

MMB

3-Methoxy-3-Methyl-1-Butanol



kuraray

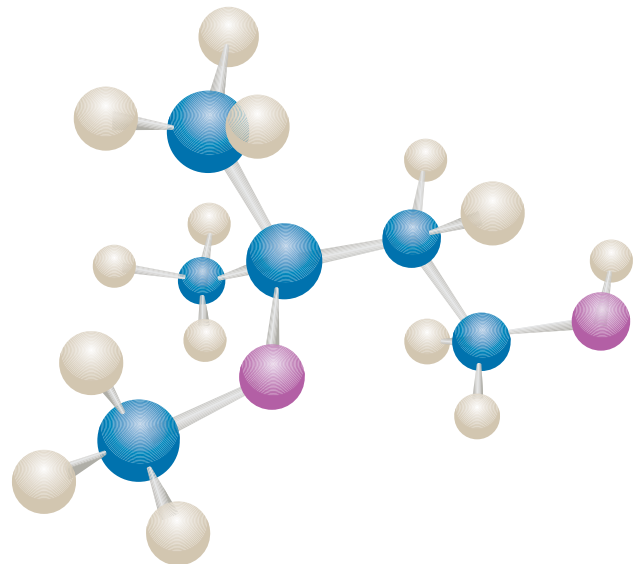
Number One Life-Changing Technology



In 1972 KURARAY developed a new isoprene synthesis process by combining C4 and C1, this new process and another new synthetic rubber process provided KURARAY the incentive to build a new plant for these materials in Kashima.

MMB

(3-Methoxy-3-Methyl-1-Butanol)



Applications at a glance

- Air Freshener
Electrical, Fan, Car type, Reed diffuser, Gel, Aerosol...
- Household Cleaner
Kitchen, Air fan, Toilet, Bathroom, Floor, Multi purpose...
- Industrial Cleaner
for Electronic, PCB, Optical, Metal parts, Precision parts...

- Dry Soap
- Hand Cleaner
- Insecticide and Pesticide
- Ink and Coating



KURARAY's KASHIMA FACILITY in Japan is under a strict quality control based on ISO-9001 and ISO-14001.

The main reasons why using MMB

Low toxicity	Geringe Toxizität
Amphipathic	Amphipatisch
Good solubilizer	Gutes Lösevermögen
Mild odor	Geruchsarm
To control evaporation speed	Konstantes Verdampfungsverhalten
Stable versus autoxidation	Stabil gegenüber Autoxidation
High Flash point	Hoher Flammpunkt
Biodegradable	Biologisch abbaubar

Faible toxicité	Baja toxicidad
Amphiphile	Anfipatico
Bonne propriété de solubilisation	Buena solubilidad
Faible odeur	Bajo olor
Permet un bon contrôle de la vitesse d'évaporation	Para controlar la velocidad de evaporación
Stable à l'auto-oxydation	Estable frente a la oxidacion
Point éclair élevé	Alto Punto de inflamación
Bonne biodégradabilité	Biodegradable

低毒性	低毒
両親媒性	両親媒
溶解力	溶解性好
低臭気	低気味
安定した蒸発速度	穩定蒸発速率
耐酸化性	耐酸化
高引火点	高閃点
生分解性	生物降解

Specification of MMB

Appearance

Clear and Colorless Liquid

Color (APHA)

10 max

Specific Gravity (20 °C / 20 °C)

0.925 – 0.930

Distillation (760 mmHg)

IBP (°C) 168 min

DP (°C) 178 max

Acidity as acetic acid (Wt %)

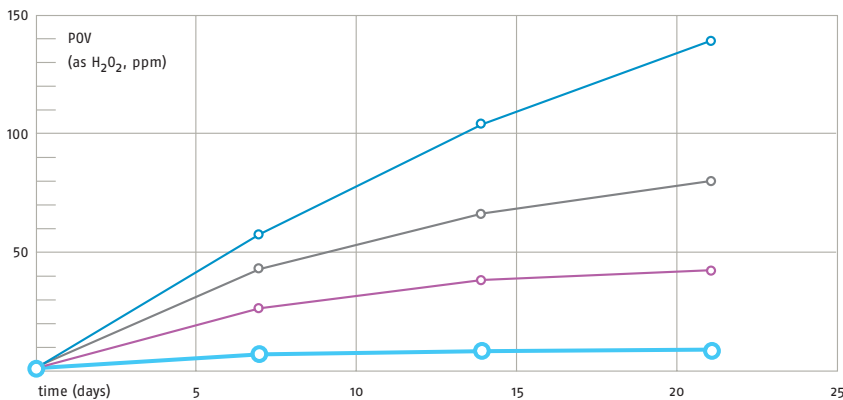
0.01 max

Water (%)

