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Anthocyanin production by over-expression of grape transcription factor gene *VlmybA1-2 in* transgenic tobacco and *Arabidopsis*

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An *myb*-related transcription factor gene of the anthocyanin biosynthetic pathway, *VlmybA1-2*, from Kyoho grape (*Vitis labruscana*), was introduced into two anthocyanin producing plants, tobacco and *Arabidopsis* and a non- anthocyanin producing spinach under the control of the Cauliflower Mossaic Virus (CaMV) 35S promoter through *Agrobacterium*-mediated transformation. VlmybA1-2 induced anthocyanin production was prominent in transformed tobacco calli and the regenerated tobacco plants were completely purple. During plant growth in pots, the intensity of purple color was reduced in leaves, whereas flowers showed intense pigmentation. Apparently, except for the color, the transgenic plants were not different from the control plants. Germinating T1 generation was a segregating population of completely dark purple seedlings and green seedlings. Green seedlings could not survive on kanamycin containing medium. Expression of *VlmybA1-2* in purple plants grown on pots was confirmed by RNA gel blot hybridization. Among the *Arabidopsis* T1 transformants, there were two prominent phenotypes: two completely purple seedlings with retarded growth and one with normal growth, and two seedlings with purple-green leaves and purple roots. The latter seemed similar to control plants and produced fertile and viable seeds of two distinguishable colors, purple and brown (similar to the wild type). Purple seeds could germinate on kanamycin- containing medium providing an easy method of transgenic seed identification in *Arabidopsis*. Both infected and wild type spinach cotyledon bases were purple after 3 days of culture, giving no indication for identification. Regenerated putative transgenic spinach plants, similar to wild type in appearance, could survive on kanamycin- containing medium and the presence of *VlmybA1-2* was confirmed by DNA gel blot hybridization. *VlmybA1-2* may not be able to induce structural genes of anthocyanin biosynthesis pathway in non anthocyanin producing spinach. *VlmybA1-2* alone, without the aid of an *myc*-related gene partner, could induce complete pigmentation in tobacco and *Arabidopsis*, indicating its potential over other previously used *myb*- and *myc*-related genes. *VlmybA1-2* shows a potential to be utilized in future work of development of a safe and efficient *in vivo* marker for plant transformation and development of plant cell systems that produce stable anthocyanins for applications as natural food colorants.

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