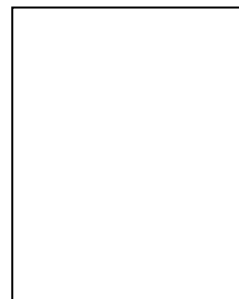


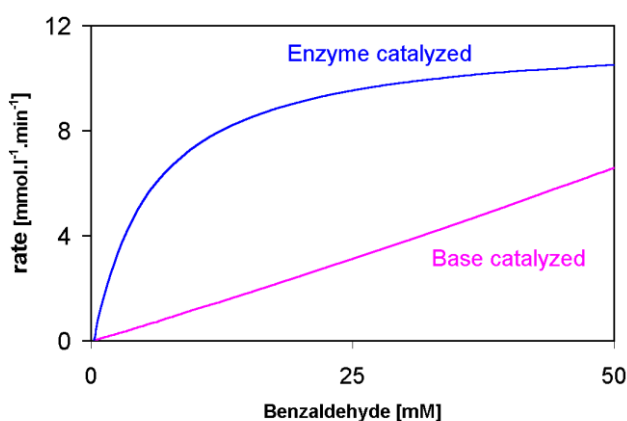
## Model based development of hydroxynitrile lyase catalysed processes

**PhD-student:** W.F. Willeman  
**Promotor:** Prof.Dr. J.J. Heijnen  
**Supervisor:** Dr. Adrie J.J. Straathof  
**Institute:** Delft University of Technology, Department of Biotechnology  
**Project term:** 1997 – 2001  
**Financed by:** IOP Catalysis



### Description

Hydroxynitrile lyases (Hnl's) are highly enantiospecific enzymes used for the synthesis of enantiopure compounds. Industrial production of (*S*)-*m*-phenoxybenzaldehyde cyanohydrin on multi-ton scale has commenced. This work describes the development of a general strategy towards the development and optimization of the industrial synthesis of enantiopure cyanohydrins, catalyzed by hydroxynitrile lyases, in aqueous-organic biphasic systems.



### Dissertation

W.F. Willeman, Model based development of hydroxynitrile lyase catalysed processes. PhD thesis, Delft University of Technology, 2001. <http://resolver.tudelft.nl/uuid:e787e43a-7e7f-413e-82a4-83158890a30e>

### Publications from the dissertation work

1. W.F. Willeman, U. Hanefeld, A.J.J. Straathof, and J.J. Heijnen, Estimation of kinetic parameters by progress curve analysis for the synthesis of (*R*)-mandelonitrile by *Prunus amygdalus* hydroxynitrile lyase. [Enzyme Microb. Technol.](#) **27** (2000) 423-433.
2. W.F. Willeman, P.J. Gerrits, U. Hanefeld, J. Brussee, A.J.J. Straathof, A. van der Gen and J.J. Heijnen, Development of a process model to describe the production of (*R*)-mandelonitrile by *Prunus amygdalus* hydroxynitrile lyase in an aqueous organic biphasic reactor, [Biotechnol. Bioeng.](#) **77** (2002) 239-247.
3. W.F. Willeman, A.J.J. Straathof, and J.J. Heijnen, Comparison of a batch, fed batch and continuous operated stirred tank reactor for the enzymatic synthesis of (*R*)-mandelonitrile by using a process model, [Bioproc. Biosystems Eng.](#) **24** (2002) 281-287.
4. W.F. Willeman, A.J.J. Straathof, and J.J. Heijnen, Reaction temperature optimization procedure for the synthesis of (*R*)-mandelonitrile by *Prunus amygdalus* hydroxynitrile lyase using a process model approach, [Enzyme Microb. Technol.](#) **30** (2002) 200-208.
5. W.F. Willeman, R. Neuhofer, I. Wirth, P. Pöchlauer, A.J.J. Straathof, and J.J. Heijnen, Development of (*R*)-4-hydroxymandelonitrile synthesis in an aqueous-organic biphasic stirred tank reactor. [Biotechnol. Bioeng.](#) **79** (2002) 154-164.

6. P.J. Gerrits, W.F.Willeman, A.J.J. Straathof, J.J. Heijnen, J. Brussee and A. van der Gen, Mass transport limitation as a tool to enhance enantioselectivity in the enzymatic synthesis of chiral cyanohydrins, [J. Mol. Catal. B Enzym.](#) **15** (2001) 111-121.
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