

# Sterigmatocystin

## 1. Description of substance

Sterigmatocystin is a mycotoxin produced mainly by *Aspergillus* fungi, and is an intermediate in the biosynthesis of aflatoxin B<sub>1</sub>. Major producing microbes include *A. versicolor* and *A. nidulans*, which are widely distributed over the world and in soil, crops, and especially cereals. In Japan, while there are many reports on the distribution of *A. versicolor*, there are few reports on natural contamination with sterigmatocystin.

Name: sterigmatocystin

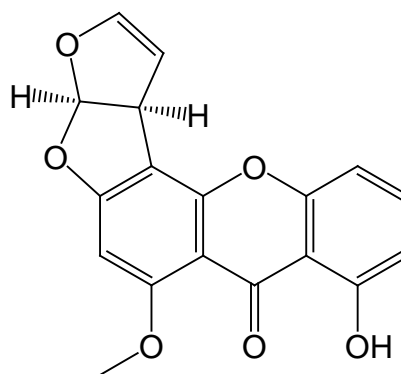
IUPAC name:

(3a*R*,12*cS*)-8-hydroxy-6-methoxy-3a,12*c*-dihydro-7*H*-furo[3',2':4,5]furo[2,3-*c*]xanthen-7-one

Molecular formula: C<sub>18</sub>H<sub>12</sub>O<sub>6</sub>

Molecular weight: 324.28

Structure:



## 2. Toxicity (mechanism of action)

The structure and the bioactivity of sterigmatocystin are similar to those of aflatoxin, but its toxicity is weaker than aflatoxin and is observed in the liver and the lung. Its toxicity is said to be 1/125 and the carcinogenicity to be 1/250 of aflatoxin B<sub>1</sub>, and its acute toxicity is low. <1>

Carcinogenicity is reported in animal studies, poisoning accidents etc., in humans or livestock have not been reported in Japan, although there were reports in the past that sterigmatocystin was found in cereals etc., that were deteriorated after long-term storage. <2>

## 3. Contamination in feeds

Sterigmatocystin has been detected in feed materials including maize, wheat, barley, milo, cassava, corn gluten feed, corn gluten meal, bran, and soybean meal.

## 4. Analysis methods

See [http://www.famic.go.jp/ffis/oie/sub3/sub3\\_mycotoxin.html](http://www.famic.go.jp/ffis/oie/sub3/sub3_mycotoxin.html)

## 5. Regulatory situation

Currently no standard value etc. is designated in the Codex and in Japan, and there are no risk assessments by international organizations etc.

## 6. Monitoring test results etc. in Japan

See [http://www.famic.go.jp/ffis/oie/sub2\\_h23\\_gaiyou\\_e.html](http://www.famic.go.jp/ffis/oie/sub2_h23_gaiyou_e.html) or [http://www.famic.go.jp/ffis/oie/obj/h23famic\\_monitoring\\_e.pdf](http://www.famic.go.jp/ffis/oie/obj/h23famic_monitoring_e.pdf)

## 7. Measures for feed contamination prevention

It is difficult to remove sterigmatocystin once it is produced; measures for prevention of the contamination are important such as low temperature and drying to prevent the appearance of molds during the storage of agricultural products.

## 8. Effects on foods (livestock products) and humans

Sterigmatocystin is classified as Group 2B with possible carcinogenicity in humans by the International Agency for Research on Cancer (IRAC). <3> It may be contained at a low concentration in cheese as for livestock products <4><5><6><7>. Effects of the toxin on human health are not well known. There has been a report that it causes apoptosis in human peripheral lymphocytes. <8>

## 9. Reference

- (1) The Pharmaceutical Society of Japan: Methods of Analysis in Health Science (2010)
- (2) Ministry of Agriculture, Forestry and Fisheries Home Page: Information about mycotoxins in food, Various mycotoxins  
[http://www.maff.go.jp/j/syouan/seisaku/risk\\_analysis/priority/kabidoku/kabi\\_iroiro.html](http://www.maff.go.jp/j/syouan/seisaku/risk_analysis/priority/kabidoku/kabi_iroiro.html)  
(Accessed 14 Dec 2012)
- (3) International Agency for Research on Cancer: Summaries & Evaluations, 10 (1987)
- (4) Northolt MD, van Egmond HP, Soentoro P, Deijll E: Fungal growth and the presence of sterigmatocystin in hard cheese, J Assoc. Off. Anal. Chem., 63(1), 115-119 (1980)
- (5) Francis OJ Jr, Ware GM, Carman AS, Kuan SS, Thin layer chromatographic determination of sterigmatocystin in cheese, J Assoc. Off. Anal. Chem., 68(4), 643-645 (1985)
- (6) Aly S.A. and Elewa N. A.: The effect of Egyptian honeybee propolis on the growth of *Aspergillus versicolor* and sterigmatocystin biosynthesis in Ras cheese, Journal of Dairy Research, 74(1), 74-78 (2007)
- (7) Versilovskis A, Van Peteghem C, De Saeger S: Determination of sterigmatocystin in cheese by high-performance liquid chromatography-tandem mass spectrometry, Food Addit. Contam. Part A Chem. Anal. Control Expo. Risk Assess., 26(1), 127-133 (2009)
- (8) Sun XM, Zhang XH, Wang HY, Cao WJ, Yan X, Zuo LF, Wang JL, Wang FR: Effects of sterigmatocystin, deoxynivalenol and aflatoxin G1 on apoptosis of human peripheral blood lymphocytes in vitro, Biomedical and Environmental Sciences, 15(2), 145-152 (2002)