In vitro antifungal effect of crop root exudates against Sclerotium rolfsii Sacc. causing stem rot in groundnut

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SUMMARY
Crop root exudates of 20 crops like groundnut, soybean, pigeonpea, green gram, black gram, chickpea, pea, cowpea, mustard, cotton, castor, sunflower, safflower, sesame, sorghum, pearl millet, maize, wheat, onion, and garlic were used in this study. Large variations of inhibitory effect of root exudates on S. rolfsii were observed. Low concentrations of root exudates (5% and 10%) had no effect on inhibition of mycelial growth and germination of sclerotia while, at high concentration (20%) inhibited the mycelial growth and germination of sclerotia. Mycelial growth, dry mycelium weight and sclerotial germination were recorded lowest in root exudates of sunflower, maize, pearl millet, sorghum, safflower, garlic, and onion. Mycelial growth, dry mycelium weight and sclerotial germination was recorded highest in root exudates of soybean, groundnut, green gram, black gram, pigeonpea, chickpea, pea and cowpea. It was observed that the root exudates of maize, sunflower and pearl millet showed a highest percentage of inhibition of mycelial growth and sclerotial germination. Another interesting of thing was observed that root exudates of groundnut, soybean and pea stimulate the mycelial growth and germination of sclerotia as compared to control. The results of this study suggested that the intercropping or crop rotation of safflower, maize, pearl millet, sorghum, sunflower, garlic, and onion with groundnut may be useful for the management of stem rot of groundnut and also for reduction of soil population of S. rolfsii in groundnut field. Similarly intercropping or crop rotation of soybean, green gram, black gram, chickpea, pea and cowpea with groundnut should be avoided. Based on these findings, it is hypothesized that root exudates of some crops contain antifungal compounds, while other stimulate the growth of fungal pathogens. Cultivation of safflower, maize, pearl millet and sorghum with groundnut could lead to a reduction in the occurrence of stem rot disease, especially when chemical control is not effective and economically costly. However, further investigation is necessary for isolation and identification of antifungal compounds in root exudates related to host-pathogen interaction.