

**Title** Kinetic modelling of aflatoxins B<sub>1</sub> conversion and validation in corn, rice, and peanut during thermal treatments

**Author** Chao Zhang, Yue Ma, Xiaoyan Zhao and Yali Zeng, Fen Wang

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### **Abstract**

A kinetic model of the aflatoxins B<sub>1</sub> conversion was plotted and validated successfully in the aflatoxin B<sub>1</sub>-contaminated rice during thermal treatments. Specifically, the kinetic Model A and Model B of the aflatoxin B<sub>1</sub> conversion were plotted based on the differential-scanning calorimetry and thermogravimetric analysis, respectively, with the pure aflatoxin B<sub>1</sub>. In succession, Model A and Model B were validated in the aflatoxin B<sub>1</sub>-contaminated corn, rice, and peanut during thermal treatments. Model A successfully simulated the conversion of aflatoxin B<sub>1</sub> in the aflatoxin B<sub>1</sub>-contaminated rice with the correlation coefficients of 0.859 and average-absolute deviation of 6.61. The activation energy and conversion order of the aflatoxin B<sub>1</sub> conversion were 89.0 kJ/mol and 0.12, respectively. Moreover, the relationships between the conversion degree and time vs temperature were plotted based on Model A. These plots would help to predict the final content of aflatoxin B<sub>1</sub> after thermal treatments, and give an instruction to develop a food processing.