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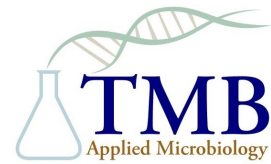
eLignin - a database on microbial catabolism of aromatic compounds derived from lignin

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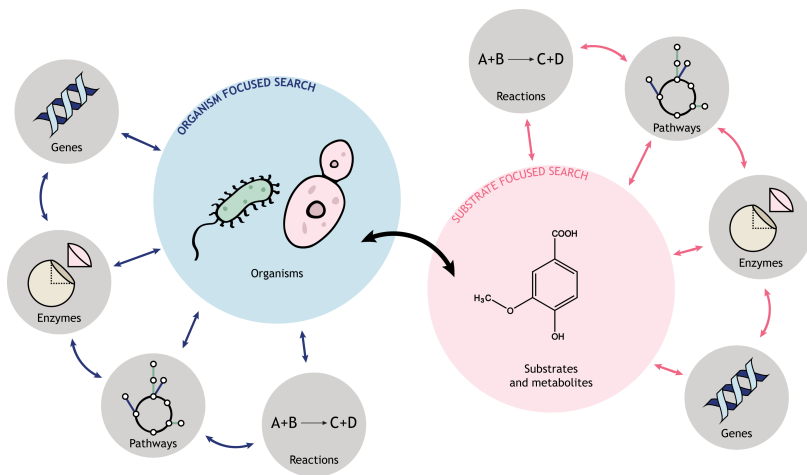
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BACKGROUND AND AIM

We here present a new database named **eLignin** for collection of data on metabolic pathways and enzymes for the **microbial conversion of lignin and lignin-derived aromatic compounds** to metabolites of the cellular central carbon catabolism.

The aim of eLignin is to bring the existing bibliome together in a single searchable platform. By doing so, we aim to **facilitate the overview of the field and generate new connections** between different aspects of the molecular biology of lignin- and aromatic catabolism that occurs in nature. Such knowledge will be an important foundation for the creation of new strategies for metabolic engineering of microorganisms to produce **value-added products from lignin** and/or its derivatives.



www.elignindatabase.com

Figure 1: Schematic representation of an organism and a substrate focused search in eLignin.

Please keep in mind that although the database was designed from this point-of-view, it is possible to begin a search in any of the available categories (enzymes, genes, metabolic pathways, organisms, reactions and substrates)

Table 1. The dataset in eLignin, as of March 2017

Entry	Count
Substrates	87
Organisms	104
Metabolic pathways	14
Reactions	34
Enzymes	25
Genes	31
References	131

CONCLUSIONS AND OUTLOOK

- eLignin will fill a gap between the existing biological databases by combining microbiology, molecular biology and metabolism related to lignin catabolism into a single repository.
- By facilitating the overview of the field, we hope that eLignin will be an useful aid in experimental design and metabolic engineering.
- The database is available at www.elignindatabase.com

The eLignin Biological Database BETA

Free-text search: eg. "catechol"

Welcome to the database on microbial lignin catabolism

Lignin is one of the most abundant carbon sources on the planet.

Best match: catechol

All search results

Substrates in database (including synonym names) matching the search query:

- 3-chlorocatechol
- 3-chloropyrocatechol
- 4-Allylcatechol-2-methyl ether
- 4-chlorocatechol
- 4-chloropyrocatechol
- Catechol
- Catechol dimethyl ether
- Catechol monomethyl ether
- Catechol-4-carboxylic acid
- O,O-Dimethyl catechol
- Pyrocatechol
- Pyrocatechol dimethyl ether

Pathways in database matching the search query:

- Beta-ketoadipate pathway: Catechol branch
- Catechol meta-cleavage pathway

Enzymes in database matching the search query:

- Catechol 1,2-dioxygenase
- Catechol 2,3-dioxygenase

Catechol

Compound overview

eLIGNIN ID:	S00001
Chemical formula:	C ₆ H ₆ O ₂
Molecular weight:	110.11 g/mol
IUPAC name:	benzene-1,2-diol
Synonyms:	1,2-dihydroxybenzene 2-hydroxyphenol benzene-1,2-diol pyrocatechol

Pathways and reactions

Catechol is associated with the following metabolic pathways:

- Reactions in which catechol is consumed:

Reaction	Pathway	Enzyme
catechol + O ₂ → cis,cis-muconate + 2H ⁺	Beta-ketoadipate pathway (all branches)	catechol 1,2-dioxygenase
catechol + O ₂ → cis,cis-muconate + 2H ⁺	Beta-ketoadipate pathway: Catechol branch	catechol 1,2-dioxygenase
catechol + O ₂ → (2Z,4E)-2-hydroxy-6-oxohepta-2,4-dienoate + H ⁺	Catechol meta-cleavage pathway	catechol 2,3-dioxygenase
- Reactions in which catechol is produced:

Reaction	Pathway	Enzyme
3,5-cyclohexadiene-1,2-diol-1-carboxylate + NAD ⁺ → Catechol + CO ₂ + NADH	funneling pathway: benzate	1,8-dihydroxycyclohex-2,4-diene-1-carboxylate
phenol + NADPH + O ₂ + H ⁺ → catechol + NADP ⁺ + H ₂	Funneling pathway: Phenol (aerobic)	

Organisms and strains in database that can utilize catechol as a carbon source

Organism	Strain	Taxonomy	Substrate comment	Reference
Amycolobopsis sp.	ATCC 39116	Bacteria > Actinobacteria; Gram positive		[1]
Candida maltosa	Falfove isolate	Fungi > Ascomycota; Yeast		[2]
Candida tropicalis	HP19	Fungi > Ascomycota; Yeast		[3]
Corynebacterium glutamicum	ATCC13032	Bacteria > Actinobacteria; Gram positive		[4]
Cryptococcus terreus	P84	Fungi > Basidiomycota; Yeast		[5]
Cupriavidus necator	JMP134	Bacteria > Proteobacteria; Gram negative		[6]
Empfindia jeikei	CBS 658.76	Fungi > Ascomycota; Yeast		[7]
Fusarium oxysporum	4287	Fungi > Ascomycota; Filamentous Fungus		[8]
Leucosporidium acotii	G43	Fungi > Basidiomycota; Yeast		[7]
Mastigobasidium intermedium	P88	Fungi > Basidiomycota; fungus		[5]
Microbotryomycetaceae sp.	AG15	Fungi > Basidiomycota; Yeast		[5]
Paenibacillus glucanolyticus	SLM1	Bacteria > Firmicutes; -		[9]
Pseudomonas fluorescens	AN13	Bacteria > Proteobacteria; Gram negative		[10]



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