

Application Information



DMSO IN PHARMACEUTICALS

Dimethyl sulfoxide (DMSO) meets stringent specifications in terms of purity, acidity, water content, UV absorbance¹. It is hence increasingly indispensable in industrial Pharmaceutical & Fine syntheses.

DMSO is a solvent that offers many benefits :

- Non labelled.
- High dipolar moment (4.3 Debye) and elevated dielectric constant ($\epsilon = 48.9$) : high solvency power.
- Intense solvation of cations by the oxygen of the sulfoxide bond : increased anion reactivity.
- Perfect stability versus alkaline hydrolysis.
- High boiling point (189 °C) : operation within a large temperature range.

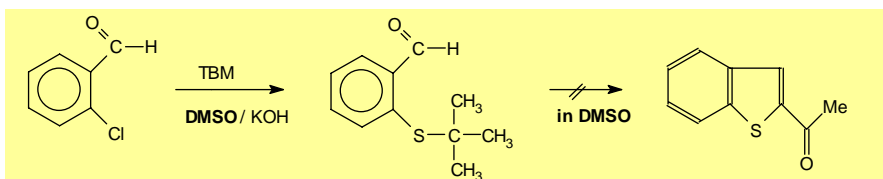
DMSO is hence a **remarkable aprotic polar** solvent for :

- **eliminations** : $R_1R_2CH - CR_3R_4R_5 \rightarrow R_1R_2C = CR_3R_4$, $R_5 = \text{leaving group}$
- **additions** : $R_1R_2C = CR_3R_4 + HR_5 \rightarrow R_1R_2CH - CR_3R_4R_5$,
- **nucleophilic substitutions** : $R - X + Nu: \rightarrow R - Nu + X^-$, $Nu: = \text{nucleophile, } X = \text{leaving group}$

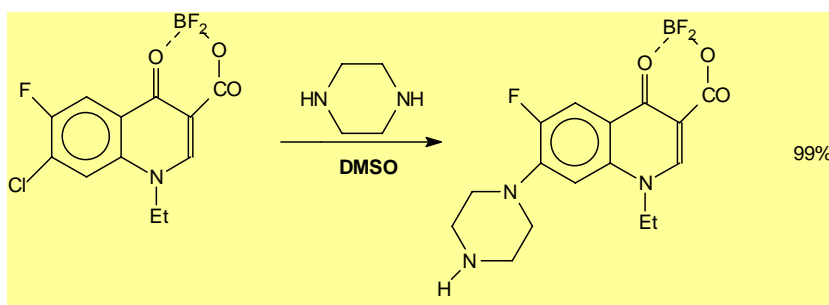
Substitution of Cl by an alkoxy (O-Me) :
Omeprazole



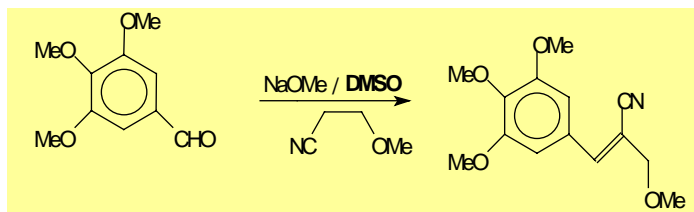
Substitution of Cl by a thioalkoxy (S-tBu) :
2-acetyl benzothiophene



Substitution of Cl by an amine :
Norfloxacin



Activation of a base (NaOMe)
to pull out a proton from a carbon (Trimetoprim)



Several comparative studies have shown DMSO's superior performance over many aprotic polar solvents :



Technically :
 \niq increased reaction rate
 \niq increased yield



Economically :
 \niq increased productivity
 \niq increased conversion rate of costly raw materials

¹ : please ask for our special 'high purity' grade

DMSO as a reagent for specific reactions :

Reaction	Example
<p>alkylation by TMSOI :</p> <p>trimethylsulfonium iodide</p>	<p><i>Mespirenone</i></p> <p><i>Fluconazole</i></p>
<p>alkylation by the dymasil anion :</p>	<p><i>Flosequinon</i></p>
<p>smooth oxidation :</p>	<p><i>MDL 74063</i></p>

DMSO as formulation solvent :

- DMSO is an **excellent carrier** for active ingredients in subcutaneous applications (pharmaceutical, veterinary products) : Idoxiridine (antiviral) solutions are diluted in DMSO for the topical treatment of herpes.
- In ampoules for injections, mainly for veterinary products.

Miscellaneous information / inventories :

CAS number : 67-68-5

Not classified as hazardous

TSCA (USA) : listed

EINECS : 200 - 664 - 3

DSL (Canada) : listed

ENCS (Japan) : 2-1553

ECL (Korea) : KE-32367

AICS (Australia) : listed

PICCS (The Philippines) : listed

ICH classification : class 3

Version 0

The values given in this document have been obtained in laboratory tests conforming to standard procedures ; they should be regarded as mean values given as an indication to customers of the best ways of using our products. They do not imply any undertaking on our part.

