

Effect of Domestic Processing Methods on All Trans and Cis Isomers of Beta Carotene Retention in Green Leafy Vegetables

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Green leafy vegetables (GLVs) are pigment-rich and nutritionally relevant functional food sources with unique phytochemical constitution that includes carotenoids. Carotenoids and their geometric isomers protect cells from oxidation and cellular damages. Cooking processes that involve factors such as temperature, light and alteration in moisture content generally promote either isomerization (*trans* to *cis* form) or oxidative degradation of carotenoids to epoxides. Studies pertaining to the effect of cooking methods on dietary carotenoids and their geometric isomers are inadequate in Indian foods. The extent of carotenoid isomerization were evaluated in GLVs such as amaranth (*Amaranthus gangeticus*), spinach (*Spinacia oleracea*) and curry leaves (*Murraya koenigii*) subjected to domestic cooking methods of microwave, sautéing, pressure cooking and deep frying in oil for time durations of 8 and 12 minutes, either with and without lid covering. The isomers of carotenoids were quantified by high performance liquid chromatography (HPLC) using vydac column (RP-C-18) with 100% methanol for first 5 minutes and methanol: chloroform (96:4) for the subsequent run as gradient mobile phase. *Trans*'s β -carotene content in amaranth ranged from 5525 to 6375 $\mu\text{g}/100\text{g}$ upon boiling without lid and microwave cooking. *9-cis* isomer of beta carotene is the predominant geometric isomer formed during cooking in all the GLV studied (Amaranth: 423 to 620, Spinach: 377 to 443, Curry leaves: 562 to 687 $\mu\text{g}/100\text{g}$). 13 *cis* isomers also formed in the processed GLV samples (22 to 375 $\mu\text{g}/100\text{g}$). 15 *cis* beta carotene was observed in few food samples during processing and not observed in some of the methods which processed. The retention percentage of all *Trans* and *cis* beta carotene was also studied. These isomers of beta carotenes were also for the precursors of Vitamin A. The changes in the contents of *Trans* and *cis* isomers of carotenes in GLVs in correlation to various cooking methods are discussed which would be valuable for food researchers, nutritionists and health practitioners in promoting nutritionally balanced diets and minimize vitamin A deficiency in Indian context.

Keywords: GLV, Carotenoids, HPLC, Isomers

Biography:

Dr. Sreenivasa Rao Jarapala is an Assistant Director at NIN, ICMR, India. He has completed his masters degree in Biochemistry from Andhra University and (PhD) from Osmania University, Hyderabad. He has published several research papers in reputed journals and he has presented his research findings in several National and International conferences and workshops. He received young scientist award (Sagarmal goenka) in 2012 and best research paper award in nutrition from USA in 2016. Presently he is working on tribal indigenous foods, plant secondary metabolites and heavy metals in Indian foods. His area of interest is carotenoids bio accessibility and bioconversion to vitamin A and nutrient retention in foods. He is a life member of NSI, SBCI, IDA, IIS and several other nutrition relevant research bodies.