0.2 max



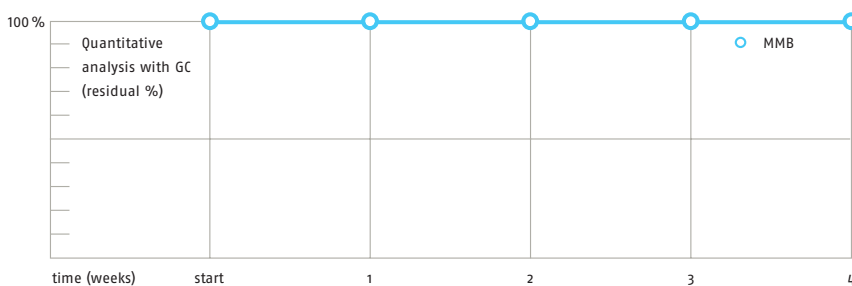
MMB is one of the fruits of our intensive development effort for novel products which are bio mimetic and at the same time friendlier to our environment and less harmful to living organisms.



Stability against Autoxidation

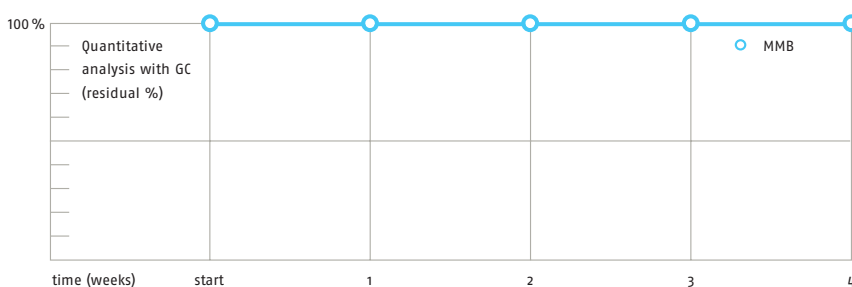
Experimental: Solvent (150 g) was placed in a beaker. Temperature was kept 18 °C to 22 °C. POV of each solvent was measured for 3 weeks by iodometric titration.

- Ethylene oxide based Glycol ether -2
- Ethylene oxide based Glycol ether -1
- Propylene oxide based Glycol ether
- MMB



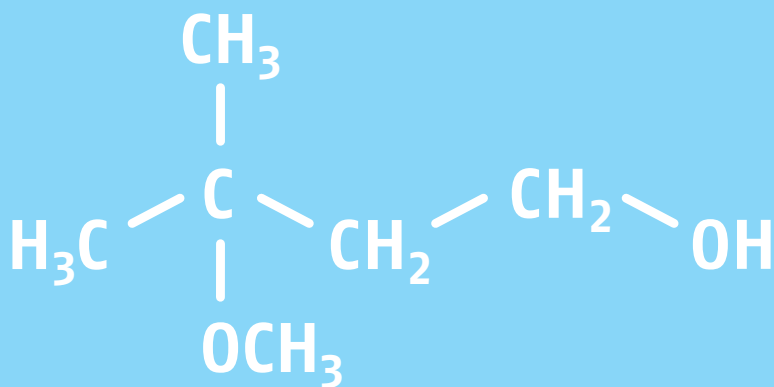
Stability in Acidic Condition / pH = 4

Experimental: MMB (50 g) and Phthalate buffer solution pH = 4.0 (50 g) were placed in a bottle and capped. The bottle was kept 50 °C for 4 weeks. Residual ratio was measured by GC analysis.



Stability in Alkali Condition / pH = 10

Experimental: MMB (50 g) and Carbonate buffer solution pH = 10.0 (50 g) were placed in a bottle and capped. The bottle was kept 50 °C for 4 weeks. Residual ratio was measured by GC analysis.



Safety Data of MMB

1. Acute Oral Toxicity

LD₅₀: 4.30 g / kg (rats)¹
 LD₅₀: 5.83 g / kg (mice)²

2. Inhalation Toxicity after repeated dose²

(rats / 500 ppm / 28 days)

No significant changes were observed in the pathological, historical and functional examinations of viscera but a slight increase in GOT activity in liver and a slight increase in kidney weights as percentages of body weight. Other abdominal viscera showed nothing wrong in other examination.

3. Mutagenicity¹ (Reversion test with bacteria / Ames test)

No evidence of mutagenic potential

4. Teratogenicity³

Developmental NOEL: 500 mg / kg - rat / day

Maternal NOEL: 250 mg / kg - rat / day

MMB is not a development toxicant, because there were no adverse effects on development at either of two dosages that were not toxic to the dams.

