Supplementary Materials

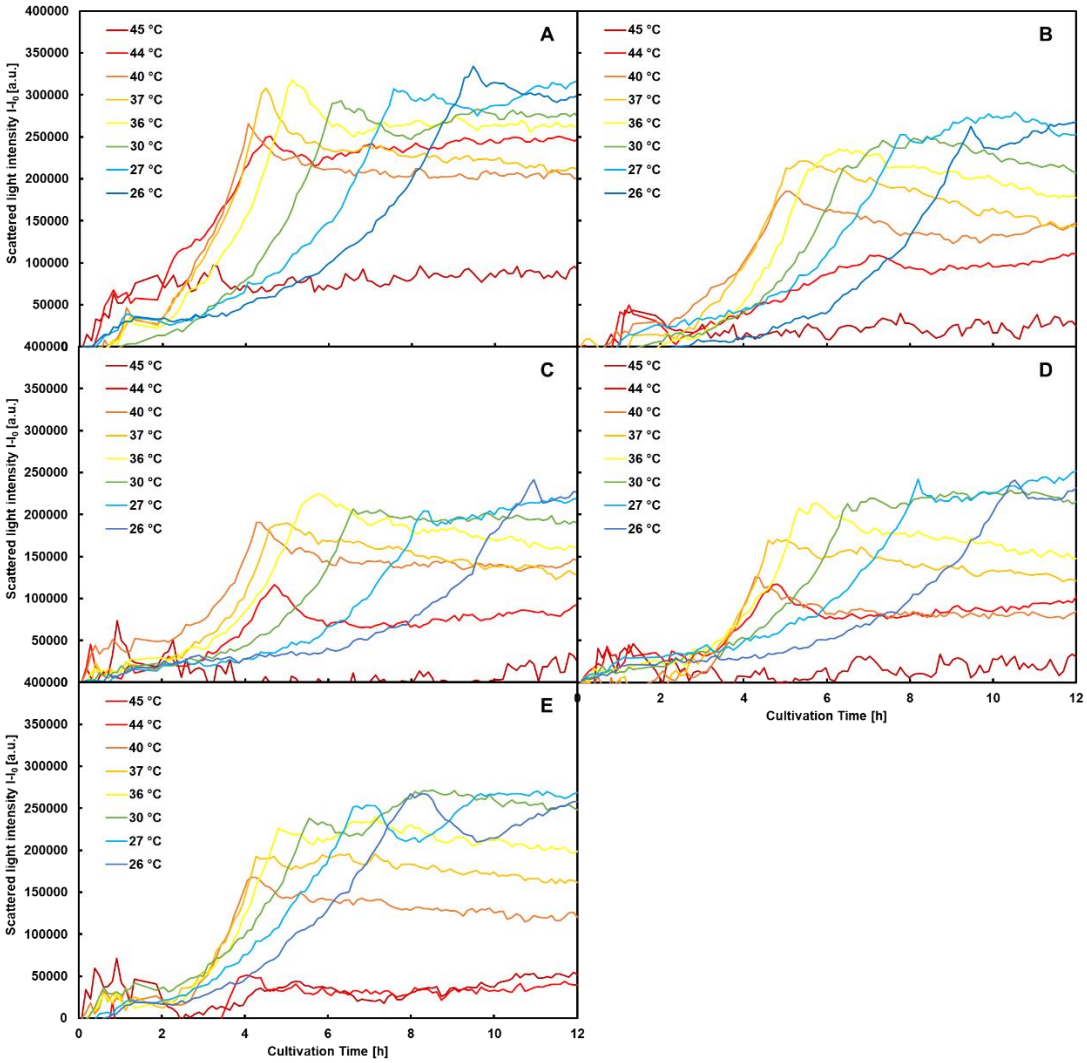

Figure S1. Determining the temperature optimum for growth of the five *P. pantotrophus* strains. The cultures were monitored for 12 hours using a custom-made biolector [30] in 48-well Microfluidic FlowerPlates (MTP-48-B, Beckman Coulter GmbH) with each well corresponding to a different temperature. Shown are the values for scattered light in arbitrary units (a.u.) as a proxy for biomass concentration. The strains were grown in LB medium. A: DSM 2944^{T}, B: DSM 11072, C: DSM 11073, D: DSM 11104, E: DSM 65.

Table S1. Overview of ΔAUC (area under curve) of all positive tested carbon sources for *P. pantotrophus* DSM 2944^{T}. The green bars show the ΔAUC as an indicator of respiration over time minus the negative control. All compounds with ΔAUC >0 indicate a positive effect.

