

## Abstract

Aflatoxin B1 (AFB1) is a potent carcinogenic mycotoxin commonly found in spices, including nutmeg, posing significant food safety and quality concerns. Indonesia's warm and humid climate may facilitate fungal growth and increase AFB1 contamination risk, yet limited studies have assessed AFB1-related health risks in Indonesian nutmeg. Therefore, this study aimed to determine AFB1 contamination levels in nutmeg from four Indonesian regions using liquid chromatography–tandem mass spectrometry (LC-MS), followed by risk assessment employing the Margin of Exposure (MOE) approach and quantitative liver cancer risk approach. Physicochemical properties including moisture content (MC), water activity (Aw), and ash content were also evaluated. AFB1 was not detected in any samples, with concentrations below the LC-MS limit of detection (LOD) at 0.48 µg/kg; thus, this LOD value was used for risk estimation. All MOE values exceeded the safety threshold of 10,000, and the quantitative liver cancer risk approach remained below 0.1 liver cancer cases per 100,000 individuals over 75 years, indicating low health concern. Significant differences ( $p < 0.001$ ) in physicochemical properties were observed among samples with all results complied with regulatory bodies maximum limits. These findings suggest that to enhance risk characterization, future studies should employ analytical methods with lower LOD and expand sampling to improve representativeness of AFB1 exposure data in Indonesian nutmeg.

**Keywords:** *Nutmeg, Aflatoxin B1, Risk Assessment, MOE, Quantitative Liver Cancer Risk*