International Journal of Agriculture Sciences
ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 20, 2018, pp.-7401-7405.
Available online at https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

# BALANCE SHEET OF N AND S RECYCLING AND PRODUCTIVITY OF INDIAN MUSTARD UNDER DIFFERENT NUTRIENT TREATMENTS AND PLANT GROWTH REGULATORS

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Received: October 15, 2018; Revised: October 25, 2018; Accepted: October 26, 2018; Published: October 30, 2018

**Abstract:** Oilseed productivity in the country is being constrained by shrinking soil fertility, inadequate and imbalanced fertilization and climatic constraints. PGRs mitigate abiotic and biotic stress and a number of laboratory/pot culture studies confirm to a strong synergistic interaction between auxins and brassinosteroids/BR but field studies in this line are meager. Therefore, N and S dynamics mainly soil depletions, crop uptake and unaccounted losses were studied through balance sheet method under different nutrient treatments and plant growth regulators/PGRs to achieve sustained higher productivity of Indian mustard during winters of 2012 and 2013 in Udaipur region. Eight nutrient treatments *i.e.* 75 and 100% recommended dose of fertilizers/RDF and their combinations with 5 t farm yard manure ha$^{-1}$/FYM, bio-fertilizers (*Azotobacter* + PSB) and FYM+ bio-fertilizers in main plots and four PGRs (water spray, BR 0.5 ppm, Indole acetic acid/IAA 50 ppm and BR 0.5 + IAA 50 ppm) in sub plots were evaluated in a split plot design replicated thrice. Results show that 100% RDF + FYM+ bio-fertilizers outperformed other nutrient treatments in pooled seed and stover yield (3231 and 13604 kg ha$^{-1}$), crop N and S uptake(157.23 and 79.43 kg ha$^{-1}$, respectively) and available soil N and S at crop harvest (272.53 and 25.44 kg ha$^{-1}$, respectively). Among PGRs, BR + IAA registered significantly higher pooled seed and stover yield (2952 and 12379 kg ha$^{-1}$) and crop N and S uptake (142.11 and 69.52 kg ha$^{-1}$, respectively).

**Keywords:** Brassinolide, Indole acetic acid, Indian mustard, Integrated nutrient management, Residue recycling