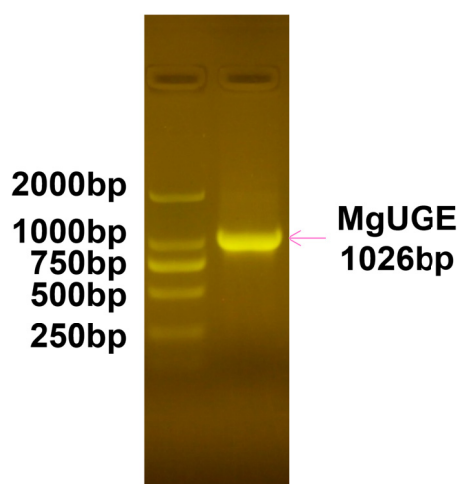
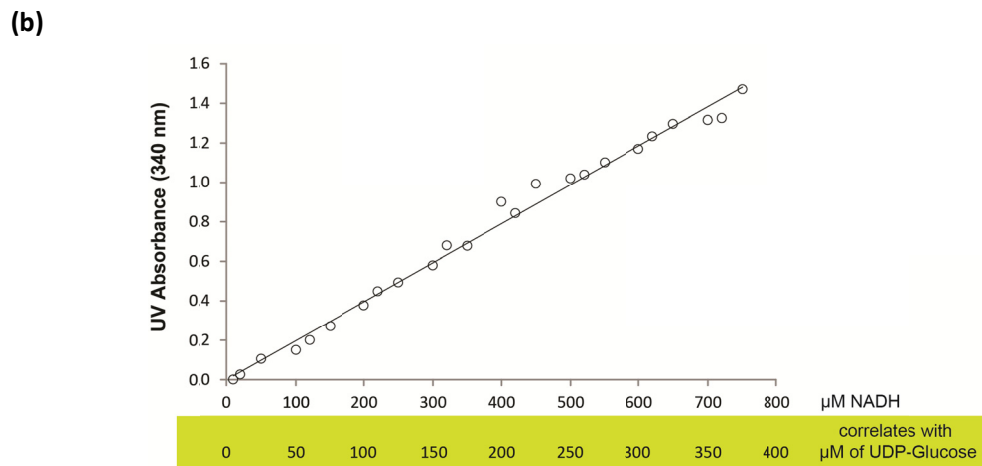
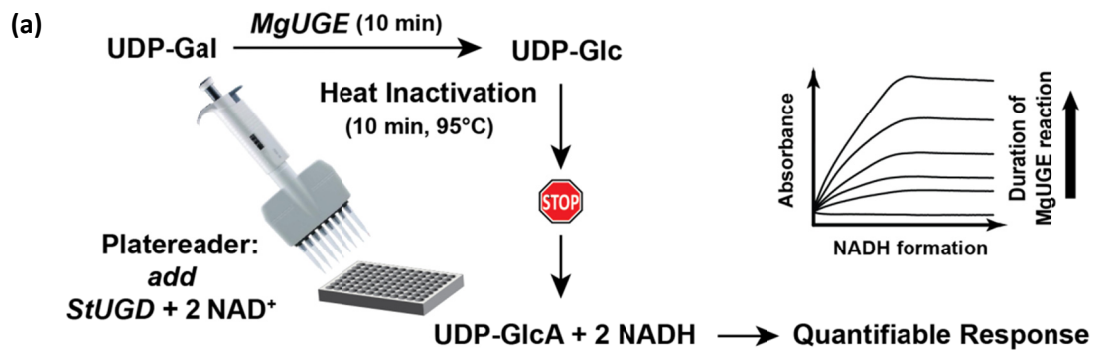

Supplementary Materials: UDP-glucose 4-epimerase and beta-1,4-galactosyltransferase from the oyster *Magallana gigas* as valuable biocatalysts for the production of galactosylated products

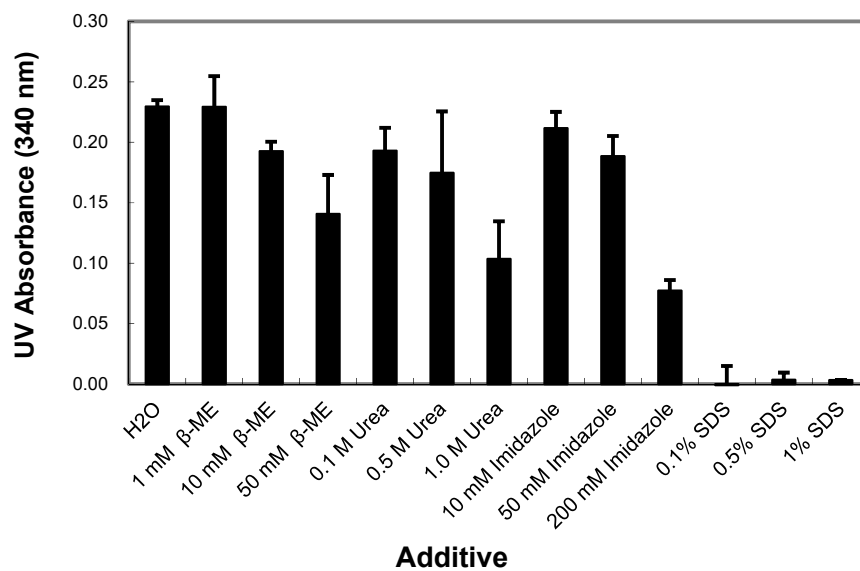
Hui-Bo Song, Meng He, Zhi-Peng Cai, Kun Huang, Sabine L. Flitsch, Li Liu and Josef Voglmeir



