Bundesamt für
Verbraucherschutz und
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Position statement of the ZKBS on risk assessment of *Neosartorya fischeri*, *Aspergillus amstelodami* and *Penicillium commune* according to § 5 Paragraph 1 of the Genetic Engineering Safety Regulations (GenTSV)

Neosartorya fischeri

Neosartorya fischeri (anamorph *Aspergillus fischerianus*) is a mold of the order *Eurotiales*, belonging to the family *Trichocomaceae* and is ubiquitous and wide-spread in soil. It grows mainly as a saprophyte, also on rotting food containing fruit harvested near or directly from the ground. *N. fischeri* grows at temperatures between 10 °C and 52 °C, alt hough the optimal temperature is around 26 – 45 °C. The telemorphic f orm dominates at 24 °C, while anamorphic growth dominates at 37 °C.

Due to the heat-resistant ascospores formed by teleomorphs the fungus can also be isolated from rotting fruit that were originally heated during preparation[2]. *N. fischeri* produces mycotoxins of the fumitremorgin group (verrucologen, fumitremorgin A, B). Following toxin uptake by an organism, it affects the central nervous system. Spasms and cramps have been described in pigs and sheep, whereby the mycotoxin verrucologen is the most effective[1].

To date, *N. fischeri* has only been documented rarely in connection with infections of humans and animals. One case of mycotic keratitis was documented in a 62-year-old man[3]. A mycotic endocarditis was described in a child that underwent open heart surgery and received a bovine pericardium transplant[5]. Further cases were an infection in a bone marrow transplant patient[6] and a lung aspergillosis in a man after receiving a liver transplant.[7]

References

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2 Beuchat LR (1976). Extraordinary heat resistance of ascospores in fruit products. J. Food Sci 51: 1506-1510.

3 Coriglione G, Stella G, Gafa L, Spata G, Olivieri S, Padhye AA, Ajello L (1990). *Neosartorya fischeri* var. *fischeri* (Wehmer) Malloch and Chain 1972 (Anamorph: *Aspergillus fischerianus* Samson and Gams 1985) as a cause of mycotic keratitis. Eur. J. Epidemiol. 6: 382-385.

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5 Summerbell RC, Repentigny L, Chartrand C, St.-Germain G (1992) Graft-related endocarditis caused by *N. fischeri* var. *spinosa.* J Clinical Microbiol (30) 6: 1580-1582.

6 Lonial S, Williams L, Carrum G, Ostrowski M, McCarthy P (1997) *Neosartorya fischeri*: An invasive fungal pathogen in an allogeneic bone marrow transplant patient. Bone Marrow Transplantation 19 (7): 753-755.

7 Gori S, Pellgrini G Filipponi F, Della Capanna S, Biancofiore G, Mosca F, Lofaro A (1998) Pulmonary aspergillosis caused by *Neosartorya fischeri* (*Aspergillus fischerianus*) in a liver transplant recipient. J Mycologie Medicale 8 (2): 105-107.

Aspergillus amstelodami

Aspergillus amstelodami is the anamorphic stage of the mold *Eurotium amstelodami* belonging to the *Trichocomaceae* family and a member of the order *Eurotiales*. This fungus is distinguished by its xerophily. It belongs to the *Aspergillus glaucus* group and is wide-spread worldwide (soil, plant remains, the air). At an optimum temperature of 25 °C it grows relatively slowly and forms greenish-yellow colonies. In rare cases *Eurotium amstelodami* can cause allergic diseases of the respiratory tract[1]. An infectious disease caused by *A. amstelodami* has not been described for immunocompetent humans or animals yet.

In addition, depending on growth conditions the synthesis of mycotoxins is possible (physcion, echinulin, glaucin, sterigmatocystin) [2-5].

References

1 Roussel S, Reboux G, Dalphin JC, Laplante JJ, Piarroux R (2005). Evaluation of Saltings as a hay preservative against farmer's lung disease agents. Ann Agric Environ Med. 12: 217-221.

2 Rabie CJ, DeKlerk WA, Terblanche M (1964) Toxicity of *Aspergillus amstelodami* to poultry and rabbits. S. Afr. J. Agric. Sci. 7: 341-344.

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4 Wu MT, Ayers JC, Koehler PE (1974) Toxigenic aspergilli and penicillia isolated from aged, cured meats. Appl. Micobiol. 28: 1094-1096.

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Penicillium commune

Penicillium commune is an anamorphic mold from the order *Eurotiales* and belongs to the *Trichocomaceae* family. It is wide-spread in warm, humid places (soil, air) and spreads on fruit, bread, cheese, flour, marmelade and jam, and fruit juices. It can cause allergic reactions such as rhinitis, coughs, rashes or asthma. *Penicillium commune* synthesizes mycotoxins, primarily cyclopiazonic acid, rugulovasin A, B and cyclopaldinic acid. Under certain culture conditions it can start to produce the neurotoxin roquefortine and the tremor-inducing toxin penitrem A[1].

References

1 Wagener RE, Davis ND, Diener UL (1980) Penitrem A and Roqufortine Production by *Penicillium commune* Appl. and Environ. Microbiology 882-887.

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3 Rundberget T, Skaar I, Flaoyen A (2003) The presence of *Penicillium* and *Penicillium* mycotoxins in food waste. Int. J. Food Microbiol. 90: 181-188.

Assessment

According to § 5 Para. 1 of the Genetic Engineering Safety Regulations (GenTSV) in conjunction with the criteria in Appendix 1 of the GenTSV the ZKBS assigns *Neosartorya fischeri*, *Aspergillus amstelodami* and *Penicillium commune* to **risk group 1** as donor or re-

cipient organisms used in genetic engineering observing the safety measures for laboratory areas listed in Appendix III A I. Sentence 8.

Reasons

Neosartorya fischeri, *Aspergillus amstelodami* and *Penicillium commune* are wide-spread molds with no pathogenicity for healthy immunocompetent humans or animals.

In analogy to the classification of bacteria that are able to form toxins, but at the same time not able to cause an infectious disease (Notification sheet 06 BG Chemie, 2005) the actual formation of toxins is not sufficient for allocation to a higher risk group. However, the formation of toxins should be taken into account in the safety measures. Contact with aerosols should be avoided, gloves, and if necessary a suitable face mask covering the nose and mouth should be worn and a safety workbench should be used. Genetic engineering operations with *Neosartorya fischeri* as recipient organism should be presented to the ZKBS for individual evaluation.

N. fischeri, *A. amstelodami* and *P. commune* are also assigned to biosafety level 1 by the ATCC. In the DSMZ, *N. fischeri* and *P. commune* are similarly listed as organisms belonging to risk group 1. In the notification sheet 007 of the BG Chemie all representatives of the order Eurotiales are assigned to risk group 1, with the exception of *A. fumigates* and *A. flavus*.

In contrast, *N. fischeri* and *P. commune* are found in risk group 2 of the organism list of the Swiss Government Office for the Environment (Bundesamt für Umwelt: BAFU), whereby all organisms with proven pathogenic activities for humans, including immunocompromised, people are in principle allocated to at least risk group 2.