

## **The Non-Mevalonate Isoprenoid Biosynthesis of Plants as a Test System for New Herbicides and Drugs against Pathogenic Bacteria and the Malaria Parasite**

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1-Deoxy-D-xylulose 5-Phosphate Pathway, Fosmidomycin, Isopentenyl diphosphate,  
Isoprene, 2-C-Methyl-D-erythritol 4-phosphate

Higher plants and several photosynthetic algae contain the plastidic 1-deoxy-D-xylulose 5-phosphate / 2-C-methyl-D-erythritol 4-phosphate pathway (DOXP/MEP pathway) for isoprenoid biosynthesis. The first four enzymes and their genes are known of this novel pathway. All of the ca. 10 enzymes of this isoprenoid pathway are potential targets for new classes of herbicides. Since the DOXP/MEP pathway also occurs in several pathogenic bacteria, such as *Mycobacterium tuberculosis*, and in the malaria parasite *Plasmodium falciparum*, all inhibitors and potential herbicides of the DOXP/MEP pathway in plants are also potential drugs against pathogenic bacteria and the malaria parasite. Plants with their easily to handle DOXP/MEP-pathway are thus very suitable test-systems also for new drugs against pathogenic bacteria and the malaria parasite as no particular security measures are required. In fact, the antibiotic herbicide fosmidomycin specifically inhibited not only the DOXP reductoisomerase in plants, but also that in bacteria and in the parasite *P. falciparum*, and cures malaria-infected mice. This is the first successful application of a herbicide of the novel isoprenoid pathway as a possible drug against malaria.