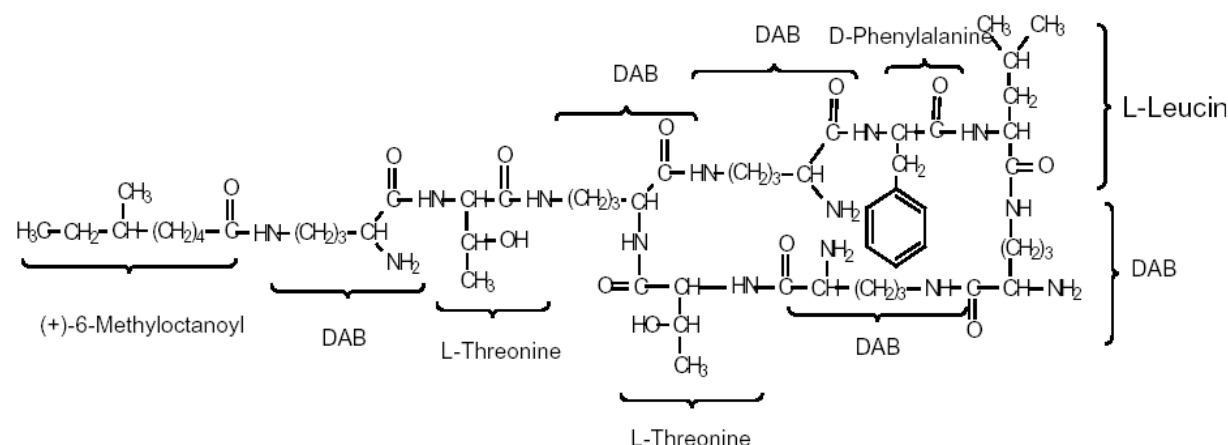


## Product Information

81334 Polymyxin B sulfate  
(Aerosporin, PMB)

This is the structure for B1; B2 has a terminal 6-methylheptanoyl group.

DAB = L-α,γ-Diaminobutyric acid

**CAS number:** 1405-20-5

**Physical Description:**

**Appearance:** White to light yellow or beige powder; hygroscopic, sensible to light<sup>1,2</sup>

**Molecular structure:** Polymyxin B is a mixture of Polymyxin B1 and B2<sup>3,4</sup>

Approximately 2.5 moles of sulfate are present.<sup>2</sup>

**Molecular formula (free base):** For B1,

$C_{56}H_{98}N_{16}O_{13}$  (MW 1203.49)<sup>4</sup>

For B2,  $C_{55}H_{96}N_{16}O_{13}$  (MW 1189.47)<sup>4</sup>

**Molecular weight:** 1450 g/mol (estimated, including ~2.5 mol sulfate)<sup>2</sup>

**Specific optical rotation:**  $-78^{\circ}$  to  $-90^{\circ}$ <sup>1</sup>

For pure B1,  $-85^{\circ}$  ( $c = 2.33$  in 75% ethanol)<sup>3</sup>

For pure B2,  $-112.4^{\circ}$  (in 2% acetic acid)<sup>3</sup>

This product is 60-70% B1 (based on HPLC data and optical rotation values).<sup>1,2,3</sup>

**Storage / Stability as supplied:**

The product should be stored at 2-8°C under argon in the dark. No change was observed in retained samples after three years' storage (tested by HPLC).<sup>2</sup>

**Solubility / Solution Stability:**

A solution of Polymyxin B sulfate in water at 50 mg/ml is clear to very slightly hazy, colorless to yellow in appearance.<sup>2</sup>

Polymyxin B sulfate has only minimal solubility in any organic solvent, for example, 0.115 mg/ml in ethanol.<sup>5</sup>

Polymyxin B was used as a component of a permeabilization reagent reported as stable at least two months at 2-8°C, more than three weeks at room temperature.<sup>6</sup>

The USP recommends that stock solutions of polymyxin B be kept only 14 days if used as reference standard.<sup>7</sup>

Solutions should be sterilized by filtration; they are rapidly inactivated by strong acids and bases.<sup>8</sup>

**General Remarks:**

Polymyxin B sulfate (PMB) is a strongly cationic cyclic polypeptide antibiotic isolated from fermentation of *Bacillus polymyxa*.<sup>1,7</sup>

PMB is a variable mixture of B1 and B2 (predominantly B1).

