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FAVORABLE MODIFICATION IN SULPHUR METABOLISM CAUSES AN IMPROVEMENT IN SULPHUR NUTRITION OF CROPS UNDER AN ELEVATED SO_2 EXPOSURE

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Abstract—*Crop plants may not only vary in their tolerance to SO_2 pollution but may also utilize SO_2 as a source of sulphur nutrition. Two experiments were conducted (a) in enclosed tunnels to assess the effect of particulate and gaseous air pollutants on growth and sulfur nutrition of bread and durum wheat, barley and chickpea with four different growth environments created using Charcoal and PM filters and by SO_2 enrichment at 25 µgm^{-3} respectively over ambient for 3 hours daily from about 30 days into growth. in the tunnel and, (b) in plastic enclosures to assess effect of ambient SO_2 (7-25 µg m^{-3},C), ambient + 10 µg SO_2 m^{-3} (LSE) and ambient + 40 µg SO_2 m^{-3} (HSE) on growth and sulphur nutrition of five carrot varieties from 30 days of crop growth. Various physiological and biochemical parameters such as, leaf sulphur, necrotic leaf area, leaf chlorophyll, membrane stability, H_2O_2 production, lipid peroxidation, superoxide radical, antioxidants, ascorbic acid and SOD activity were measured. In experiment (a) SOx enriched environment significantly improved the activity of serine transacetylase (SAT) activity in all experimental crops however, activity of O-acetylserine (thiol) lyase was enhanced chiefly in wheat but not in chickpea and where as in experiment (b), SOx enrichment particularly at HSE, significantly improved the activity of serine transacetylase (SAT) and O-acetylserine (thiol) lyase (OAS-TL) enzymes for different experimental crops. SO_2 enriched environment promotes plant growth and S metabolism in both experiment across crops and that the tolerant crop species are capable of utilizing SO_2 towards the plant S pool. There is a need, however, to determine threshold values for SOx tolerance across crops.*