Supplement

Experimental and Regression Vapor–liquid Equilibrium Data for Ethanol + Dipropylene Glycol Binary System. Ethanol Anhydrization Process Simulation using DPG as Extractive Agent

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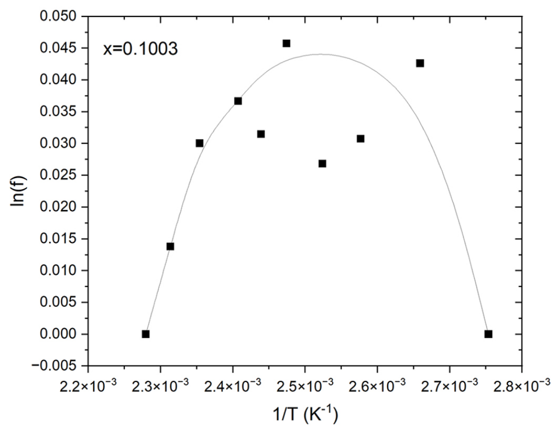
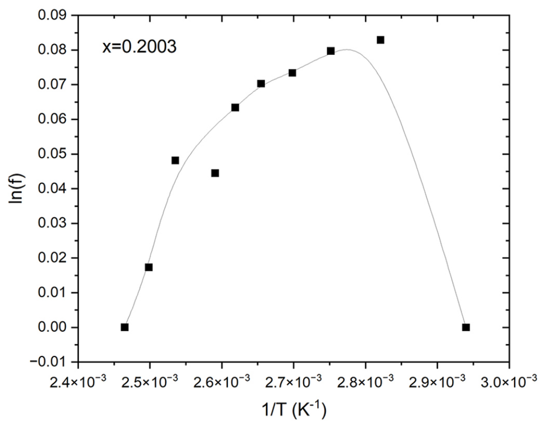
Determination of the consistency of the vapor–liquid equilibrium (VLE) data
Arc Test method

Table S1 The values of the constants α and β used to calculate the ln(f) function used to represent the arc for the studied mixtures and for the pure components

Mole fraction x of ethanol in the mixture	α	β
0.0000	25.893	7260.89
0.1003	20.790	4100.24
0.2003	21.518	4087.28
0.3006	22.357	4258.73
0.4015	23.137	4436.57
0.4990	24.082	4684.44
0.6000	24.953	4922.97
0.7004	25.661	5118.89
0.8004	25.536	5025.06
0.8990	25.148	4840.44
1.0000	25.716	4986.44

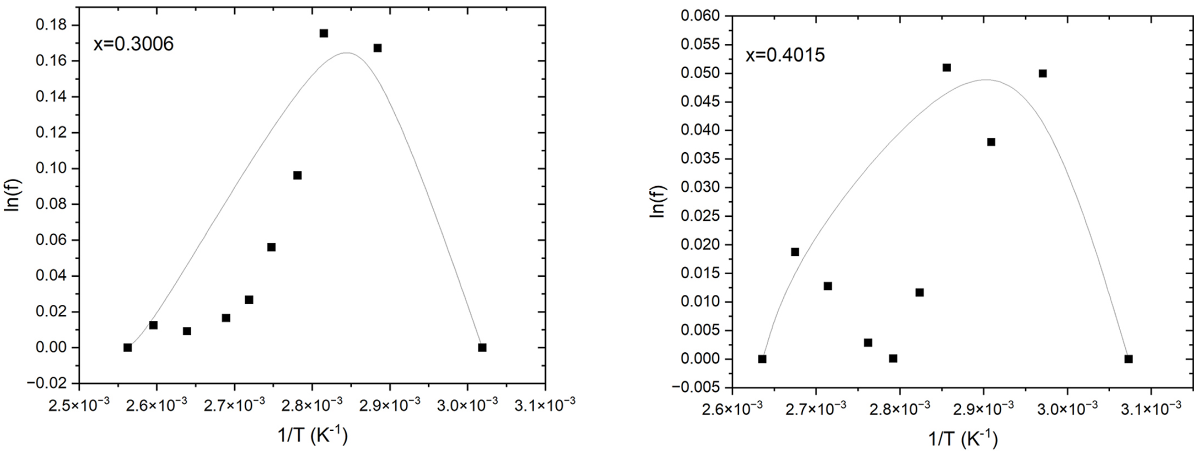


(a)