Polymyxins combine with cell membranes and disrupt normal permeability to small molecules.<sup>1</sup> Polymyxin B and the other polymyxin antibiotics act primarily by binding membrane phospholipids and disrupting the cytoplasmic membrane, inducing pore formation in bacterial walls (large enough to permit nucleotide leakage).<sup>8</sup> Polymyxin B binds to the lipid-A portion of the lipopolysaccharide in the cell membrane of Gram-negative bacteria. The interaction involves ionic forces between amino groups in Polymyxin B and phosphate and carboxyl

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groups in the lipid A-Kdo region, with hydrophobic interactions between the respective acyl groups. Data suggest a stoichiometric binding of one LPS monomer to one polymyxin B molecule.<sup>9,10</sup>

"Polymyxin B has a bactericidal action on most Gram-negative bacilli (E. coli, e.g.) except proteus spp. ... not active against Neisseria species, ... most fungi and Gram-positive bacteria."<sup>11</sup>

Activity is inhibited by iron(II), Co(II), Mn(II) and magnesium ions.<sup>12</sup>

Polymyxin B may be incompatible with other microbial agents, including amphotericin, cephalothin sodium, cephasolin sodium, chloramphenicol sodium succinate and tetracycline hydrochloride; it is also incompatible with heparin sodium and prednisolone sodium phosphate.<sup>11</sup>

### Units:

Usage of Polymyxin B sulfate is often reported in terms of unit activity: "one unit is contained in 0.000119 mg of the second International Standard Preparation (1969) of Polymyxin B Sulfate which contains 8403 units per mg."<sup>11</sup> One USP unit equals one International Unit for this product.<sup>13</sup> Minimum potency of Fluka 81334 is 6500 IU/mg solid.

### Applications:

Polymyxin B conjugated to horseradish peroxidase has been used to quantify lipid A in ELISA and to stain Gram-negative bacteria histochemically.<sup>9</sup>

Comparative inhibition of protein kinase C by mastoparan, melittin, cardiotoxin and polymyxin B was studied.<sup>14</sup>

Polymyxin B has been immobilized and used to remove endotoxins from solutions (See Sigma P1411).<sup>15,16</sup>

### References:

1. Supplier information.
2. Fluka and Sigma quality control.
3. Data for Biochemical Research, 3rd Ed., Dawson, R. et al. eds. (Oxford Press, 1986), p. 301.
4. Merck Index, 12<sup>th</sup> Ed., (Merck Company, 1996), #7734.
5. Weiss, P.J. et al., Antibiot. and Chemother., 7, 374-377 (1957).
6. Schupp, J.M. et al., BioTechniques, 19, 18 (1995).
7. U.S. Pharmacopeia, XXI, p. 1162.
8. Lerner, H.R. et al., Physiol. Plant., 57, 90-94 (1983).
9. Appelmeik, B.J. et al., Anal. Biochem., 207,311-316 (1992).
10. Morrison, D.C. and Jacobs, D.M., Immunochem., 13, 813-818 (1976).
11. Martindale: The Extra Pharmacopoeia, 30<sup>th</sup> ed., J. Reynolds, ed. (Pharmaceutical Press, 1993), p.194.
12. Martindale: The Extra Pharmacopoeia, 28<sup>th</sup> ed., J. Reynolds, ed. (Pharmaceutical Press, 1982), p.1204.
13. U.S. Pharmacopeia, XXX (1995), p. 5.
14. Raynor, R.L. et al., J. Biol. Chem., 266, 2753-2758 (1991).
15. Bio/Technology, Dec. 1984, p. 1035.
16. Hermanson, G.T. et al., Immobilized Affinity Ligand Techniques (Academic Press, 1992), pp. 354-355.

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