

Terms Included in Model	Number of Terms	RSquare	RMSE	AICc	Δ_i
Ammonium chloride, Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8436	0.0844	-106.362	0
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract, Bis-Tris*Yeast extract	6	0.8435	0.0844	-106.3123	0.0497
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Potassium nitrate*Yeast extract, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8434	0.0845	-106.2805	0.0815
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Sodium chloride*Phosphate buffer, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8411	0.0851	-105.4411	0.9209
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	5	0.8331	0.0863	-105.4359	0.9261
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Potassium nitrate*Yeast extract, Phosphate buffer*Bis-Tris, Bis-Tris*Yeast extract	6	0.841	0.0851	-105.4316	0.9304
Yeast extract, Potassium nitrate*Sodium chloride, Potassium nitrate*Yeast extract, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract, Bis-Tris*Yeast extract	6	0.8406	0.0852	-105.269	1.093
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Sodium chloride*Phosphate buffer, Phosphate buffer*Bis-Tris, Bis-Tris*Yeast extract	6	0.8401	0.0854	-105.111	1.251
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Bis-Tris*Yeast extract	5	0.8307	0.087	-104.6427	1.7193
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Potassium nitrate*Phosphate buffer, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8386	0.0858	-104.5895	1.7725
Phosphate buffer, Yeast extract, Ammonium sulphate*Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8384	0.0858	-104.5265	1.8355
Sodium chloride, Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.8383	0.0858	-104.4707	1.8913
Ammonium chloride, Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Bis-Tris*Yeast extract	6	0.8382	0.0859	-104.4308	1.9312
Phosphate buffer, Yeast extract, Ammonium chloride*Sodium carbonate, Potassium nitrate*Sodium chloride, Phosphate buffer*Bis-Tris, Bis-Tris*Yeast extract	6	0.838	0.0859	-104.3734	1.9886
Phosphate buffer, Yeast extract, Potassium nitrate*Sodium chloride, Sodium carbonate*Phosphate buffer, Phosphate buffer*Bis-Tris, Phosphate buffer*Yeast extract	6	0.838	0.0859	-104.3707	1.9913

Table S8: Measures of fit for 15 stepwise regression models of the results of the second DoE iteration.

All possible linear regression models were fit to the data, with Heredity Restriction and a maximum of 6 terms per model. The goodness-of-fit of each of the resulting 9,531,039 models was assessed using the Akaike Information Criterion (AICc). For each candidate model (*j*), the Kullback-Leibler distance from the optimum model (*i.e.* the model with the smallest AICc) was calculated as

$\Delta_i = AICc_i - AICc_{min}$. Models were selected for further interrogation when Δ_i was less than 2.0 (Burnham *et al.*, 2010). The 15 selected models are listed in the table in ascending order of Δ_i .