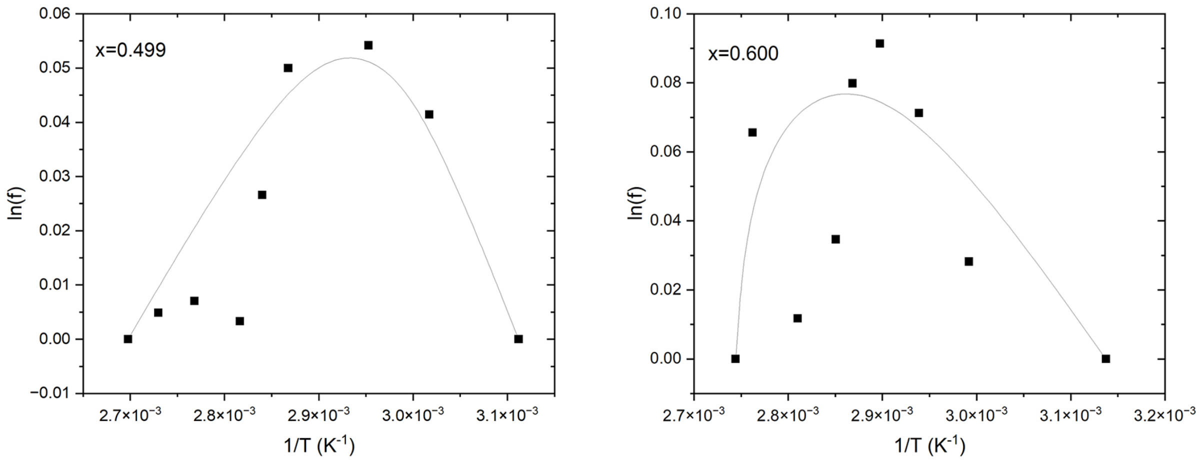
(b)

Figure S1 Experimental vapour pressure data of binary mixture ethanol + dipropylene glycol (DPG) in ln(f) representation: full square – experimental points; continuous line – ln f function calculated by means of the corresponding equation and using the constants given in Table S1: a) for a mixture with 0.1003 mole fraction ethanol; b) for a mixture with 0.2003 mole fraction ethanol



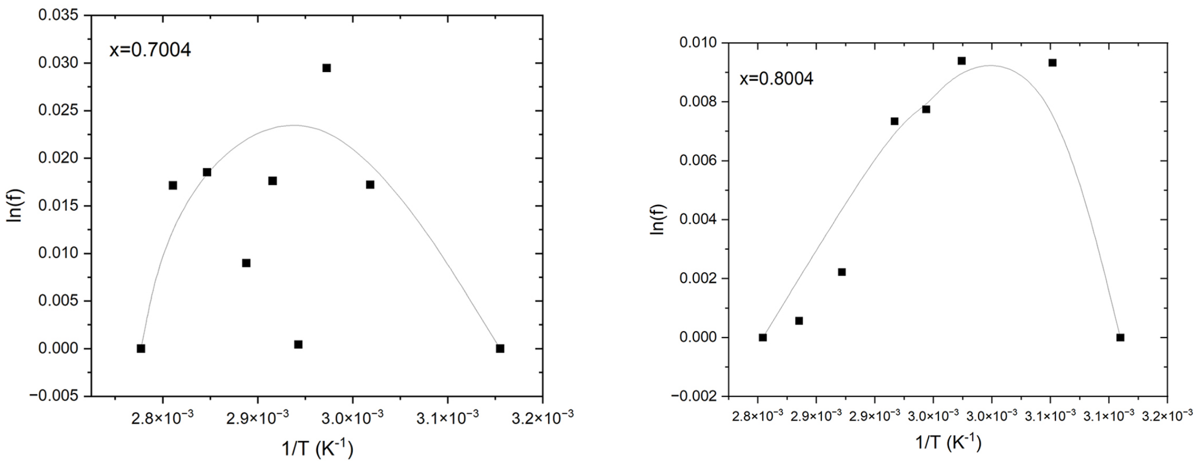
(a) (b)

Figure S2 Experimental vapour pressure data of binary mixture ethanol + DPG in ln(*f*) representation: full square – experimental points; continuous line – ln *f* function calculated by means of the corresponding equation and using the constants given in Table S1: a) for a mixture with 0.3006 mole fraction ethanol; b) for a mixture with 0.4015 mole fraction ethanol



