Glycosylation Database

The goal of the NOVOSIDES project is to develop cheap but efficient processes for the **glycosylation of small molecules**. To that end, the glycosylation reactions catalyzed by different enzyme classes have been systematically evaluated, using a collection of representative acceptor substrates like aliphatic and aromatic alcohols, terpenoids and catechols. The reactions have been performed with **cheap donor substrates**, such as sucrose and starch, to maximize their commercial potential in various industrial sectors.

The results of this screening effort can be found in Table 1, and the structures of some of the acceptor structures are shown in Figure 1. Several of the most promising reactions are currently being **developed into large-scale processes** at pilot plant facilities, and the glycosylated products will be made available through the catalogue of our commercial partner. Please check out our website (www.novosides.eu) for more information, or contact us directly to discuss the possible glycosylation of the molecule of your choice.

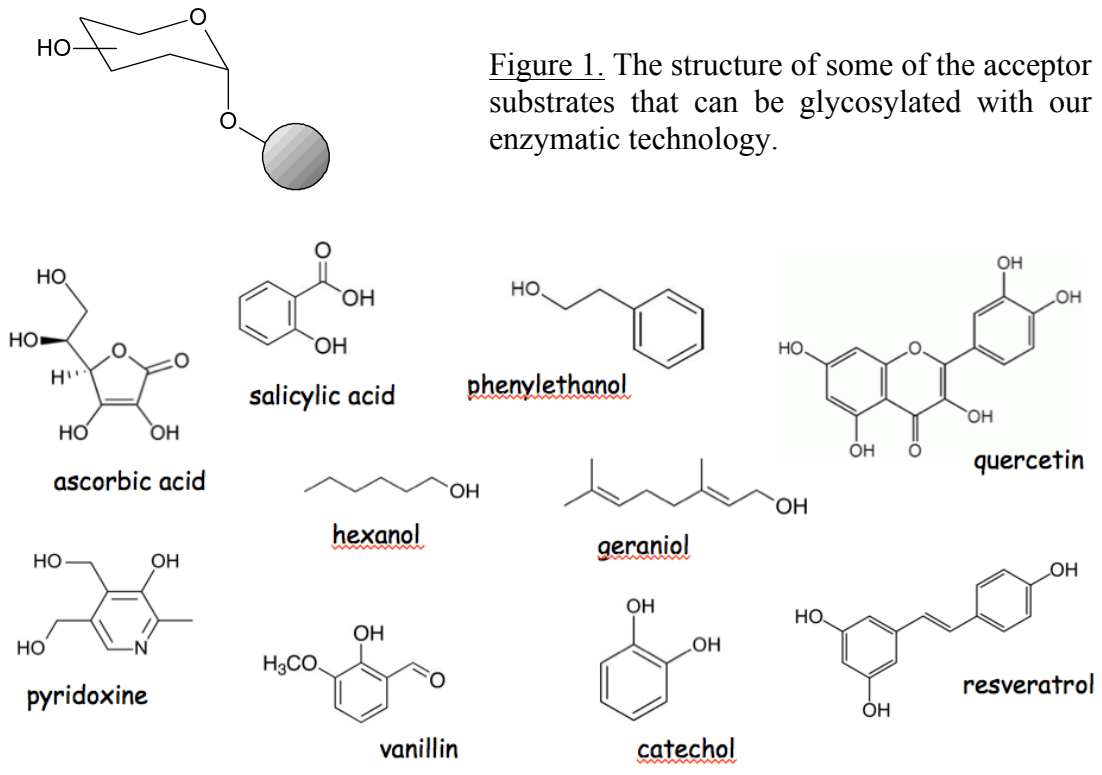

Figure 1. The structure of some of the acceptor substrates that can be glycosylated with our enzymatic technology.

Acceptor	GP	TG	GH	Acceptor	GP	TG	GH
resveratrol (trans)	+	-	+	2-hydroxypyridine	-	-	-
quercetin	+	-	-	3-hydroxypyridine	+	-	-
phenol	-	-	+	4-hydroxypyridine	-	-	-
catechol	+	+++	+++	2,4-dimethyl-5-hydroxypyridine	-	-	-
resorcinol	++	+/-	++	2,4-dimethyl-3-hydroxypyridine	-	-	-
hydroquinone	+	-	++	2-hydroxy-3-nitropyridine	-	-	-
pyrogallol	+++	++	-	3-hydroxy-2-nitropyridine	+	-	-
p-nitrophenol	+	-	-	4-hydroxy-3-nitropyridine	-	-	-
o-nitrophenol	-	+++	-	2-hydroxy-5-nitropyridine	-	-	-
salicyl alcohol (saligenin)	++	+/-	+	2-amino-4-hydroxypyridine	-	-	-
salicylic acid	-	-	+	5-bromo-2-hydroxy-3-nitropyridine	-	-	-
its methyl ester	++	-	++	5-chloro-2-hydroxy-3-nitropyridine	-	-	-
3-hydroxybenzoic acid	-	-	-	4,4'-dihydroxy-2,2'-bipyridine	-	-	-
its methyl ester	+	-	-	hexanol	++	-	+++
4-hydroxybenzoic acid	-	-	-	heptanol	++	-	++
its methyl ester	+	-	-	octanol	+	-	+
gallic acid	-	+++	-	nonanol	+	-	+
its ethyl ester	+++	-	-	decanol	+	-	+
shikimic acid	-	-	-	dodecanol	-	-	-
dopamine	-	-	-	cyclohexanol	++	-	+++
3-phenoxyphenol	-	-	+	nerolidol (cis + trans)	-	-	-
4-phenoxyphenol	-	-	+	anisyl alcohol	-	-	++
R-1-phenylethanol	+++	-	-	linalool	+	-	-
S-1-phenylethanol	+++	-	-	pinacol	-	-	-
2-phenylethanol	+	-	++	geraniol	+	-	++
curcumin	-	-	-	cinnamyl alcohol	++	-	++
L-ascorbic acid	+	+	-	vanillyl alcohol	+++	-	++
cholesterol	-	-	-	vanillin	+	-	+
pyridoxine	+	+	+	menthol (L)	-	-	-

Table 1. The substrate scope of the different enzyme classes in our collection

The reactions have been performed at pH 4-9 and 37-60°C, in the presence of organic co-solvents if needed to solubilize the acceptor substrates. The activities are only reported in a semi-quantitative fashion, since relatively low substrate concentrations were used during the high-throughput screening. The productivities of the most promising reactions will subsequently be optimized during process development.

GP = glycoside phosphorylases, with sucrose phosphorylase as main representative
TG = transglycosidases, with glucansucrase as main representative
GH = glycoside hydrolases, with rutinosidase as main representative