5. Acute Dermal Toxicity in Rats⁴

LD₅₀: >2,000 mg / kg

No deaths occurred and no clinical signs were noted after 24 h dermal administration, under occlusion of MMB at a dose level of 2,000 mg / kg.

6. Skin sensitization potential⁴

Negative responses noted in all test and control group animals following challenge with MMB at concentration of 100 %.

7. Primary Skin Irritation in Rabbits⁴

MMB is non-irritant to rabbit skin under the test conditions. Mean irritation scores:

MMB 100 % : 0.04

MMB 50 % v/v in distilled water : 0.00

Very slight erythema was noted at one test site treated with MMB at a concentration of 100 % at the 24 h assessment only.

8. Dermal Irritation in Rabbits (28 day repeat)⁴

MMB 100 % : 0.6 (slightly irritant)

MMB 50 % v/v in distilled water : 0.0

9. Photo-irritation potential in Guinea Pigs⁴

No photo-irritant responses were noted in the test and control groups.

10. Photosensitisation potential in Guinea Pigs⁴

None of the test group animals showed a positive response.

11. Human Skin Patch Test⁵

48 h male & female : negative

12. Primary Eye Irritation in Rabbits⁵

MMB is moderately irritant to rabbit eyes, however, rising 30-60 s after instillation with distilled water reduces the irritation potential of MMB. The non-rinsed eyes showed some responses, and returned to normal by 9-10 days post instillation.

References

¹ Huntingdon Life Sciences, U.K.

² Japan Industrial Safety Association, Japan

³ Argus Research Laboratory Inc., U.S.A.

⁴ Inveresk Research International, U.K.

⁵ Nihon Mouhatsu Kagaku Kyokai, Japan



MMB is a clear, colorless, low toxic water miscible liquid. In addition to MMB, Kuraray also produces, Diols, Diamine and Pesticide raw materials.

Environmental Effect of MMB

1. Acute Toxicity for fish¹

(Killfish, 48 hrs JIS – K – 0102 – 55)

TLm : 7,400 ppm

2. Biomagnification in fish¹ (carp, 8 weeks)

No magnification

3. Biodegradability²

MMB is biodegradable, in accordance with ISO 14593 (adopted March 1999), OECD 310 (adopted March 2006).

→ This test designed to meet the requirements of EC 648/2004 (amended by EC 907/2006), and EPA OPPTS 835.3120 (adopted January 1998)

4. Chemical Oxygen Demand (COD)³

8,060 mg/L (1% aqueous solution of MMB)

References

¹ Chemicals Inspection & Testing Institute, Japan

² Huntingdon Life Sciences Ltd, U.K., 2008

³ Japan Oil Staff Inspectors Corporation, Inc., Japan

Packaging

16 kg (35 lbs) in can*

185 kg (407 lbs) in drum

890 kg (1962 lbs) in IBC

19.9 MT in ISO container

*available in Europe and Japan

Regulatory Status

CAS Number 56539-66-3

AICS (Australia)	Listed
CRC-SEPA (China)	Listed
DSL (Canada)	Listed
ECL (Korea)	Listed KE-24367
EINECS (EU)	Listed 260-252-4
ENCS (Japan)	Listed 2-3079
NZIoC (New Zealand)	Listed
PICCS (Philippine)	Listed
SWISS (Switzerland)	Listed G-117002
TSCA (USA)	Listed

REACH Pre-registered
(Kuraray Europe GmbH has intention to register MMB in REACH as an importer)

INCI Name:
Methoxymethylbutanol



Kuraray Co., Ltd.

Chemicals Marketing & Sales Department
Tokyo Head office
Ote Center Building, 1-1-3, Otemachi
Chiyoda-ku, Tokyo, 100-8115 Japan
Phone +81-3-67 01-16 23
Telefax +81-3-67 01-16 46

Kuraray Europe GmbH

Building F 821, Höchst Industrial Park
65926 Frankfurt am Main, Germany
Phone +49-69-30 53 58 44
+33-146-68 04 66
Telefax +49-69-30 53 56 45

Kuraray America, Inc.

600 Lexington Avenue, 26th Floor
New York, NY 10022 USA
Phone +1-212-3 56 42 58
Telefax +1-212-8 67 35 43

www.kuraray.co.jp/en/

To the best of our knowledge, information contained herein is accurate. It is the sole responsibility of the customer to determine whether the product is appropriate and suitable for customer's specific use. Specific end use may require approval by appropriate regulatory agencies. All chemicals may present unknown health hazards and should be used with caution. Although certain hazards may be described in this publication, we cannot guarantee that these are the only hazards that exist. Kuraray makes no warranties, express or implied, regarding products on any information contained here in. Kuraray disclaims any liability for infringement of any patent by reason of customer's use of any Kuraray products in combination with other materials or in any process. **02/2008**