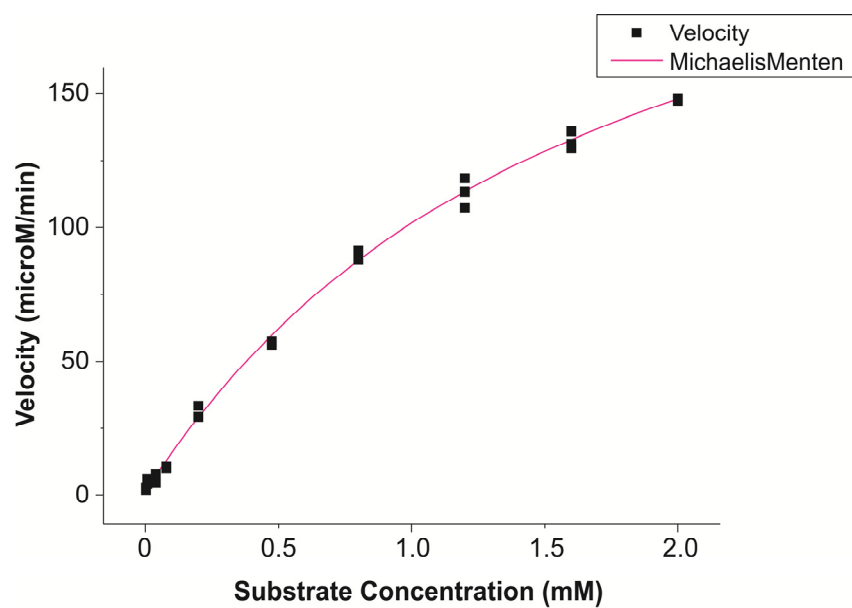
Supplementary Figure S1: Agarose gel electrophoresis of the PCR product of MgUGE.



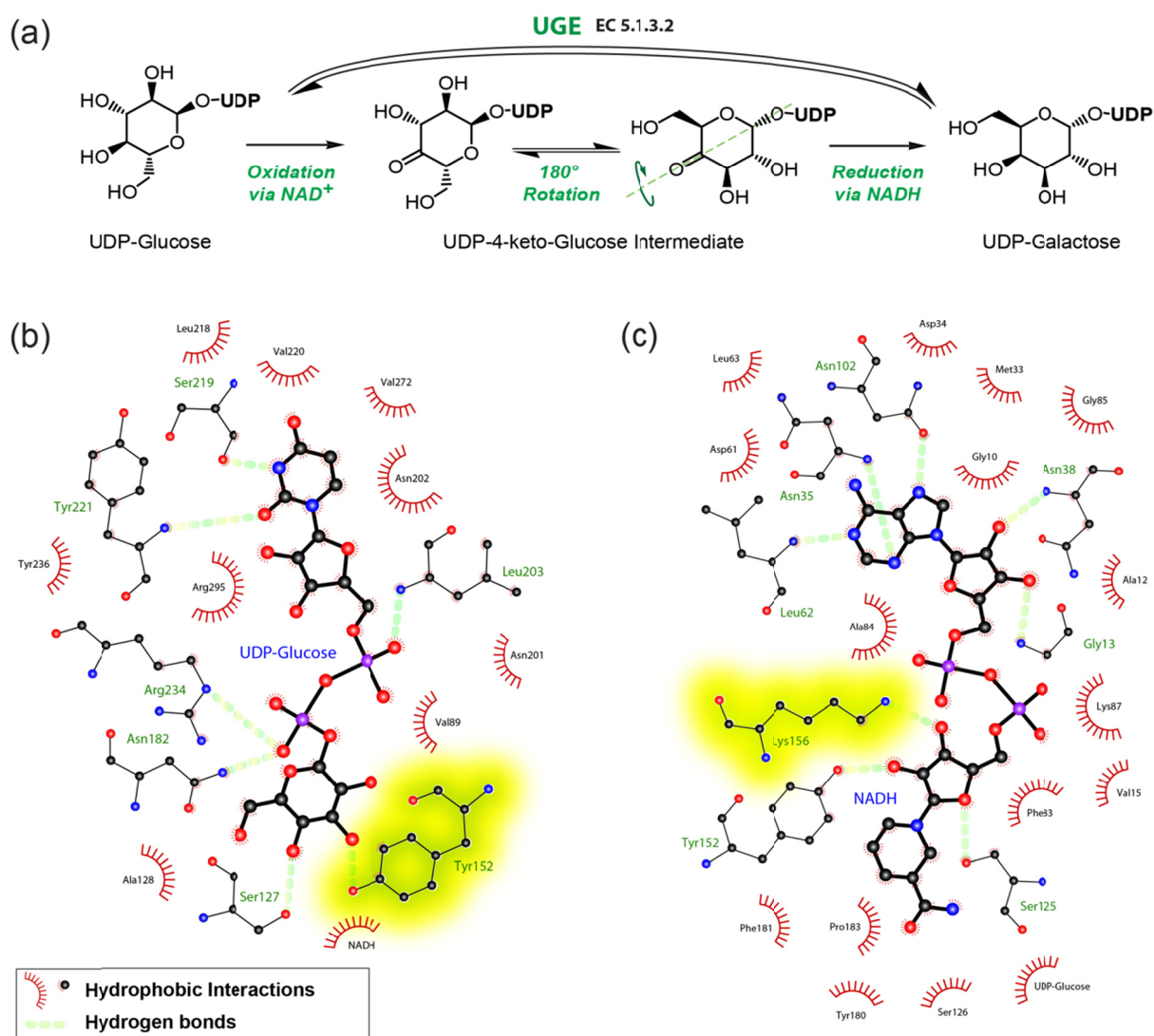
Supplementary Figure S2. (a) Schematic overview of the experimental setup for the plate reader-based spectrophotometric detection of MgUGE activity. (b) Relationship between the UV absorbance of various NADH-concentrations, and the concentration of generated UDP-Glucose.