(a) (b)

Figure S3 Experimental vapour pressure data of binary mixture ethanol + DPG in ln(*f*) representation: full square – experimental points; continuous line – ln *f* function calculated by means of the corresponding equation and using the constants given in Table S1: a) for a mixture with 0.4990 mole fraction ethanol; b) for a mixture with 0.600 mole fraction ethanol



(a) (b)

Figure S4 Experimental vapour pressure data of binary mixture ethanol + DPG in ln(*f*) representation: full square – experimental points; continuous line – ln *f* function calculated by means of the corresponding equation and using the constants given in Table S1: a) for a mixture with 0.7004 mole fraction ethanol; b) for a mixture with 0.8004 mole fraction ethanol

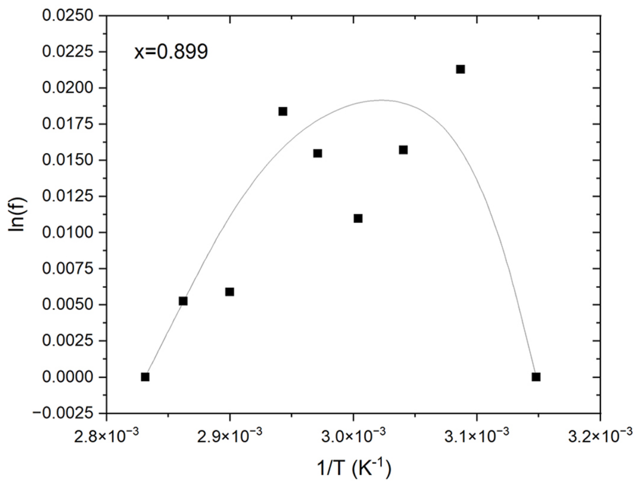


Figure S5 Experimental vapour pressure data of binary mixture ethanol + DPG in ln(*f*) representation: full square – experimental points; continuous line – ln *f* function calculated by means of the coreresponding equation and using the constants given in Table S1 for a mixture with 0.8990 mole fraction ethanol.

Consistency method from NIST

Table S2 The values of Δp_1^0 and Δp_2^0 of the pure component consistency test applied to the *T-P-x* experimental data of the ethanol-DPG binary system

Δp_1^0	Δp_2^0
0.00780	0.0015
0.00443	0.0266
0.00147	0.00371
0.00160	0.00018
0.00148	0.00253
0.00173	0.00816
0.00006	0.00109
0.00034	0.00083

Temperature and flowrates profile for the preconcentration (PC), extractive distillation (EDC) and solvent recovery (SRC) columns

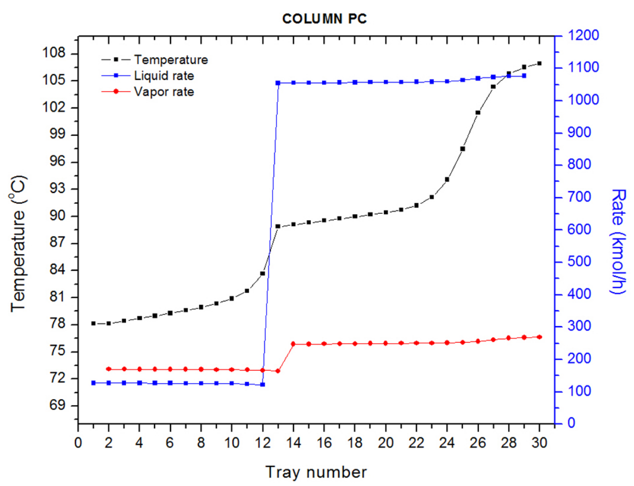


Fig. S6 Temperature and flowrates profile for the preconcentration (PC) column, Variant A (best)

