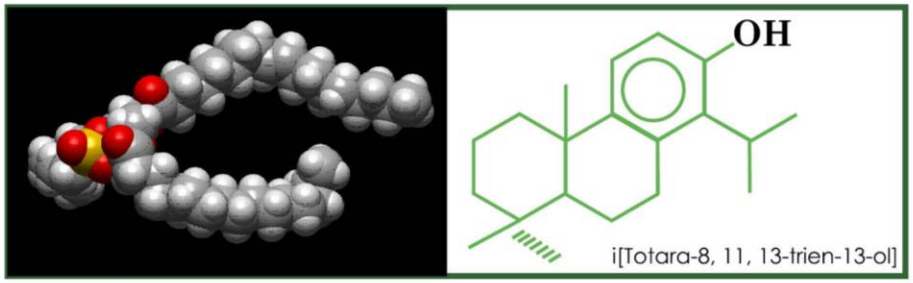
The 31% remaining impurities in the super critical extracted product are compounds that are related to **Totarol™** in structure (as confirmed by NMR) but are at too low concentrations to isolate and fully characterize.

There are four main reasons why Mende Biotech uses its own super critical extraction method:

- it makes the product completely organic
- it cuts out any solvent residue
- it yields higher purity
- it yields higher extraction rates.

The big differences between Totarol™ and other similar products on the market are that Totarol™

- ***is very stable***
- ***is very safe***
- ***does not smell***
- ***has no taste***
- ***is extremely potent.***



The supercritical extraction of Totarol™ is contracted out to New Zealand's largest extraction plant located in Nelson!

Extract Solutions Ltd

the essence of nature – pureas NZ

Quality & Certification

- **ESL** is ISO 9001:2000 accredited
- **ESL** has modern Food Certified premises
- **ESL** operates a Risk Management Programme certified by NZ Food Safely Authority
- **ESL** is a certified organic processor - BIOGRO Registration No. 4760 CO1
- **ESL** holds a current Kashrus Certificate for processing Kosher products.
- **ESL's** plant is listed for export to the EU and USA.

ESL's Supercritical Technology

ESL employs the latest Supercritical CO_2 methods and equipment to capture the finest natural extracts.

What is CO_2?

CO_2 is an atmospheric gas composed of one carbon and 2 oxygen atoms.

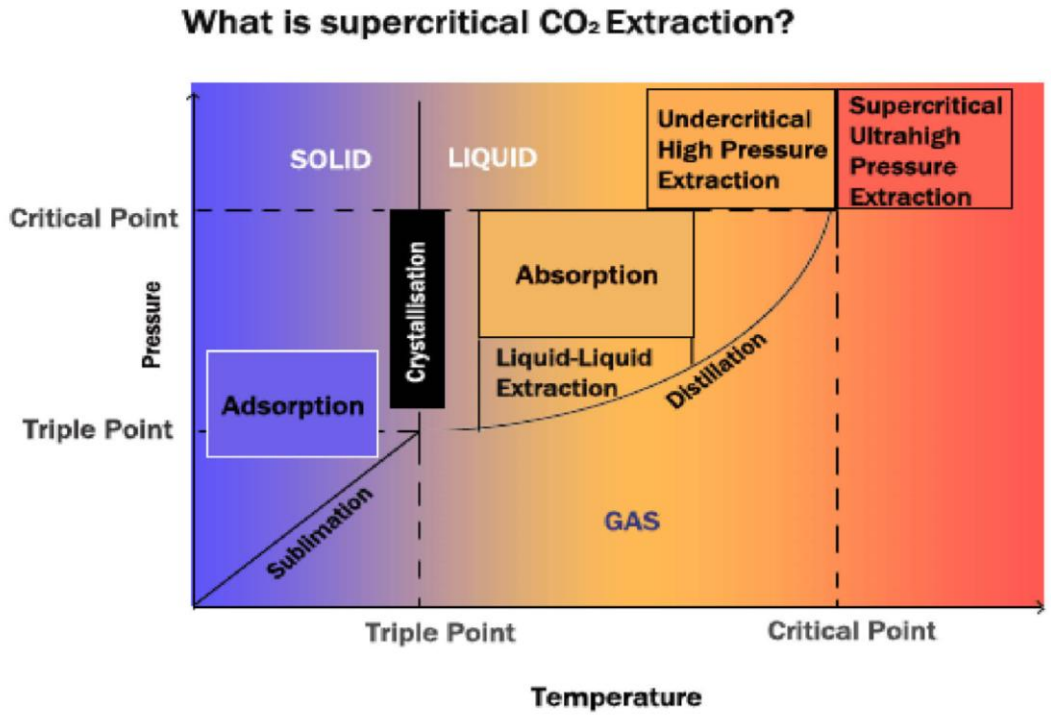
In 2004, CO_2 in the earth's atmosphere = 379ppm or 0.038% by volume.