Supplementary Figure S3: Impact of additives on the enzymatic activity of MgUGE (β-ME – 2-mercaptoethanol; SDS – sodium dodecyl sulfate).



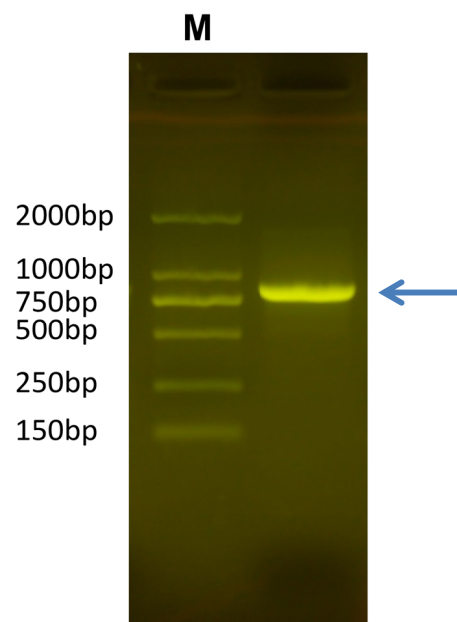
Supplementary Figure S4: Michaelis-Menten Plot for the analysis of the kinetic parameters of MgUGE towards the substrate UDP-galactose.



Supplementary Figure S5. Catalytic mechanism and substrate recognition of UGE. (a) Reaction mechanism of the substrate interconversion within the active site of UGE; Two-dimensional illustration of the substrate-ligand interactions of MgUGE with (b) UDP-Glucose and (c) NADH based on crystallographic data of the human UGE isoform. The catalytic amino acids are highlighted in yellow.

