

# MMB

3-Methoxy-3-Methyl-1-Butanol



***kuraray***

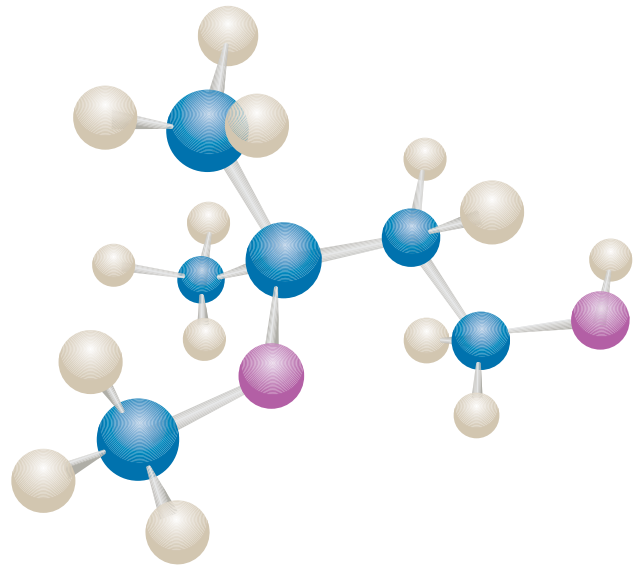
Number One Life-Changing Technology



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
- Dry 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

Amphipathic

Good solubilizer

Mild odor

To control evaporation speed

Stable versus autoxidation

High Flash point

Biodegradable

Geringe Toxizität

Amphipatisch

Gutes Lösevermögen

Geruchsarm

Konstantes Verdampfungsverhalten

Stabil gegenüber Autoxidation

Hoher Flammpunkt

Biologisch abbaubar

Faible toxicité

Amphiphile

Bonne propriété de solubilisation

Faible odeur

Permet un bon contrôle de la vitesse d'évaporation

Stable à l'auto-oxydation

Point éclair élevé

Bonne biodégradabilité

Baja toxicidad

Anfipatico

Buena solubilidad

Bajo olor

Para controlar la velocidad de evaporación

Estable frente a la oxidacion

Alto Punto de inflamación

Biodegradable

低毒性

両親媒性

溶解力

低臭気

安定した蒸発速度

耐酸化性

高引火点

生分解性

低毒

両親媒

溶解性好

低気味

穩定蒸発速率

耐酸化

高閃点

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 (760mmHg)

IBP(°C) 168 min

DP (°C) 178 max

### Acidity as acetic acid (Wt %)

0.01 max

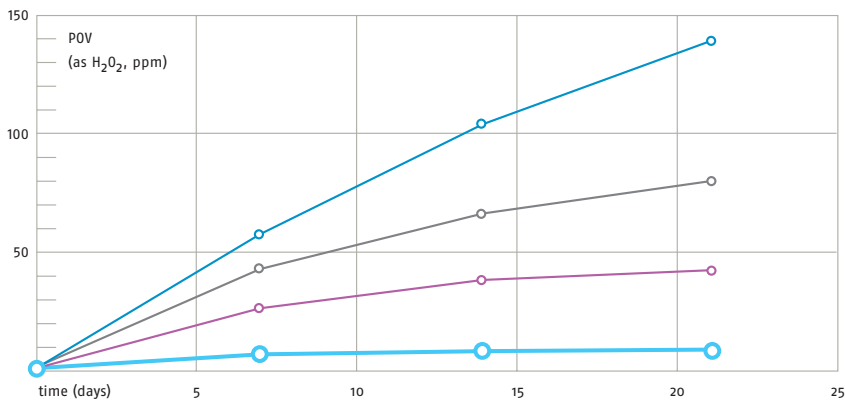
### Water (%)

0.2 max





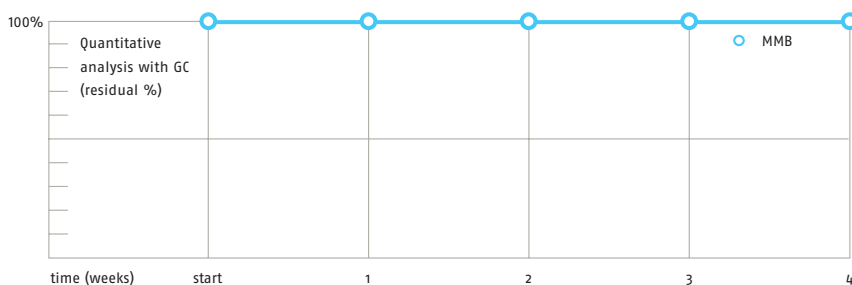
MMB is one of the fruits of our intensive development effort for novel products which are bio mimetic and at the same time friendlier to our environment and less harmful to living organisms.