Saccharides	ΔAUC	Amino acids	ΔAUC	Organic acids	ΔAUC	Sugar derivative	ΔAUC	Other	ΔAUC
D-Ribose		D-Alanine		Fumaric acid		D-Mannitol		D-Glucosamine	
D-Fructose		L-Alanine		L-Malic acid		β-Methyl-glucose		M-Inositol	
Sucrose		D,L-Carnitine		D-Gluconic acid		Dulcitol		Pectin	
D-Arabinose		L-Proline		D,L-Malic acid		Glucuronamide		Methyl pyruvate	
L-Arabinose		Hydroxyl-L-proline		Propionic acid				3-0-B-D-Galactopyranosyl-D-arabinose	
D-Mannose		L-Glutamic acid		L-Lactic acid				Glycogen	
Dextrin		L-asparagine		Formic acid				2,3-Butanone	
L-Sorbose		L-Ornithine		Quinic acid				D,L-Octopamine	
D-Tagatose		Glycine		5-Keto-D-Gluconic acid				Thymidine	
D-Galactose		D-Aspartic acid		Glyoxylic acid				D-Lactic acid methyl ster	
L-Rhamnose				Caproic acid				Inulin	
D,L-A-Glycerol-phosphate				Γ-Amino Butyric acid				Mannan	
D-Raffinose				A-Keto-Butyric acid				Putrescine	
				4-Hydroxy Benzoic acid				D-Fructose-6-phosphate	
				Glycyl-L-Glutamic acid				Laminarin	
				Acetoacetic acid					
				Succinamic acid					
				Oxalomalic acid					
				D-Glucuronic acid					
				L-Pyroglutamic acid					
				D-Tartaric acid					

Table S2. Overview of ΔAUC (area under curve) of all positive tested nitrogen sources for *P. pantotrophus* DSM 2944^{T}. The green bars show the ΔAUC as an indicator of respiration over time minus the negative control. All compounds with ΔAUC >0 indicate a positive effect.

Amino acids	ΔAUC	Nucleosid/base	ΔAUC	Amine	ΔAUC	Mixture	ΔAUC	Other	ΔAUC
L-Cysteine		Guanosine		N-Amylamine		Ala-Gly		Urea	
L-Histidine		Guanine		Ethylenediamine		Gly-Asn		Uric acid	
Xanthine		Uracil		Biuret		Gly-Met		Allantoin	
L-Asparagine		Cytosine				Ala-Glu		D-Glutamic acid	
L-Proline		Thymidine				Ala-His		Γ-Amino-N-Butyric acid	
Glycine		Xanthosine				Ala-Gln		Δ-Amino-N-Valeric acid	
D-Serine		Cytidine						N-Phthaloyl-L-Glutamic acid	
L-Tryptophan								E-Amino-N-Caproic acid	
N-Acetyl-D-glucosamine								N-Acetyl-D,L-Glutamic acid	
L-Isoleucine								D,L-A-Amino-N-Butyric acid	
L-Threonine								N-Acetyl-D-mannosamine	
L-Methionine								L-Pyroglutamic acid	
L-Citruilline								Nitrate	
D-Glucosamine								L-Glutamic acid	
L-Valine								Nitrite	
D-Galactosamine								L-Aspartic acid	
D-Mannosamine								A-Amino-N-Valeric acid	
L-Lysine								D-Aspartic acid	
Methylamine								Ethanolamine	
Histamine								Agmatine	
L-Ornithine									
L-Homoserine									
D-Lysine									
D-Valine									
L-Glutamine									
L-Alanine									
L-Serine									
N-Butylamine									
Glucuronamide									
Putrescine									

Table S3. Percentage of amino acid pairs which yielded a positive ΔAUC. The percentages relate to total amount of each pair (in brackets) as it occurred in the screening.

1st AA / 2nd AA	Charged	Uncharged	Aromatic	Hydrophobic
Charged	23.5 (17)	42.9 (7)	16.7 (12)	25.0 (28)
Uncharged	12.5 (8)	50.0 (6)	66.7 (3)	57.1 (14)
Aromatic	33.3 (9)	66.7 (3)	55.6 (9)	38.9 (18)
Hydrophobic	21.9 (32)	17.4 (23)	28.0 (25)	18.0 (61)

Table S4. Overview of ΔAUC (area under curve) of all positive tested sulfur sources for *P. pantotrophus* DSM 2944^T. The green bars show the ΔAUC as an indicator of respiration over time minus the negative control. All compounds with ΔAUC >0 indicate a positive effect.

Amino acids	ΔAUC	acids	ΔAUC	thionine	ΔAUC	anorganic	ΔAUC	other	ΔAUC
L-Cysteine		p-Amino benzene sulfonic acid		D-Methionine		Dithiophosphate		1-Thio-β-D-glucose	
L-methionine sulfoxide		L-Cysteine sulfinic acid		Lanthionine		Thiophosphate		Cysteamine	
L-Cysteinyl-glycine		L-Cysteic acid		Cystathionine		Tetrathionate		D,L-Lipoamide	
D-Cysteine		L-Djenkolic acid		Glycyl-L-methionine					
N-Acetyl-L-cysteine		2-Hydroxyethane sulfonic acid		N-Acetyl-D,L-methionine					
				Glutathione					

Table S5. Overview of ΔAUC (area under curve) of all positive tested phosphorus sources for *P. pantotrophus* DSM 2944^T. The green bars show the ΔAUC as an indicator of respiration over time minus the negative control. All compounds with ΔAUC >0 indicate a positive effect.