		1		59
(K1QYA2)	Mg	MGDSCILVTGGAGFVGSHSVIELIEAGYSVVMDNLANASM-----ESIKRVEEITGKSIPSYS		
(Q14376)	Hs	MAEK-VLVTGGAGYIGSHTVLELLEAGYLPVVIDNFHNAFRGGGSLPESLRRVQELTGRSVEFEE		
(Q9W0P5)	Dm	MAPPTVLVTGGAGYIGSHTVLEMLNAGYNVICVDNLCNAYSSGAKLPEALSRVQEITGKKVNFYR		
(P09147)	Ec	MRVLVTGGSGYIGSHTCVQQLQNGHDVILDNLCNSKRS-----VLPVIERLGGKHPTFVE-		
(C8VAU8)	An	MPSGSVLVTGGTGYIGSFTTLALLEAGYKVVVADNLYNSSA-----EALNRIELISGKKAFAQ		
		60		123
(K1QYA2)	Mg	VDLLDKPALSDLFNKHK-FTSVIHFAGLKAVGES CQLPLLYYKNNVGGTVNLLLEVMEKGVKNLI		
(Q14376)	Hs	MDILDQALQRLFKKYS-FMAVIHFAGLKAVGESVQKPLDYRVNLTGTIQLLEIMKAHGVKNLV		
(Q9W0P5)	Dm	VDITDREQVRSVFQEHK-IDMVAHFAALKAVGESCRIPLYYHNNMTGTNVLLEAMADNNVFKFV		
(P09147)	Ec	GDIRNEALMTEILHDDHA-IDTVIHFAGLKAVGESVQKPLEYYDNNVNGTLRLISAMRAANVKNF		
(C8VAU8)	An	LDVTDEAAFDKVFEAHPDIDSVIHFAALKAVGESGEKPLDYHVNVYGTICLLRSMVRHNVTNIV		
		124		172
(K1QYA2)	Mg	FSSSATVYGS----PQYLPIDEKHPVGCTNPYGKTYFYFIEEILRDLHKAEPD-----		
(Q14376)	Hs	FSSSATVYGN----PQYLPIDEAHTGGCTNPYGKTYFFIEEMIRDLCAADKT-----		
(Q9W0P5)	Dm	YSSSATVYGE----PKFLPVTIEHTGNCSTPYGKTYFYFIEEILKDLCKSDKR-----		
(P09147)	Ec	FSSSATVYGD----NPKIPYVESFTGTPQSPYGKTYLMVEQILTDLQKAQPD-----		
(C8VAU8)	An	FSSSATVYGDATRFPMIPIPEHCLG-PTNPTGNTTFAIELAITDVINAQRNNAKAGNETEAA		
		173		236
(K1QYA2)	Mg	-WNIIMLRYFNPVGAHKSGKIGEDPQGI PNNLMPFIAQVAVGKRAELSVYGS DYDTPDGTGVRDY		
(Q14376)	Hs	-WNAVLLRYFNPTGAHASGCI GEDPQGI PNNLMPYVSQVAIGRREALNVFGNDYDTE DGTGVRDY		
(Q9W0P5)	Dm	-WAVVSLRYFNPVGAHISGRIGEDPNGE PNNLMPYIAQVAVGRRPSLSVYGSDFPTH DGTGVRDY		
(P09147)	Ec	-WSIALLRYFNPVGAHPSGDMGEDPQGI PNNLMPYIAQVAVGRRDSLAI FGNDYPTEDGTGVRDY		
(C8VAU8)	An	KWNGALLRYFNPA GAHPSGIMGEDPQGV PYNLLPLLAQVATGKREKLLVFGDDYASHDGT AIRDY		
		237		299
(K1QYA2)	Mg	IHVVDLAQGHVAAQKKIEK--KCGCKVYNLGTGKGYSVIEMAKAFEEASGKPIPFKKVDRRAGDV		
(Q14376)	Hs	IHVVDLAKGHIAALRKLKE--QCQCRIYNLGTGTGYSVLQM VQAMEKASGKKIPYKVVARREGDV		
(Q9W0P5)	Dm	IHIVDLAEGHVKALDKLRNIAETGFFAYNLGTGVGYSVLD MVKAFKASGKKVNYTLVDRRSGDV		
(P09147)	Ec	IHVMDLADGHVVAMEKLAN--KPGVHIYNLGA VGNSVLDVVNAFSKACGKPVNYHFAPRREGDL		
(C8VAU8)	An	IHILDADGHLKALNYLRA-NNPGVRAWNLGTGRGSTVYEMIRAFSKAVGRDLPYEVAPRRAGDV		
		300		341
(K1QYA2)	Mg	GSVYGNADLAKHEELGWSASRDLKQMCEDTWRWQSSNPNGFRK		
(Q14376)	Hs	AACYANPSLAQEELGWTAAALGLDRMCEDLWRWQKQNP SGFGTQA		
(Q9W0P5)	Dm	ATCYADATLADKKLGWKAERGIDKMCEDTWRWQS QNPNGYANK		
(P09147)	Ec	PAYWADASKADRELNWRVTRTLDEMAQDTWHWQSRHPQGYPD		
(C8VAU8)	An	LNLTSNPTRANTELGWKAQRTLEQACEDLWLWTKNNPQGYRQPPAEELLEQLKK		

Supplementary Figure S6: Homology alignment of MgUGE with UGE homologues from *Homo sapiens* (Hs), *Drosophila melanogaster* (Dm), *Escherichia coli* (Ec) and *Aspergillus nidulans* (An). The tyrosine and lysine residues highlighted in green are the proposed catalytic amino acids. Uniprot identifiers are shown in parentheses.



Supplementary Figure S7: Agarose gel electrophoresis of the PCR product of MgGalT7.