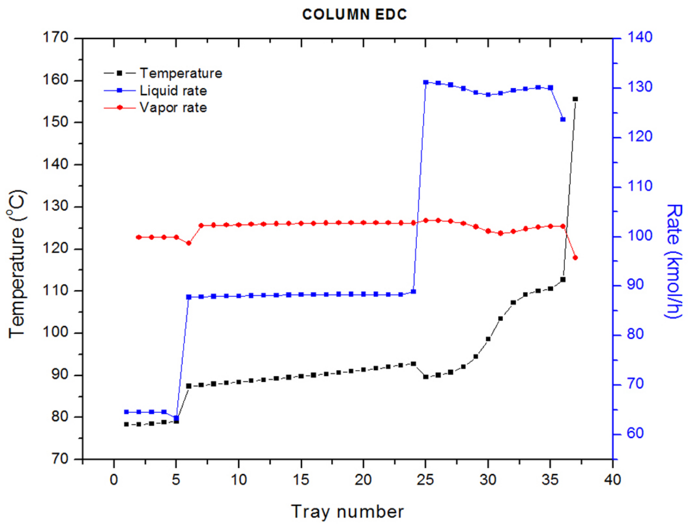


Fig. S7 Temperature and flowrates profile for extractive distillation (EDC) column, Variant A (best)

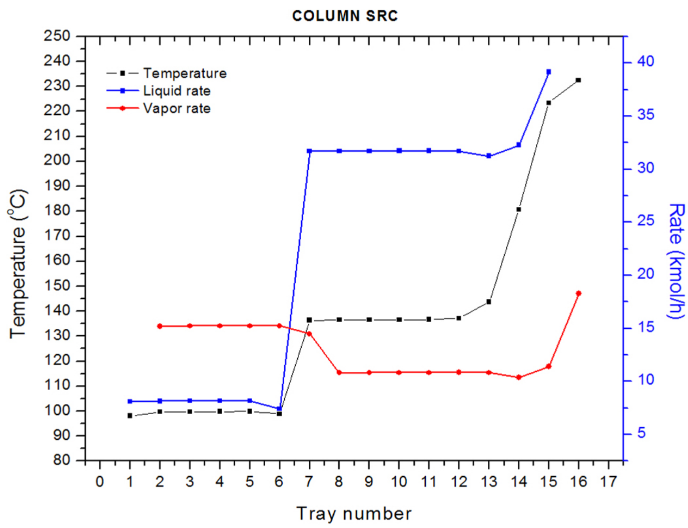


Fig. S8 Temperature and flowrates profile for the solvent recovery (SRC) column, Variant A (best)

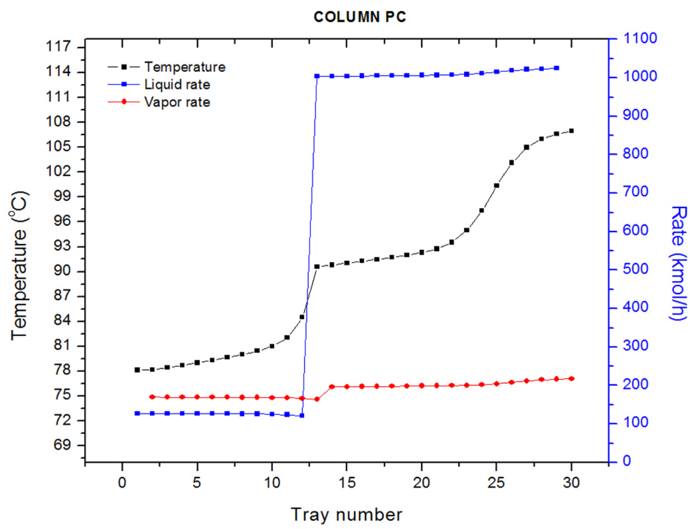


Fig. S9 Temperature and flowrates profile for the preconcentration (PC) column, Variant B (best)

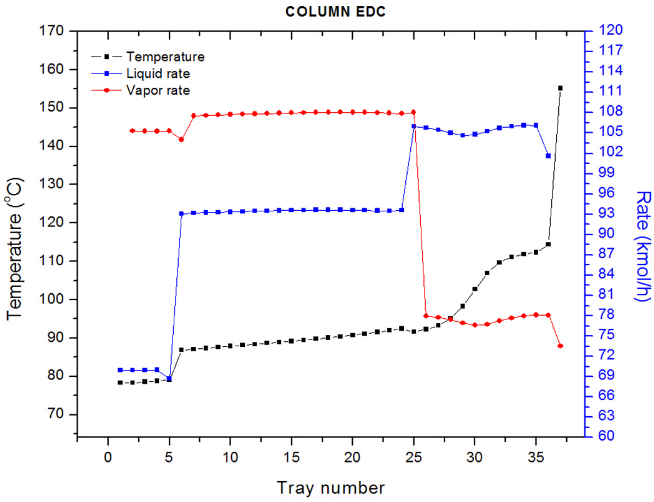


Fig. S10 Temperature and flowrates profile for extractive distillation (EDC) column, Variant B (best)