### Stability against Autoxidation

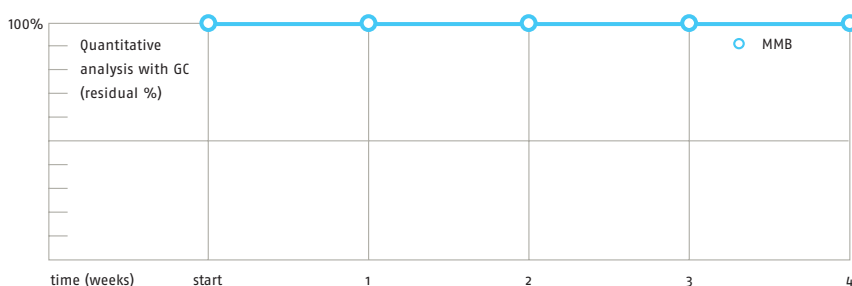
**Experimental:** Solvent (150g) was placed in a beaker. Temperature was kept 18 °C to 22 °C. POV of each solvent was measured for 3 weeks by iodometric titration.

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



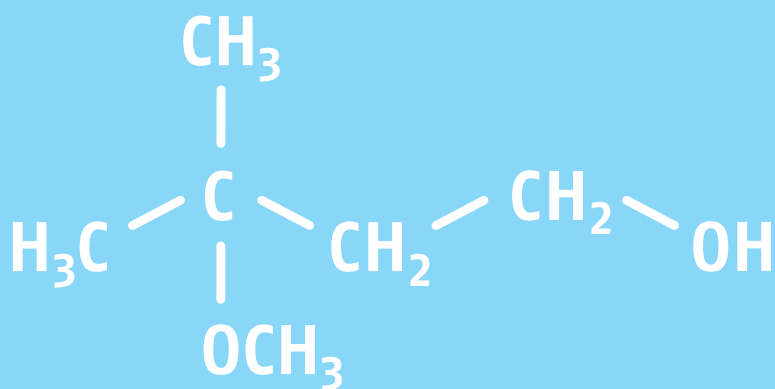
### Stability in Acidic Condition / pH = 4

**Experimental:** MMB (50g) and Phthalate buffer solution pH = 4.0 (50g) 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 (50g) and Carbonate buffer solution pH = 10.0 (50g) 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

LD<sub>50</sub>: 4.30 g / kg (rats)<sup>1</sup>

LD<sub>50</sub>: 5.83 g / kg (mice)<sup>2</sup>

### 2. Inhalation Toxicity after repeated dose<sup>2</sup>

(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. Mutagenicity<sup>1</sup> (Reversion test with bacteria / Ames test)

No evidence of mutagenic potential

### 4. Teratogenicity<sup>3</sup>

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 Rats<sup>4</sup>

LD<sub>50</sub>: > 2,000 mg / kg

No deaths occurred and no clinical signs were noted after 24h dermal administration, under occlusion of MMB at a dose level of 2000 mg / kg .

### 6. Skin sensitization potential<sup>4</sup>

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

### 7. Primary Skin Irritation in Rabbits<sup>4</sup>

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)<sup>4</sup>

MMB 100% : 0.6 (slightly irritant)

MMB 50% v/v in distilled water : 0.0

### 9. Photo-irritation potential in Guinea Pigs<sup>4</sup>

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

### 10. Photosensitisation potential in Guinea Pigs<sup>4</sup>

None of the test group animals showed a positive response.

### 11. Human Skin Patch Test<sup>5</sup>

48 h male & female : negative

### 12. Primary Eye Irritation in Rabbits<sup>5</sup>

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

<sup>1</sup> Huntingdon Life Sciences, U.K.

<sup>2</sup> Japan Industrial Safety Association, Japan

<sup>3</sup> Argus Research Laboratory Inc., U.S.A.

<sup>4</sup> Inveresk Research International, U.K.

<sup>5</sup> 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 fish<sup>1</sup>**  
(Killfish, 48 hrs JIS - K - 0102 - 55)  
TLm : 7,400 ppm
- 2. Biomagnification in fish<sup>1</sup>** (carp, 8 weeks)  
No magnification
- 3. Biodegradability<sup>1</sup>**  
(Japanese MITI - 2 test condition, evaluated by OECD criteria)  
MMB is biodegradable.  
MMB (30 ppm) was stirred with bacterial sludge (100 ppm) at 25 °C for 4 weeks, then MMB (88%) was biologically oxidized.
- 4. Chemical Oxygen Demand (COD)<sup>2</sup>**  
8,060 mg / L (1% aqueous solution of MMB)

### References

- <sup>1</sup> Chemicals Inspection & Testing Institute, Japan  
<sup>2</sup> Japan Oil Stuff 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	Will be registered

INCI Name:  
**Methoxymethylbutanol**



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