

vtc 4) involved in maintaining the concentration of ascorbic acid have been isolated⁹. L-ascorbic acid deficient and ozone sensitive mutant vtc 1 (ref. 10) has recently been shown to be defective in the enzyme GDP-D-mannose pyrophosphorylase¹¹. All these evidences are in favour of the pathway proposed by Smirnoff as the sole route of L-ascorbic acid synthesis in higher plants. However, *Arabidopsis* cell suspension cultures have been recently shown to synthesize and accumulate L-ascorbic acid from a number of precursors, viz. L-galactose, L-glucose, galacturonic acid methyl ester, glucuronic acid methyl ester, L-gulonolactone, and D-glucuronolactone¹². Surprisingly, galacturonic acid methyl ester was found to be at least as efficient a substrate as L-galactono-1,4-lactone. Though the results supported L-galactose based synthesis of L-ascorbic acid (Smirnoff pathway), the ability of the plants to efficiently synthesize L-ascorbic acid from L-galacturonic acid methyl ester could not be ruled out. L-gulonolactone has recently been identified in

plant extracts and a NADPH-dependent enzyme catalysing the reduction of D-glucuronolactone, is being characterized¹². Thus plants can synthesize L-ascorbic acid both from L-galactose and galacturonic acid. The unravelling of the ascorbate biosynthesis in higher plants has filled a major gap in plant carbohydrate metabolism, as up to 10% of soluble carbohydrate content of leaves can be L-ascorbate³.

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Rajesh Luthra and Sushil Kumar are in the Central Institute of Medicinal and Aromatic Plants, Lucknow 226 015, India; Pratibha M. Luthra is in the Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi, Delhi 110 007, India.

RESEARCH SNIPPETS

Haze and crop yields

'Case study of the effects of atmospheric aerosols and regional haze on agriculture: An opportunity to enhance crop yields in China through emission controls'

W. L. Chameides *et al.*

Proc. Natl. Acad. Sci. USA, 1999, **96**, 13626–13633

Atmospheric aerosols affect the flux of solar radiation passing through the atmosphere. This study suggests 'that regional haze in China is currently depressing optimal yields of ~ 70% of the

crops by at least 5–30%'. Reducing the severity of regional haze through air pollution control could preferentially result in a significant increase in crop yields and help meet growing food demands in coming decades.

Structure of a polio virus-receptor complex

'Three-dimensional structure of polio virus receptor bound to polio virus'

D. M. Belnap *et al.*

Proc. Natl. Acad. Sci. USA, 2000, **97**, 73–78

'Interaction of the polio virus receptor with polio virus'

Y. He *et al.*

Proc. Natl. Acad. Sci. USA, 2000, **97**, 79–84

Two independent determinations of the structure of the polio virus bound to its cellular receptor (Pvr) have been achieved at 21–22 Å resolution by a combination of cryoelectron microscopy and image reconstruction. The receptor, Pvr (CD 155), is a member of the IgG superfamily and acts as an 'unzipper' that initiates changes in the virion that prime it for uncoating.