# The origin of the tocopherol content of *Arabidopsis thaliana* seeds

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After the discovery of the MEP pathway, people were convinced that plastidic isoprenoids derive exclusively from the MEP pathway and that cytoplasmic and mitochondrial isoprenoids derive exclusively from the MVA pathway. The fact that the MVA pathway products can not recover the mutant phenotype of plants mutated in the MEP pathway and *vice versa* solidified this view. However, radioactive labelled mevalonate was discovered to be incorporated into plastidic isoprenoids, and therefore a possible cross-flow of intermediates of the two isoprenoid pathways was suggested. In seeds of *Arabidopsis thaliana* plants which are mutant in the chlorophyll synthase (*CHLSYN*) or in the phytol kinase (*VTE5*), a reduction of tocopherol levels of 75% - 80% has been shown. These results indicated that 75% - 80% of seed tocopherol levels derive from chlorophyll recycling, and it has been suggested that the rest derives from the direct reduction of MEP pathway derived geranylgeranyl diphosphate (GGPP). It has not yet been demonstrated if the remaining 20% - 25% are deriving from this reduction or if there is a MEP pathway independent production of tocopherols in seeds of *Arabidopsis thaliana*. This master thesis aimed to find genetic evidences to answer the question if a cross-flow of MVA pathway derived isoprenoid precursors happens naturally in *Arabidopsis thaliana*, and to investigate whether or not the mentioned remaining 20% - 25% of seed tocopherols of *chlsyn* or *vte5* plants are deriving from the MEP pathway. Results from analyses of the tocopherol content of single seeds of a plant which was hemizygous mutant in the *HDR* gene indicate that there is no cross-flow happening on a natural basis. This would indicate that the remaining 20% - 25% of tocopherol content in seeds of *chlsyn* and *vte5 Arabidopsis thaliana* plants are indeed deriving from the direct reduction of GGPP by the geranylgeranyl reductase. This result could not be confirmed by analysation of the tocopherol content of 5 mg of homozygous mutant *cmk* seeds and by previously produced single seed data. They indicated that most seed tocopherols derive from a MEP independent source. Results of seeds, downregulated in MVA gene expression are pending.

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