Heirloom vegetables in Kyoto, termed *Kyo-yasai*, have had their seeds preserved by traditional cultivation methods. These heirloom vegetables offer a more distinctive flavor than conventional vegetables, and extracts from some *Kyo-yasai* are known to decrease ultraviolet light induced mutations in *Escherichia coli* B/r WP2 (trpE65) significantly more than extracts from their counterpart of conventional vegetables. 4-Methylthio-3-butenyl isothiocyanate which causes the pungency in daikon (*Raphanus sativus*), and 3-methylthiopropionic acid ethyl ester, which causes melon-like odor, were identified from heirloom vegetables in Kyoto to be antimutagens in *Escherichia coli* mutagenicity assays. These two chemicals also demonstrated *in vivo* animal cancer prevention, and induced differentiation, a chemotherapeutic strategy, in *in vitro* human colon-cancer cell system. The heirloom daikon varieties in Kyoto produced 2.0-11.5 times higher levels of 4-methylthio-3-butenyl isothiocyanate which causes the pungency in daikon (*Raphanus sativus*), and 3-methylthiopropionic acid ethyl ester, which causes melon-like odor, were identified from heirloom vegetables in Kyoto to be antimutagens in *Escherichia coli* mutagenicity assays. These two chemicals also demonstrated *in vivo* animal cancer prevention, and induced differentiation, a chemotherapeutic strategy, in *in vitro* human colon-cancer cell system. The heirloom daikon varieties in Kyoto produced 2.0-11.5 times higher levels of 4-methylthio-3-butenyl isothiocyanate as compared to the conventional Aokubi variety, because the conventional variety is grown for consumer preferences of milder flavor, which is corresponding to both quantity of 4-methylthio-3-butenyl isothiocyanate and quality associated with its antimutagenicity. The heirloom pickling melon in Kyoto, Katsura-uri (*Cucumis melo* var. *conomon*) began to produce 3-methylthiopropionic acid ethyl ester between the midripening to fully ripening stage of fruit development. Shiro-uri, a conventional variety for Katsura-uri, did not contain 3-methylthiopropionic acid ethyl ester. Results also indicate that antimutagenic and anticarcinogenic properties change over the ripening stage quantitatively. In this review, we discuss the value of retaining the original phenotypes of vegetables, including the flavors, to maximize the anticarcinogenic properties of these food products.
Antimutagenic properties of bell and black peppers. Food Chem. Toxicol. 41: 41-47. Fedeli D, Berrettini M, Gabryelak T & Falcioni G. 2004. The effect of some tannins on trout erythrocytes exposed to oxidative stress. Mutat. Res. 2015. Assessment of the Genotoxic and Antioxidant Activities of Several Vegetables, Spices and Herbs in Combination with Cyclophosphamide and 4-Nitroquinoline n-Oxide in Drosophila Melanogaster. Adv. Tech. Biol. Med. S1: 002. doi: 10.4172/2379-1764.S1-002. Stamenković-Radak M, Savić T, Vićentić M & Andjelković M. 2005. Kyōyasai is the term for heirloom vegetables originating in Japan’s Kyoto Prefecture. According to research of the Laboratory of Health and Environment of Kyoto, Kyoyasai have more minerals, fibers and vitamins than many other vegetables. According to research, Kyoyasai have more nutrients that repair DNA than other vegetables. Kyoyasai are relatively expensive. Japanese consumers consider many Kyoyasai strange, because of their appearance. The antimutagenic and anticarcinogenic activities of green tea are extensively examined. The chemical components of green and black tea are polyphenols, which include EC, ECG, EGC, EGCG and TFs. This article reviews the epidemiological and experimental studies on the antimutagenicity and anticarcinogenicity of tea extracts and tea polyphenols. The anticarcinogenic activity of tea phenols has been shown in experimental animals such as rats and mice, in transplantable tumors, carcinogen-induced tumors in digestive organs, mammary glands, hepatocarcinomas, lung cancers, skin tumors, leukemia, tumor promotion and metastasis.