DMS Headspace Calibration

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DMSP can be cleaved to DMS in an equimolar hydrolysis in 0.5 to 10 M NaOH.

Material:

- Glass vials, screw-thread caps with holes and PTFE/silicone septa. Size of vials depends on experiments; I commonly use Fisher '4 mL' vials VGB-100-336L, Fisher caps VGB300-484D, Fisher septa VGB-200-885C. Alternatively, Fisher '2 mL' vials can be used.
- DMSP stock solutions at 75 µM, 750 µM, 7.5 mM and 75 mM (all kept in freezer in 3.07)
- Gilson pipettes and sterile tips
- 0.5 M NaOH

Procedure (described here with '4 mL' vials):

- Put 3 mL of 0.5 M NaOH into a '4 mL' vial (actual volume of vial is about 4.92 mL). Prepare caps with PTFE/silicone septa with the (red) Teflon facing to the inside, (white) silicone facing to the outside of the vial. Label vials with running numbers (take log in labbook etc.).
- Add a drop of DMSP stock solution of 2 to 14 µL onto the red Teflon (inside of vial cap). See table below for guidance.
- Carefully invert cap and close vial gas-tightly
- Shake vial and incubate, depending on type of experiment, at standard condition (30 °C in dark) or experimental condition for at least 6 hours.

Note: When closing the vial, make sure the vial is gas tight. Too lose and it will leak (obviously…) but too tight and it will leak as well. Typically, the lid is gas-tightly closed when, during closure, the septum just starts to bulge to the inside of the vial.

Table 1: Calibration with an exploratory (exponential) range of DMS concentrations. This could provide guidance to find a suitable DMS concentration range.

			DMSP [uM] [uL]				
Vial #		DMS [uM]	75	750	7500	75000	0.5 M NaOH [uL]
1		0.00					3000
2		0.00					3000
3		0.95		4			3000
4		0.95		4			3000
5		1.89		8			3000
6		1.89		8			3000
7		4.75			2		3000
8		4.75			2		3000
9		9.49			4		3000
10		9.49			4		3000
11		18.95			8		3000
12		18.95			8		3000
13		47.47				2	3000
14		47.47				2	3000
15		94.87				4	3000
16		94.87				4	3000

References

Steinke M., P. Brading, P. Kerrison, M.E. Warner, D.J. Suggett 2011. Concentrations of dimethylsulfoniopropionate (DMSP) and dimethylsulfide (DMS) are strain-specific in symbiotic dinoflagellates (*Symbiodinium* sp., Dinophyceae). Journal of Phycology 47: 775–783

Franchini F., M. Steinke 2016. Protocols for the quantification of dimethyl sulfide (DMS) and other volatile organic compounds in aquatic environments. In: K. Timmis *et al*. (eds.) Hydrocarbon and Lipid Microbiology Protocols, in press