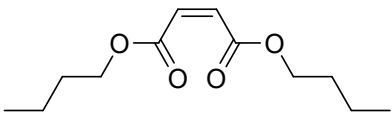


皮膚障害物質データシート

Dibutyl maleate(DBM)

化学構造式 (Structure)	
化学物質名 (Generic Name)	Dibutyl maleate(DBM) ジ(ブチル)マレート
元素組成、分子量 (Molecular Formula, Molecular Weight)	C ₁₂ H ₂₀ O ₄ = 228.29
NITE-CHRIP ID	C005-808-63A
用途 (Use, Activity)	可塑剤

化合物情報、皮膚障害情報

Dibutyl maleate(DBM)は、プラスチックに用いられる可塑剤である。Dibutyl fumarate(DBF)と DBM は、光変換(cis-trans)する関係である (図-1)。

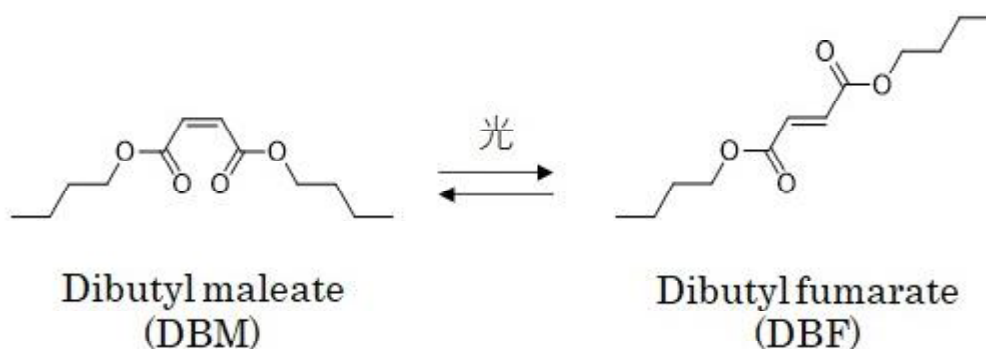


図-1 Dibutyl maleate(DBM)と Dibutyl fumarate(DBF)の光変換(cis-trans)

DBM は、過去にアレルギー接触皮膚炎や感作性の報告があり(1-4)、DBF も靴によるアレルギー接触皮膚炎の事例が報告(4)がある。DBM 及び DBF は、感作性があるとの報告がある(5)。

2021 年、サンダルによるアレルギー性接触皮膚炎が発生し、NITE に事故情報が報告された。事故原因究明テストの結果、DBM 及び DBF がサンダルの皮膚接触面の樹脂から検出され、パッチテストで陽性反応 (DBM 5%pet ++、DBF 5%pet ++) を示したことからアレルギー性接触皮膚炎の原因物質として確認された。

DBM 及び DBF と類似の化学構造を有する化学物質においても、アレルギー性接触皮膚炎の事例が報告されている。

フマル酸及びマレイン酸のメチルエステルである Dimethyl fumarate (DMF) 及び Dimethyl maleate (DMM) は、特に欧州でアレルギー性接触皮膚炎が多発(6-32)した。

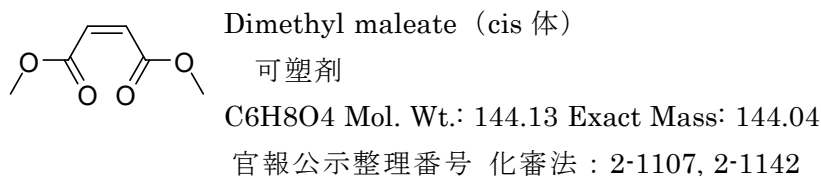
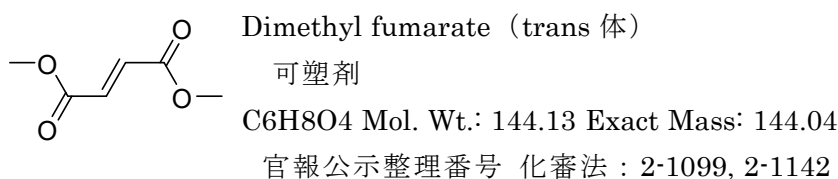


図-2 Dimethyl fumarate 及び Dimethyl maleate の化学構造

DMF は、可塑剤のほか、防腐剤やかび防止剤として、皮革、履物、家具、繊維製品、車のシート、食品、食糧、飼料、化粧品、煙草等にも用いられていた。

DMF については、欧州委員会が 2009 年 5 月 1 日より、委員会決定「2009/251/EC」により、規制を開始しており、DMF を含むあらゆる製品の欧州市場への投入・販売を禁止している(33)。

NITE 事故情報 (NITE-Accident information)

2021-2846 靴 (サンダル)

文献 (References)

・ DBM

(1) J Thormann, I Hansen, J Misfeldt.; Occupational dermatitis from dibutyl maleinate, Contact Dermatitis. 1985 Nov;13(5):314-6.

