Electronic Supporting Information for

Ice Recrystallisation Inhibition by Polyols: Comparison of Molecular and Macromolecular Inhibitors and Role of Hydrophobic Units

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Ice Recrystallisation Inhibition: Additional Data

Concentration dependant activity of glucose derivates (main text, Figure 5) is shown in Figure S1 and the activity of mannose and O-ethylmannose is shown in Figure S2.

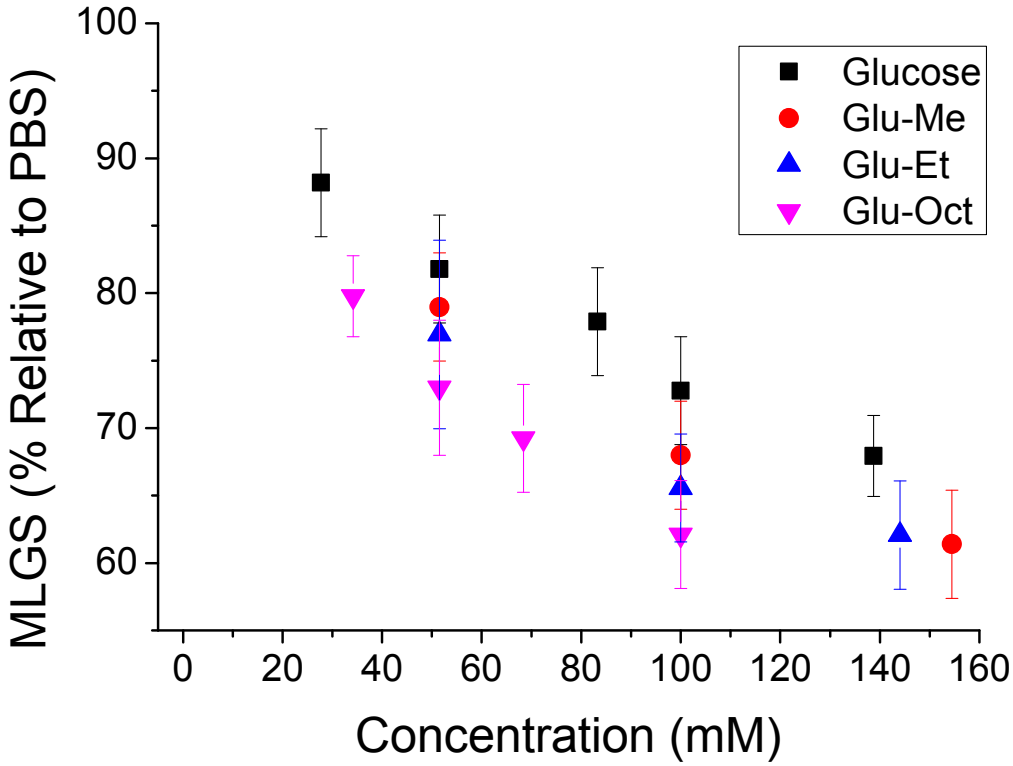

Figure S1. Ice recrystallisation inhibition activity of glucose and its derivatives.

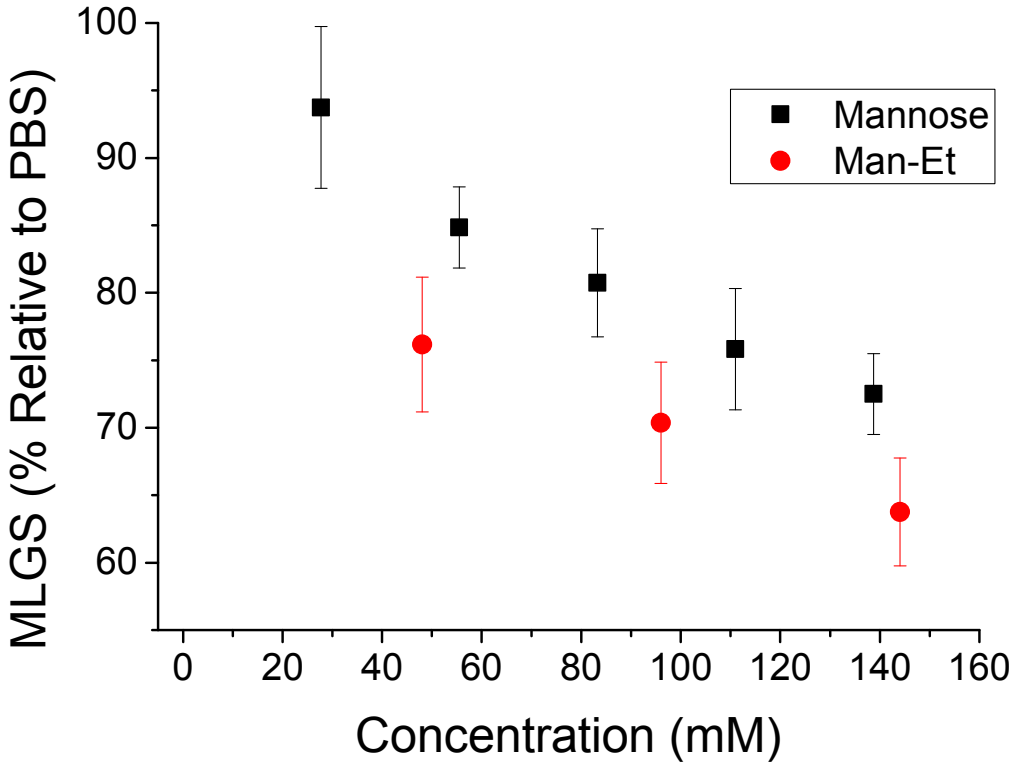

Figure S1. Ice recrystallisation inhibition activity of mannose o-ethylmannose.

Additional Experimental

Synthesis of 15 kDa poly(vinyl alcohol) used in DPH inclusion assay

Methyl(ethoxycarbonothioyl)sulfanyl benzene (0.21 g, 0.99 mmoles), ninyl acetate (43.05 g, 0.500 mol) and ACVA (4,4'-azobis(4-cyanovaleric acid)) (0.013 g) were added to a stoppered vial. The solution was thoroughly degassed under a flow of N_2 for 20 mins and the reaction mixture was then allowed to polymerise at 68^{o}C for 15 h. The yellow solution was then cooled to room temperature. Poly (vinyl acetate) was then recovered as a yellow sticky solid after precipitation into hexane. The hexane was then decanted and the poly (vinyl acetate) was re-dissolved in THF, which was then concentrated *in vacuo* and was then thoroughly dried under vacuum at 40^{o}C for 24 h, forming a white crystalline solid. The PVAc precursor was characterised by ^{1}H NMR and SEC in THF. PVAc was then dissolved in a methanol (20 mL) and hydrazine hydrate solution (15 mL, 80% in water) in a round bottom flask. The reaction mixture was stirred at 30°C for 2 hours, then dialysed using distilled water. Poly(vinyl alcohol) was recovered as a spongy white solid by freeze drying the dialysis solution. Hydrolysis was confirmed by ^{1}H NMR.

PVAc Precursor: ^{1}H NMR (400 MHz, $CDCl_3$): δ=4.61 (-C*H*O-CH_2 br 1H), δ=1.74 (-CO-CH_3 br 3H), δ=1.53 (-CH_2- br 2H), M_n^{GPC}(THF) = 34400 Da, M_n/M_w = 1.22.

PVA: ^{1}H NMR (400 MHz, $CDCl_3$): δ=4.00 (-C*H*OH- br 1H), δ=1.68-1.60 (-CH_2- br 2H).