Effectiveness of Glycine max on Microplastic Removal From Soil

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The purpose was to determine the effectiveness of using Glycine max (soybean) to remove microplastics from soil. Due to the increase of microplastics in the environment, discovering methods to remove microplastics is vital. Plants could solve this because studies show microplastics have been found in crops (Li, 2021). It was hypothesized that soybean plants would effectively remove microplastics up to 0.3mm in size from soil containing the microplastics through absorption. This was tested by growing 24 soybean plants in a 2.2% w/w mixture (0.68g of microplastics to 30g of soil) with two microplastic sizes. Eight plants were grown in only soil, eight in soil with 38-45µm particles, and eight in soil with 250-300µm particles. The plants were watered every day except weekends, and their heights were recorded at two points. After 26 days, the soybeans were dried, their biomass was taken, then, the roots, stems, and leaves were separated, ground, and scanned. The 38-45µm group was mixed with Tween 80 solution, the 250-300µm group was mixed with vegetable oil, and the control was split, half with Tween 80 solution and half with vegetable oil. The absorbance per gram and the fluorescence per gram were larger in the control group than the correlating microplastic group showing errors in data collection had occurred because it is improbable that adding microplastics to plant matter would decrease the absorbance and fluorescence values by half. The suspected error lies with the large plant matter masses used. The results were inconclusive and further studies are needed.

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