PURIFICATION OF STERIGMATOCYSTIN WITH LIQUID-LIQUID CHROMATOGRAPHY

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Fungi play an important role in causing grain spoilage in stored food, posing a significant challenge to food safety. The Food and Agriculture Organisation (FAO) estimates that approximately 25% of the world's food crops are affected by mycotoxins during both their growth and storage phases. Sterigmatocystin (STC) is a mycotoxin, also known as the precursor of Aflatoxin B1 (AFB1) for biosynthesis, and its chemical structure is similar as well. AFB1 is the most potent carcinogenic mycotoxin known [1]. They are naturally occurring hepatotoxic and carcinogenic mycotoxins. The International Agency for Research on Cancer classifies sterigmatocystin in Group 2B. Although STC is highly toxic, no country has set a maximum limit for it due to the low incidences. STC is produced by several species of *Aspergillus*, including *A. versicolor*, *A. nidulans*, or *A. creber*. STC has been found in stored grains or cheese, but not in the field [2]. The first pure isolation of this mycotoxin was in 1954 [3], but it took another 8 years to clarify its complete chemical structure [4]. The STC consists of a xanthone nucleus attached to a bisfuran structure similar to aflatoxins. STC is soluble in acetone, benzene, ethyl acetate, and chloroform, slightly soluble in ethanol, methanol, and diethyl ether, but insoluble in petroleum ether and water [5].

In our work, the development of a proper preparative method capable of liquid-liquid chromatographic separation of STC was aimed. For this purpose, the 'best solvent' approach was applied using the shake flask method to find the suitable biphasic solvent system. Within this testing period, the biphasic hexane-acetone-water, hexane-methanol-water, hexane-methanol-acetonitrile, hexane-ethanol-water, chloroform-methanol-water and Arizona solvent system were applied to measure the peak areas of the STC and the three major impurities by HPLC-UV separations in the upper and lower phases of the systems. On the basis of the partition coefficients and separation factors of the examined components, the most appropriate system was selected for the liquid-liquid chromatographic separation of STC.

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References

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