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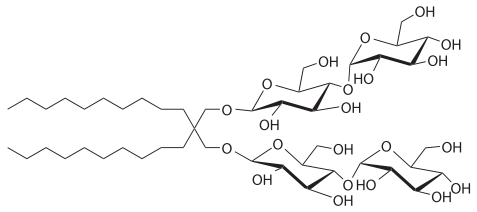
Crystallography

Anatrace® Neopentyl Glycol Class Detergents

The new Anatrace Neopentyl Glycol (NG) class detergents are revolutionary new amphiphiles which have already shown great utility in membrane protein studies[1]. NG class detergents are a more effective detergent for extracting and solubilizing/stabilizing proteins, and are particularly beneficial in the crystallization process due to some unique properties conferred by a revolutionary new architecture. The amphiphilic molecule consists of a central quaternary carbon with two hydrophilic heads and two lipophilic tails (Fig. 1), generating subtle constraints on overall conformational flexibility that allows the molecule to pack densely when forming a micelle. This dense packing increases thermal stability of the detergent/protein complex and most importantly, produces exceptionally low critical micelle concentrations and extreme water solubility.

Fig. 1. Lauryl maltose neopentyl glycol



New NG with two hydrophilic heads and two lipophilic tails built around a central quaternary carbon.

Most significantly, the Neopentyl Glycol amphiphiles are substitute products for three of today's most popular detergents: lauryl maltoside (dodecyl maltoside), octyl glucoside and decyl maltoside. The remarkable differences in CMC between the new NG class and their counterparts, where approximately 17-fold less of the NG class detergent achieves the same critical micelle concentration as the equivalent maltoside or glucoside (Fig. 2). Presumably this results from the larger total hydrophobic surface of this new class of amphiphiles.

Fig. 2. Comparison of critical micelle concentrations

Product Number	Products	CMC
NG310	Lauryl Maltose Neopentyl Glycol	.01 mM
D310	Lauryl Maltoside	0.17 mM
NG311	Octyl Glucose Neopentyl Glycol	1.02 mM
O311	Octyl Glucoside	18-20 mM
NG322	Decyl Maltose Neopentyl Glycol	.036 mM
D322	Decyl Maltoside	1.8 mM

The low CMC values of the NG class detergents are an advantageous feature in membrane protein studies. These low CMC values reduce the often detrimental effects of excess solubilizing agent on crystallization. Additionally, NG class detergents also demonstrate a superior ability to solubilize expressed proteins without interfering with the protein expression mechanics of cell free protein expression systems.

Lauryl Maltose Neopentyl Glycol	
NG310	1 gm
	5 gm
	25 gm

Octyl Glucose Neopentyl Glycol	
NG311	1 gm
	5 gm
	25 gm

Decyl Maltose Neopentyl Glycol	
NG322	1 gm
	5 gm
	25 gm

References:

1. Seok Chae, P., Rasmussen, S. G. F., Rana, R. R., Gotfryd, K., Chandra, R., Goren, M. A., Kruse, A. C., Nurva, S., Loland, C. J., Pierre, Y., Drew, D., Popot, J-L., Picot, D., Fox, B. G., Guan, L., Gether, U., Byrne, B., Kobilka, B., and Gellman, S. H. (2010) *Nature Methods* **(7) (12)**, 1003-1008.

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