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### Balance-dose-response of soil amended with two industrial byproducts flyash and wastewater on canola (*Brassica napus*) cv. GSL 1 under levels of NPK

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A pot experiment was conducted on *Brassica napus* cv. GSL 1 grown in soil amended with 100% wastewater, two levels of flyash and three levels of inorganic fertilizers to obtain the suitable combination of NPK, FA and water based on the growth performance and heavy metal extracting capability with biomass production. Flyash was mixed in soil at 10 and 20 t/ha while NPK at 40:15:15, 60:30:30 and 80:45:45 kg/ha respectively. The treated plants were compared with ground water irrigated plants and results were concluded. The results were recorded by the study of growth, physiological, biochemical as well as five heavy metals at 105 DAS (days after sowing). Finally at harvest stage seed yield, oil content and oil yield was examined. Bio-concentration factor (BCF), translocation factor (TF), tolerance index (Ti) were also calculated. The result showed that all the traits were increased in both FA<sub>10</sub> and FA<sub>20</sub> with all three doses of NPK, marked significantly superior over control (no FA, NPK and WW). However among all the treatments N<sub>60</sub>P<sub>30</sub>K<sub>30</sub>FA<sub>20</sub> proved to be best as it at par to N<sub>80</sub>P<sub>45</sub>K<sub>45</sub>FA<sub>20</sub>. The mean value of two water treatments showed WW irrigation increased the growth, physiological as well as yield characteristics were better than GW irrigation. And interesting result was also noted GW×N<sub>80</sub>P<sub>45</sub>K<sub>45</sub>FA<sub>20</sub> when compared to WW×N<sub>40</sub>P<sub>15</sub>K<sub>15</sub>FA<sub>20</sub>; and GW×N<sub>40</sub>P<sub>15</sub>K<sub>15</sub>FA<sub>20</sub> with WW×N<sub>0</sub>P<sub>0</sub>K<sub>0</sub>FA<sub>0</sub> found to be statistical equaled indicating the application of WW as of NPK fertilizers either can be removed/ or reduced.

For heavy metal accumulation, although in respect to seed yield and biomass yield, N<sub>60</sub>P<sub>30</sub>K<sub>30</sub>FA<sub>20</sub> was proved to be optimum dose to accumulate the heavy metal with net increase in biomass yield condition required by phytoremediation. Also on the basis of BCF, TF and Ti calculated were recorded greater than one, it proved that Brassica cultivar was more of less useful and somewhat tolerable to at all dose of these two wastes with high dose of NPK.

#### Biography

Seema Sahay is a research scholar doing Ph.D. (Plant Physiology and Environmental Sciences) from Aligarh Muslim University, Aligarh, India. She is awardee of UGC-Rajiv Gandhi National Fellowship for 5 years. She has published more than more than 10 papers in reputed journals of repute.

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