

MORPHOLOGICAL AND MOLECULAR CHARACTERIZATION OF AFLATOXIN PRODUCING STRAINS OF *ASPERGILLUS* SPP. IN GROUNDNUT FROM INDIA

P. SUMBHE ¹, B. ACHYUT ¹, M. SONI ²,
V. UPADHYE ³, N.M. CHAUHAN ⁴,
S. MAGAR ¹, S.T. HAJARE ^{5,*}

¹ Plant Biotechnology Department, College of Agricultural Biotechnology Latur, Vasantao Naik Marathwada Krushi Vidyapeeth Parbhani, Maharashtra, India

² Dr D.Y Patil Vidyapeeth, Pune and Department of CSE, University centre for Research & Development Chandigarh University, Mohali Punjab

³ Associate Professor (RDC), Parul University, Vadodara, Gujarat, (India)

⁴ College of Natural and Computational Sciences, Dilla University, Dilla 419, Ethiopia

⁵ NMDC, Hingoli, SRTMU, Nanded (MS), India

Address for correspondence: S.T. Hajare: e-mail: sunilhajare@gmail.com

The production of aflatoxin, a well-known mycotoxin, is primarily attributed to two distinct Emericella species and various Aspergillus species. Because of these mycotoxin high acute toxicity, immunosuppressive, mutagenic, teratogenic, and carcinogenic properties, aflatoxin poisoning has resulted in significant financial losses in the production of corn, cottonseed, groundnuts, sorghum, wheat, rice, and other commodities. Accordingly, the proposed study aims to characterize aflatoxin producing strains from various groundnut samples using morphological and molecular methods. A total of 11 isolates were found from an infected groundnut seed sample; qualitative analysis revealed that six of these samples were aflatoxin producing Aspergillus strains. Nevertheless, four samples were identified as producing aflatoxin by molecular detection using a gene specific primer involved in aflatoxin biosynthesis. These samples were collected from the districts of Dhule, Ahmednagar, Dapoli, and Latur in the Indian state of Maharashtra. The molecular method confirmed the highest level of accuracy when compared to other methods of detection; therefore, precise and unambiguous identification of aflatoxin producing Aspergillus spp. will be crucial for

the development of control strategies for the fungus in groundnuts and groundnut products that are extensively consumed in India.

Key words: Aflatoxin; *Aspergillus* spp., Groundnut; Molecular detection, Mycotoxins.

МОРФОЛОГІЧНІ Й МОЛЕКУЛЯРНІ ХАРАКТЕРИСТИКИ ШТАМІВ *ASPERGILLUS* SPP., ПРОДУЦЕНТІВ АФЛАТОКСИНУ, В АРАХІСІ З ІНДІЇ

Виробництво афлатоксину, добре відомого мікотоксину, в основному приписують двом штамам *Emericella* та різним штамам *Aspergillus*. Через високу й гостру токсичність, імуносупресивні, мутагенні, тератогенні та канцерогенні властивості цих мікотоксинів отруєння афлатоксином призводить до значних фінансових втрат у виробництві кукурудзи, бавовни, арахісу, сорго, пшениці, рису та інших продуктів. Відповідно, метою запропонованого дослідження було охарактеризувати штами-продуценти афлатоксину з різних зразків арахісу за допомогою морфологічних та молекулярних методів. Загалом було виявлено 11 ізолятів із зараженого насіння арахісу; якісний аналіз показав, що шість із цих зразків були штамами *Aspergillus*, які продукують афлатоксин. Тим не менш, чотири зразки були ідентифіковані як такі, що продукують афлатоксин шляхом молекулярного виявлення за допомогою генно-специфічного праймера, що бере участь у біосинтезі афлатоксину. Ці зразки були зібрані в районах Дхуле, Ахмеднагар, Даполі та Латур в індійському штаті Махараштра. Молекулярний метод підтвердив найвищий рівень точності порівняно з іншими методами виявлення, тому точна й однозначна ідентифікація штамів *Aspergillus* spp., що продукують афлатоксин, матиме вирішальне значення для розробки стратегій контролю грибка в арахісі та продуктах з нього, які широко споживаються в Індії.

Ключові слова: афлатоксин, *Aspergillus* spp., арахіс, молекулярне виявлення, мікотоксини.

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