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Stability of the nutraceutical carotenoid beta-carotene in transgenic soybean seeds over years in storage

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Biofortification of crops holds great promise for human kind in developing nations, especially for subsistence farmers. As vitamin A deficiency is a serious health problem affecting millions of children under the age of five and pregnant woman globally, enhanced content of b-carotene or pro-vitamin A, in crops may help alleviate that aliment. Transgenic soybean (*Glycine max*) plants overexpressing a seed-specific chloroplast targeted phytoene synthase gene from *Pantoea ananatis* accumulated 845 µg carotene g-1 dry seed weight with a 12:1 ratio of b to a. The elevated b-carotene in these transgenic soybeans confer a substantial additive nutritional quality to soybeans with a single gene insertion. In order for these seeds to be successfully implemented to subsistence farmers in developing nations the enhanced b-carotene content would need to be stable for at least 6 months, or even a year, in storage. Carotenoids are known to be unstable as they can be readily oxidized and are light sensitive. Other reports have demonstrated the instability of enhanced b-carotene in monocotyledonous crops. Here we report on the stability of the carotenoid content of the transgenic enhanced b-carotene soybean seeds at various storage conditions for up to four years. The majority of the enhanced b-carotene within the transgenic soybean seeds is stable under ambient storage and temperature conditions for several years.