It is a non-flammable, colourless, odourless natural constituent of air and once pressurised is an ideal and gentle, natural solvent.

What is Supercritical CO_2?

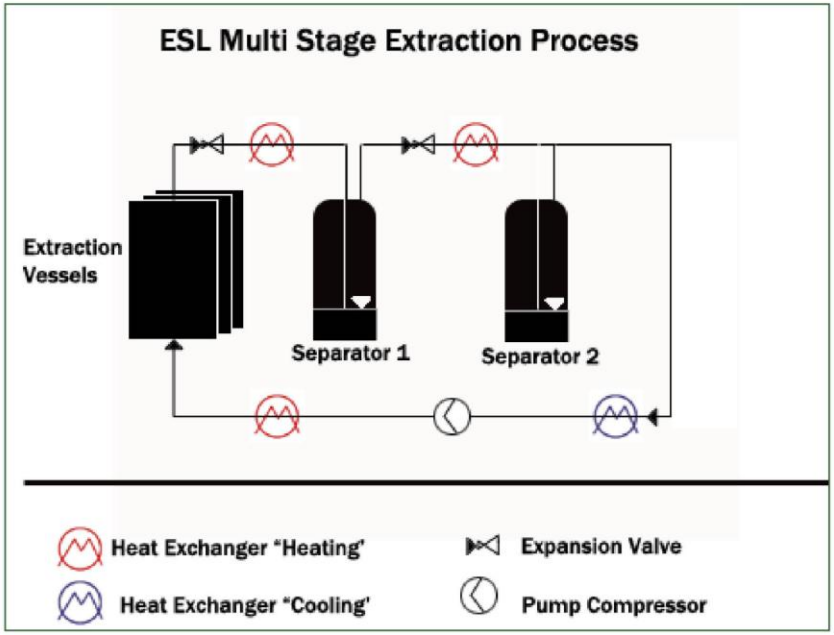
At conditions above its critical temperature and pressure, CO_2 exhibits the propensity to dissolve materials.

"This critical point is reached at pressures above 73 atmospheres and temperatures over 31°C, and by varying temperature and pressure above these limits supercritical CO_2 can be used to selectively extract components from raw materials."



How is Supercritical CO_2 Used to Extract High Quality Natural Products?

- Supercritical CO_2 is pumped through extraction vessels containing the raw material.
- The dense Supercritical CO_2 dissolves the required extracts and takes them into solution.
- The solution passes through a pressure reduction valve.
- The extracts then precipitate from the CO_2 and collect in the separator
- The CO2 is recompressed and recycled to the extractor.

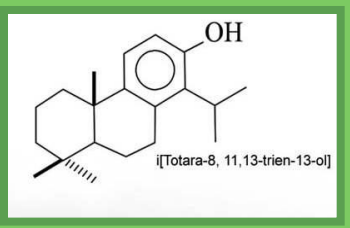


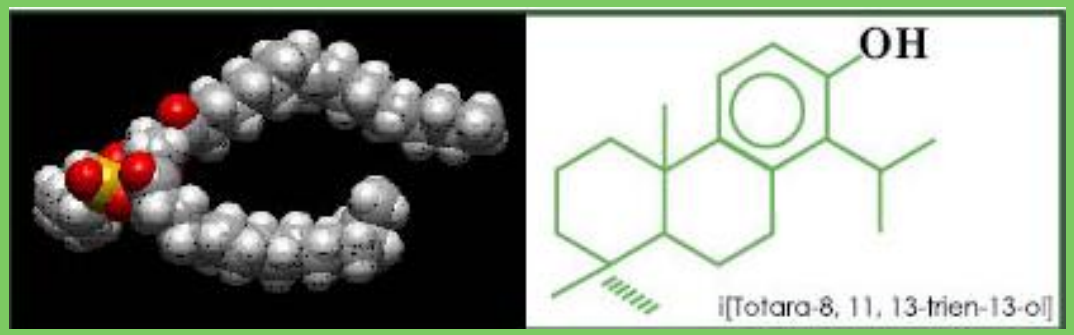
The Benefits of Supercritical CO_2

Features	Benefits
Inert extraction medium	*No solvent residues or impurities*
Maximum product recovery	*High extract yield with minimum loss of volatiles*
Non-intrusive technology	*Retention of product integrity and biological activity*
Low temperature	*No thermal degradation*
Recyclable extraction medium	*Environmentally responsible*


TOTAROL POWDER
Date Packed: 15/04/04
Net Weight: 1.00 kg

Totarol™





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