Nucleo-(cyclic)monophosphate	ΔAUC	Acids	ΔAUC	Organic phosphates	ΔAUC	Anorganics	ΔAUC	Other	ΔAUC
Uridine-5'-monophosphate		Methylene diphosphonic acid		D-Glucosamine-6-phosphate		Thiophosphate		Phosphoryl choline	
Cytidine-3'-monophosphate		2-Aminoethyl phosphonic acid		Cysteamine-S-phosphate		Phosphate		Phospho-L-arginine	
Cytidine-5'-monophosphate		D-3-Phospho-glyceric acid		D-Glucose-6-phosphate		Hypophosphite		O-Phospho-D-tyrosine	
Uridine-2'-monophosphate		Phosphono acetic acid		D-Mannose-6-phosphate		Pyrophosphate		Phosphocreatine	
Uridine-3',5'-cyclic monophosphate		D-2-Phospho-glyceric acid		Triethyl phosphate		Trimetaphosphate		O-Phosphoryl-ethanolamine	
Thymidine 3'-5'-cyclic monophosphate				D,L-A-Glycerol phosphate				O-Phospho-L-serine	
Adenosine-2',3'-cyclic monophosphate				Carbamyl phosphate				Phosphoenol pyruvate	
Huanosine-3'-5'-cyclic monophosphate				2-Deoxy-D-Glucose 6-phosphate				O-Phospho-D-serine	
Guanosine-3'-monophosphate				D-Glucose-1-phosphate					
Adenosine-5'-monophosphate				Inositol hexaphosphate					
Adenosine-2'-monophosphate				Dithiophosphate					
Adenosine-3',5'-cyclic monophosphate									
Cytidine-2',3'-cyclic monophosphate									
Guanosine-2'-monophosphate									
Adenosine-3'-monophosphate									
O-Phospho-L-threonine									
Guanosine-2',3'-cyclic monophosphate									

Table S6. Overview of ΔAUC (area under curve) of all tested osmotic regulators for *P. pantotrophus* DSM 2944^{T}. The green bars show the positive ΔAUC as an indicator of respiration over time minus the negative control, the orange bars show negative ΔAUC. All compounds with ΔAUC >0 indicate a positive effect.

NaCl 6 % + osmotic regulator	**ΔAUC**
NaCl 6 % + Glutathione	
NaCl 6 % + L-Carnitine	
NaCl 6 % + Octopine	
NaCl 6 % + N-N Dimethylgylcine	
NaCl 6 % + Trehalose	
NaCl 6 % (Control)	
NaCl 6 % + L-Proline	
NaCl 6 % + Dimethylsulphonylpropionate	
NaCl 6 % + Betaine	
NaCl 6 % + Glycerol	
NaCl 6 % + KCl	
NaCl 6 % + Trimethylamine	
NaCl 6 % + Trimethylamine-N-oxide	
NaCl 6 % + MOPS	
NaCl 6 % + Ectoine	
NaCl 6 % + N-Acethyl-L-glutamine	
NaCl 6 % + Creatinine	
NaCl 6 % + Trigonelline	
NaCl 6 % + Γ-Amino-N-butyric acid	
NaCl 6 % + β-Glutamic acid	
NaCl 6 % + Choline	
NaCl 6 % + Sarcosine	
NaCl 6 % + Creatine	
NaCl 6 % + Phosphorylcholine	

Table S7. Overview of ΔAUC (area under curve) of all tested pH protective compounds for *P. pantotrophus* DSM 2944^{T}. The green bars show the positive ΔAUC as an indicator of respiration over time minus the negative control, the orange bars show negative ΔAUC. All compounds with ΔAUC >0 indicate a positive effect.

pH 4.5 + compound	AUC	pH 9.5 + compound	AUC
L-Homoserine		L-Tryptophan	
Anthranilic acid		Anthranilic acid	
L-Lysine		Urea	
Trimethylamine-N-oxide		Phenylethylamine	
L-Methionine		Hydroxy-L-proline	
L-Proline		L-Lysine	
L-Homoarginine		Norvaline	
Aminobenzoate		L-Phenylalanine	
D,L-Diamino pimelic acid		L-Arginine	
Urea		Putrescine	
L-Aspartic acid		L-Isoleucine	
A-Amino-N-butyric acid		L-Methionine	
L-Valine		L-Ornithine	
Norvaline		L-Glutamine	
L-Asparagine		L-Threonine	
L-Ornithine		L-Proline	
L-Arginine		Creatine	
L-Phenylalanine		L-Histidine	
D-Lysine		L-Homoserine	
L-Leucin		L-Aspartic acid	
L-Isoleucine		Control	
L-Glutamine		L-Homoarginine	
L-Tryptophan		Agmatine	
5-Hydroxy lysine		L-Serine	
L-Cysteic acid		L-Glutamic acid	
5-Hydroxy tryptophan		L-Asparagine	
L-Serine		Histamine	
L-Norleucine		Glycine	
L-Glutamic acid		L-Alanine	
Control		Tyrosine	
L-Histidine		L-Leucine	
L-Alanin		Cadeverine	
Glycine		Trimethylamine-N-oxide	
L-Threonine		Tyramine	
Hydroxy-L-proline		L-Valine	
Tyrosine		Norleucine	