

IDT1-015 | Investigations on prevalence of aflatoxin contamination in major groundnut growing states of India, influence of soil characteristics and farmers' level of awareness

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Food safety issues are of major concern in groundnut due to aflatoxin contamination by *Aspergillus flavus*. Monitoring aflatoxin prevalence and understanding the factors responsible can provide useful information for devising effective management strategies. The present study focused on mapping the pre-harvest aflatoxin contamination in India along with its determining factors. A comprehensive survey was undertaken during 2012-2014 in four major groundnut growing States such as Andhra Pradesh, Gujarat, Karnataka, and Tamil Nadu. Pod (n=2434) and rhizospheric soil samples (n=1322) were collected to ascertain *A. flavus* populations and pre-harvest aflatoxin contamination. Further, kernel aflatoxin levels were correlated with soil organic carbon, available calcium and pH levels in the fields from where the samples were collected. Farmers' awareness on aflatoxin problem

was also determined using a semi-structured questionnaire. Our results indicate wide variations in the occurrence of pre-harvest aflatoxin contamination levels of kernels among different States (0 - 5486 ppb) and samples within States. Detectable levels of aflatoxins (>1ppb) were highest in Karnataka (70.5%), whereas it was lowest in Andhra Pradesh (32.9%). Correlation studies revealed that aflatoxin contents were positively associated with soil pH ($r = 0.54-0.99$) and *A. flavus* populations ($r = 0.63$ in Gujarat; $r = 0.75$ in Karnataka) whereas soil organic carbon and available calcium were negatively correlated with toxin levels in kernels ($r = -0.99$). Farmers' awareness was considerably poor in all the States under survey. Overall, our results suggest the prevalence of aflatoxin contamination in major groundnut growing areas in India, and influence of certain edaphic factors.

IDT1-016 | Evaluation of symbiotic potential, nutrient uptake and yield of chickpea cultivars under field conditions

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In India, chickpea (*Cicer arietinum* L) is an important cool season food legume crop cultivated under rainfed conditions. It has an inherent potential to fix atmospheric nitrogen through symbiotic association with Mesorhizobia. In chickpea, Symbiotic Nitrogen Fixation (SNF) contributes 40-80% of total plant nitrogen depending upon host genotype, efficient strains of *Mesorhizobium* in nodules, and soil type. The present study aims to evaluate the chickpea cultivars for superior SNF potential associated with improved plant growth, nutrient uptake and yield. About 23 chickpea cultivars were grown under IARI field conditions without application of chemical inputs. These cultivars were assessed for *in-planta* nitrogenase activity, nodulation potential, plant growth, nutrient uptake and seed yield to study the inter-relationship of plants' physiological characters and their variance

from one genotype to another. Principal Component Analysis (PCA) showed a significant positive correlation among *in-planta* nitrogenase activity, shoot weight, nodule dry weight, and N and P uptake. Additionally, genotypes were clustered, based on their performances. Eight out of 23 cultivars were categorised as high-performing group in which SNF potential correlated with plant growth and yield; whereas six genotypes were found to be relatively poor and were categorised as low performance group. A few other genotypes were accorded to mediocre performance cluster while five genotypes did not fall in any cluster as their performance was highly variable across the tested parameters. The cultivars with improved SNF associated with plant growth and yield can perform better under low nutrient conditions which are most prevalent in rainfed agriculture.