(2) Denis Sasseville, Philippe Lafaille, Valerie Joncas.; Allergic contact dermatitis from occupational exposure to dibutyl maleate, Contact Dermatitis. 2009 May;60(5):298-300.

(3) J S English, C R Lovell, R J Rycroft.; Contact dermatitis from dibutyl maleate, Contact

Dermatitis. 1985 Nov;13 (5):337-8.

• DBM, DBF

(4) Ingrid Siemund, Jakob Dahlin.; Occupational allergic contact dermatitis to dibutyl maleate and dibutyl fumarate present in a safety shoe: A reason for concern ? , Contact Dermatitis. 2021 Nov;85 (5):582-584.

(5) Takeshi Matsuoka, Kohta Kurohane, Wakana Suzuki, Erina Ogawa, Kamiyu Kobayashi, Yasuyuki Imai.; Dibutyl Maleate and Dibutyl Fumarate Enhance Contact Sensitization to Fluorescein Isothiocyanate in Mice, Biol Pharm Bull. 2016;39 (2):272-7.

• DMF

(6) P Mercader, E Serra-Baldrich, A Alomar.; Contact dermatitis to dimethylfumarate in armchairs., Allergy. 2009 May;64 (5):818-9.

(7) C Foti, C G Zamboni, N Cassano, A Aresta, A Damascelli, F Ferrara, G A Vena.; Occupational allergic contact dermatitis associated with dimethyl fumarate in clothing., Contact Dermatitis. 2009 Aug;61 (2):122-4.

(8) Ana Gimenez-Arnau, Juan Francisco Silvestre, Pedro Mercader, Jesus De la Cuadra, Isabel Ballester, Fernando Gallardo, Ramon M Pujol, Erik Zimerson, Magnus Bruze.; Shoe contact dermatitis from dimethyl fumarate: clinical manifestations, patch test results, chemical analysis, and source of exposure., Contact Dermatitis. 2009 Nov;61 (5):249-60.

(9) K Lammintausta, E Zimerson, T Hasan, P Susitaival, S Winhoven, B Gruvberger, M Beck, J D Williams, M Bruze.; An epidemic of furniture-related dermatitis: searching for a cause., Br J Dermatol. 2010 Jan;162 (1):108-16.

(10) Franca Davanzo, Laura Settini, Patrizia Stefanelli, Giuseppe Bartolini, Daniela Barciocco, Fabrizio Sesana, Rossana Borghini, Giscardo Panzavolta, Aurelia Fonda.; A case of contact dermatitis to dimethylfumarate in shoes identified in Italy., Ann Ist Super Sanita. 2010;46 (4):366-9.

(11) Kaija Lammintausta, Erik Zimerson, Sandra Winhoven, Paivikki Susitaival, Taina Hasan, Birgitta Gruvberger, Jason Williams, Michael Beck, Magnus Bruze.; Sensitization to dimethyl fumarate with multiple concurrent patch test reactions., Contact Dermatitis. 2010 Feb;62 (2):88-96.

(12) Ana Fraga, Raquel Silva, Paulo Filipe, Kerstin Scharrer, Joao Borges Da Costa, Petra Nussbaum, M Marques Gomes.; Allergic contact dermatitis to dimethyl fumarate in footwear., Contact Dermatitis. 2010 Feb;62 (2):121-3.

(13) Felicidade Santiago, Pedro Andrade, Margarida Goncalo, Rosa Mascarenhas, Americo Figueiredo.; Allergic contact dermatitis to shoes induced by dimethylfumarate: A new allergen imported from China., Dermatol Online J. 2010 Mar 15;16 (3):3.

(14) P Susitaival, S M Winhoven, J Williams, K Lammintausta, T Hasan, M H Beck, B Gruvberger, E Zimerson, M Bruze.; An outbreak of furniture related dermatitis ('sofa dermatitis') in Finland and the UK: history and clinical cases., J Eur Acad Dermatol Venereol. 2010 Apr;24 (4):486-9.

(15) J F Silvestre, P Mercader, A M Gimenez-Arnau.; Contact dermatitis due to dimethyl

fumarate., *Actas Dermosifiliogr.* 2010 Apr;101(3):217-22.