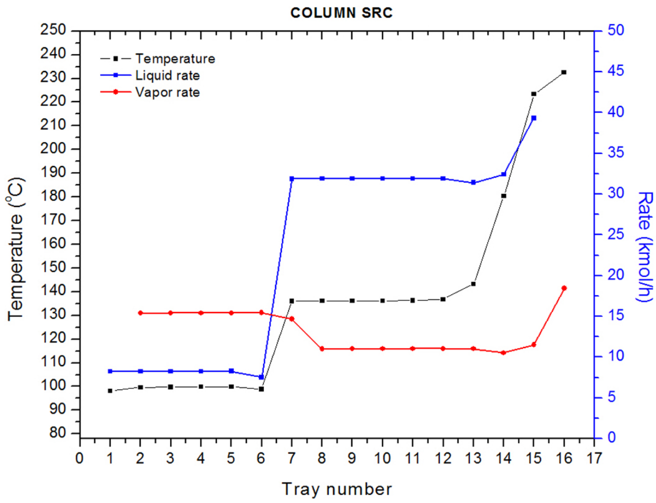


Fig. S11 Temperature and flowrates profile for the solvent recovery (SRC) column, Variant B (best)

Composition profiles for the preconcentration (PC), extractive distillation (EDC) and solvent recovery (SRC) columns

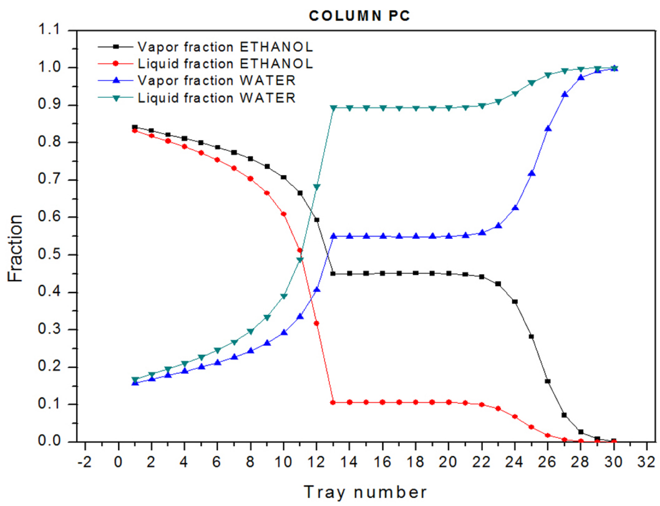


Fig. S12 Composition profiles for the preconcentration (PC) column, Variant A (best)

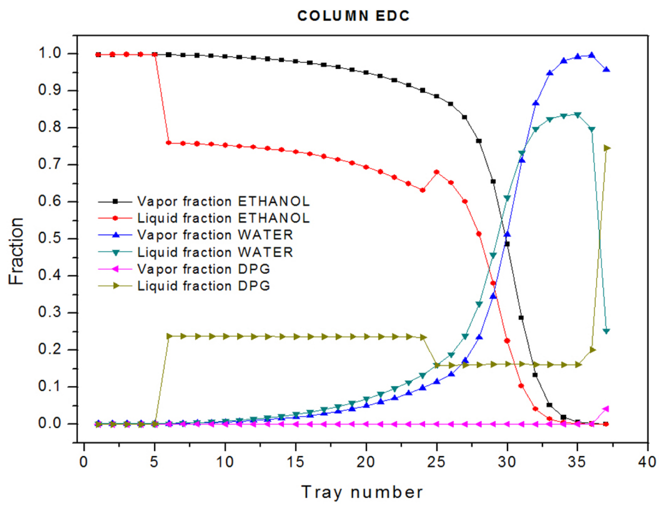


Fig. S13 Composition profiles for the extractive distillation (EDC) column (PC) column, Variant A (best)

