STUDIES OF STERIGMATOCYSTIN (ST) PRODUCED BY ASPERGILLUS VERSICOLOR IN HUMAN GASTRIC JUICE IN VITRO

SECTION II. EFFECTS OF pH AND CULTURED TIME ON A. VERSICOLOR'S PRODUCING ST AND GROWING

Wang Dian-sheng and Sun He-ling

Laboratory of Mycotoxin-producing Fungi, Beijing Institute for Cancer Research, Beijing, (China)

The range of pH in human normal gastric juice is from 0.9 to 1.5. The pH will increase in the patients with chronic atrophic gastritis, and certain fungi and bacteria were found in their gastric juice, and some of them could produce toxic metabolites (ref. 1, 2).

We have found A. versicolor could produce ST in SPKM and CS human gastric juice media incubated at 37°C for 12 days (see section I). The purpose of the study was to research the effects of pH and cultured time on A. versicolor's growing and ST producing.

Results and Discussion

1. The effects of pH on A. versicolor's producing ST and its growing in SPKM and CS human gastric juice media. Four groups, pH 1.0, 3.0, 6.5, and 8.0, have been designed according to the classification of gastric acid absence in clinic. The results show all experimental strains of A. versicolor could grow from pH 3.0 to pH 8.0 in both SPKM and CS human gastric juice media. Parts of them could grow at pH 1.0 in CS human gastric juice medium. The weight of mycelium both in pH 6.5 and pH 8.0 groups was heavier than that of in both pH 1.0 and pH 3.0 groups.

All experimental strains could produce ST when they were cultured at pH 6.5 and pH 8.0 in SPKM human gastric juice medium except Sa. strain at pH 8.0. Only at pH 6.5 in CS human gastric juice medium, all experimental strains could produce ST.

Hitokoto and his colleague had reported that the maximal (10.6 µg/ml) and submaximal (10.4 µg/ml) ST could be obtained at initial culture pH 5.0 and 5.5 respectively. The initial culture pH from 4.0 to 7.0 in the SSP medium had no significant influence on
either growth or toxin formation of *A. versicolor* (ref. 4). The experimental results of this study showed that *A. versicolor* grown and produced ST in both SPKM and CS human gastric juice media, and an obvious change between pH 3.0 and 6.5 could be found. So far, we know the risk of stomach cancer incidence is 20 times higher in patients with chronic atrophic gastritis than that in normal persons, and ST is one of the carcinogenic compounds. As *A. versicolor* could stay in human gastric juice in vivo at pH>3.0 (ref. 2), so it suggests that ST may be one of the factors of turning chronic atrophic gastritis into stomach cancer.

2. The effects of cultured time on *A. versicolor*′s producing ST in SPKM and CS human gastric juice media. Hitokoto had studied the growth and ST formation of *A. versicolor* (isolated from small dried sardines) for different culture times in SSP medium. During the culture time, the authors had observed that *A. versicolor*′s mycelia could be found after the third days, then showed an abrupt increasing from the sixth to ninth days, and finally reached the maximum at the thirteenth days. The formation of toxin was recognized in the sixth days culture, and the amount of toxin was abruptly increased from the tenth to twelveth days (ref. 4). Rabie inoculated *A. versicolor* in the Corn medium, and ST was found after the three days culture (14 μg/kg) (ref. 5). We have obtained the results with the same tendency as above papers. A trace of ST is found when *A. versicolor* has been in stationary culture for the eight days at pH 6.5, 37°C condition in both SPKM and CS human gastric juice media, and following that the amount of ST has an acute increasing after ten days.

References