

## Probiotic potential of *Lactococcus lactis* subsp. *lactis* and their efficacy against food safety

Koteswara Rao V

Biochemical Sciences Davison, CSIR-National Chemical laboratory, Pune-Maharashtra-411008

020-25902217

[v.koteswara@ncl.res.in](mailto:v.koteswara@ncl.res.in)

---

### Abstract

The poultry industry has become an important economic activity in many countries. Indian food industry is expected to cross USD 540 billion in 2020, growing at 12 percent per annum. Mycotoxins are secondary metabolites of fungi, which contaminate food and feed, pose a major biothreat to the humans and animal health. Mycotoxicosis caused by the effects of toxins, disease is often subclinical and may be difficult to diagnose and also major concern to the food safety. Probiotics play an important role in immunological properties by producing bioactive metabolites, proteins/peptides. We isolated and evaluated probiotic potential of *Lactococcus lactis* subsp. *lactis* against the growth of toxigenic fungi such as *Aspergillus flavus*, *Penicillium verrucosum* and *Fusarium graminearum* and production of aflatoxins (AF), ochratoxin A (OTA), and zearalenone (ZEA). *L.lactis* subsp. *lactis* strain KNCL1 (MG917752) was identified by Field Emission Scanning Electron Microscope (FE-SEM) and confirmed by 16s rRNA gene sequence analysis. The cell-extract of this strain evaluated for the antibacterial, antibiofilm, antifungal, ergosterol, anitmycotoxin and anticancer activity of colon cancer cell lines (SAT116). The CE of strain showed significant activity against *A.flavus* (73%), *F.graminearum* (80%), *P. verrucosum* (83%) and their minimum inhibitory concentration (MIC50%) 48.97±0.40, 35.69±2.69, and 25±1.44 µg/ml was recorded. Molecular detection of these toxins was determined by targeting their metabolic pathway genes, norsolorinic acid (NOR), *otapksPN*, and *PKS13* gene biosynthetic genes encoding AF, OTA and ZEA respectively and by detected by PCR. However, 67, 53 and 40% poultry feed samples were positive for AF, OTA and ZEA, and quantified were not in permissible limit (European Commission). The probiotic strain was evaluated against mycotoxins and resulted significant inhibition of AF and OTA at 2% cell and complete inhibition of the ZEA production at 3% lyophilized cell was recorded. Also, 73% of the inhibitor of colon cancer was recorded at 14 µg/ml was evaluated by *In-vitro* studies. This strain can be used as bio-preservatives in food industry, and biotherapeutics in the management of human health and diseases.

---