(16) M Lynch, P Collins.; Sofa dermatitis presenting as a chronic treatment resistant dermatitis., *Ir Med J.* 2010 Apr;103(4):119-20.

(17) L A Gonzalez-Guzman, J J Goday, J M Barja-Lopez, L Perez-Varela.; Allergic contact dermatitis due to dimethyl fumarate in boots., *Actas Dermosifiliogr.* 2010 May;101(4):366-7.

(18) Angel Carlos Matia Cubillo, Juan Jose Emilio Huertes Garcia, Francisco Javier De Juana Izquierdo.; Allergic contact dermatitis due to shoes with dimethylfumarate., *Med Clin (Barc).* 2010 Jun 19;135(3):138-9.

(19) Karin Schad, Stephan Nobbe, Lars E French, Barbara Ballmer-Weber.; Sofa dermatitis., *J Dtsch Dermatol Ges.*, . 2010 Nov;8(11):897-9.

(20) Magnus Bruze, Erik Zimerson.; Dimethyl fumarate., *Dermatitis.* Jan-Feb 2011;22(1):3-7.

(21) Ana Gimenez-Arnau.; Dimethyl fumarate: a human health hazard., *Dermatitis.* Jan-Feb 2011;22(1):47-9.

(22) Agnes Lefranc, Françoise Flesch, Amandine Cochet, Jamel Daoudi, Raphael Crinier, French Dimethylfumarate Working Group.; Epidemiological description of an outbreak of dermatitis related to dimethylfumarate, France, 2008., *Arch Environ Occup Health.* 2011;66(4):217-22.

(23) Michel Castelain.; Globalisation and allergy., *Eur J Dermatol.* Jul-Aug 2011;21(4):472-8.

(24) A Lo Balbo, M J Gotelli, W P Mac Cormack, N Kogan, C Gotelli.; Contact dermatitis caused by dimethylfumarate in Argentina., *Clin Toxicol (Phila).* 2011 Jul;49(6):508-9.

(25) Fernando Toledo, Juan Francisco Silvestre, Laura Cuesta, Leopoldo Borrego, Maria Perez.; Correlation between lesion site and concentration of dimethyl fumarate in different parts of shoes in patients with contact dermatitis caused by dimethyl fumarate in footwear., *Contact Dermatitis.* 2011 Aug;65(2):92-5.

(26) Juan Francisco Silvestre, Fernando Toledo, Pedro Mercader, Ana Maria Gimenez-Arnau, Spanish Research Group of Allergic Contact Dermatitis due to Dimethyl Fumarate in Spain.; A Summary of shoe allergic contact dermatitis caused by dimethyl fumarate in Spain., *Contact Dermatitis.* 2011 Aug;65(2):122-3.

(27) Angelo Massimiliano D'Erme, Andrea Bassi, Torello Lotti, Massimo Gola.; Dimethyl fumarate contact dermatitis of the foot: an increasingly widespread disease., *Int J Dermatol.* 2012 Jan;51(1):42-5.

(28) Joseph Doumit, Genevieve Gavigan, Melanie Pratt.; Allergic contact dermatitis from dimethyl fumarate after contact with a Chinese sofa., *J Cutan Med Surg.* Sep-Oct 2012;16(5):353-6.

(29) Maria Antonia Pastor-Nieto, Jesus Eduardo Quintanilla-Lopez, Belen Gomara, Ignacio Yanguas-Bayona, Marcos Hervella, Consuelo Sanchez-Herreros, Jesus Cuevas.; Contact dermatitis caused by dimethyl fumarate in wallets., *Contact Dermatitis.* 2013 Feb;68(2)

:118-20.

(30) David A Basketter, Ian R White, Florence G Burleson, Gary R Burleson, Ian Kimber.; Dimethylfumarate: potency prediction and clinical experience., Contact Dermatitis. 2013 May;68(5):269-72.

(31) Danka Švecová 1 , Maria Šimaljakova, Anna Doležalová.; Footwear contact dermatitis from dimethyl fumarate., Int J Dermatol. 2013 Jul;52(7):803-7.

(32) C Rousselle, V Pernelet-Joly, C Mourton-Gilles, J P Lepoittevin, R Vincent, A Lefranc, R Garnier.; Risk assessment of dimethylfumarate residues in dwellings following contamination by treated furniture., Risk Anal. 2014 May;34(5):879-88.

• DMF 規制

(33) THE COMMISSION OF THE EUROPEAN COMMUNITIES.; requiring Member States to ensure that products containing the biocide dimethylfumarate are not placed or made available on the market., Official Journal of the European Union. 2009; L 74: 32-4.