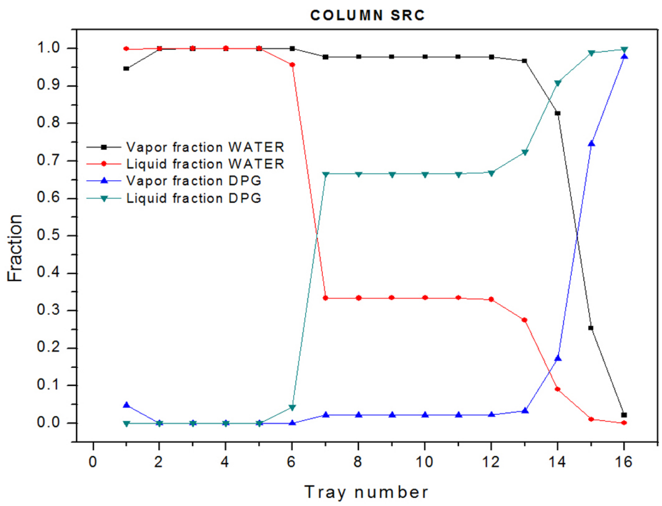


Fig. S14 Composition profiles for solvent recovery (SRC) column Variant A (best)

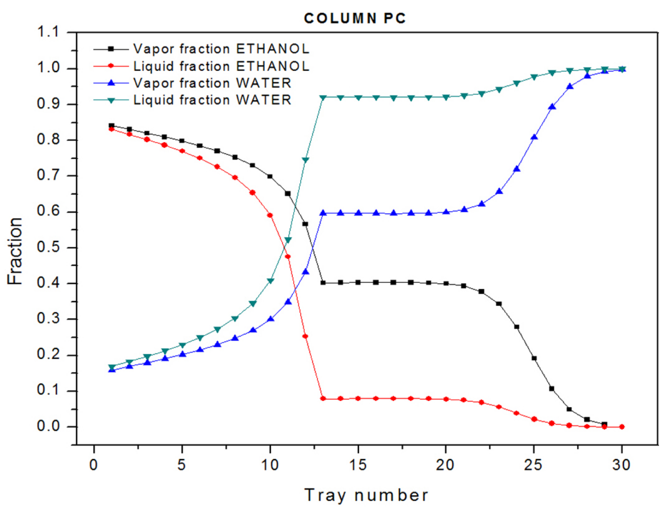


Fig. S15 Composition profiles for the preconcentration (PC) column, Variant B(best)

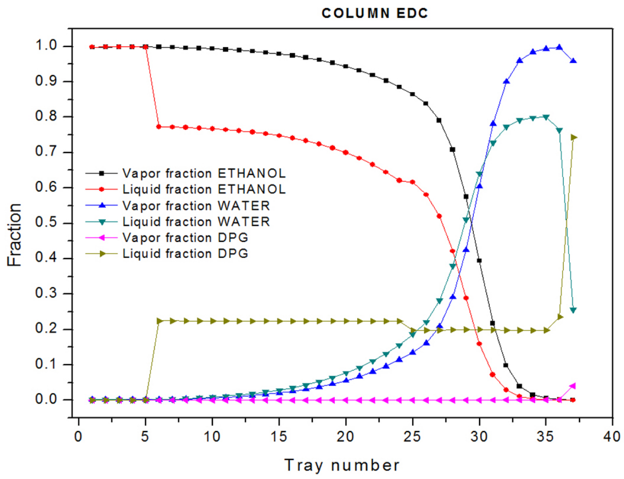


Fig. S16 Composition profiles for the extractive distillation (EDC) column (PC) column, Variant B (best)

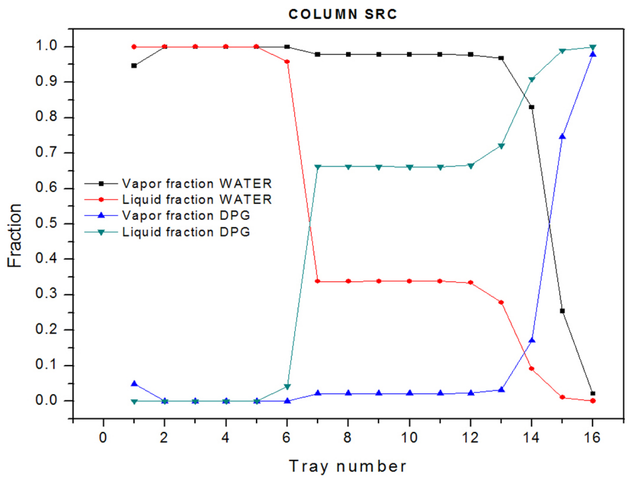


Fig. S17 Composition profiles for solvent recovery (SRC) column Variant B (best)