

abstract

In the present study, eight cultivars of ripe mango fruits viz., *Alphonso*, *Banginapalli*, *Neelam*, *Raspuri*, *Rumani*, *Sindhura Totapuri* and *Mulgoa* grown in Andhra Pradesh, South India, were procured from the local market, Tirupati. Fresh edible portion of the fruits was used for the study. Mango (*Mangifera indica* L.) juice and wine samples were irradiated at a doses of 0, 0.5, 1.0 and 3.0 kGy and physico-chemical properties, microbial load (bacteria, yeast and mold), total polyphenols, flavonoids, ascorbic acid contents, antioxidant activities, colour, aroma volatiles and sensory properties were evaluated. Variability was observed in different physico-chemical properties of mango juice and wine at different dose levels. The colour of mango juice and wine was improved in the irradiated samples, which is essential for maintaining the quality during storage. Microbiological assay of the mango juice and wine showed better quality after γ -irradiation. A significant ($P \leq 0.05$) reduction in ascorbic acid was observed in all the irradiated mango juice samples, however, dehydroascorbic acid was stable with increase in irradiation dose. The total polyphenols and flavonoids were significantly ($P \leq 0.05$) increased in all irradiated samples leading to increased free-radical scavenging activities (DPPH, FRAP, NO, ABTS and DMPD) in all cultivars of mango juice and wine samples. Mango juice and wine were found to be rich source of antioxidants and possessed strong *in vitro* radioprotective activity. γ -Irradiation appeared to be a suitable method for improving some defects and producing higher taste quality in mango wine, without the presence of irradiation residues. It revealed that γ -irradiation could be an effective method for improving the aroma volatiles and for enhancing sensory attributes of all cultivars of mango juice and wine samples.

The present study also revealed noticeable improvements of several hepatic and kidney parameters by following non-irradiated and γ -irradiated mango juice (GMJ) and mango wine (GMW) consumption in contrast with the rats with similar ethanol intake. Gamma irradiated mango products can be considered safe as they did not cause any lethality or adverse changes in the general behavior, and also no detrimental effects caused by these irradiated beverages in biochemical and histopathological changes in rat model could be observed. This shows the non toxic nature of the GMJ and GMW. Thus these may be safely administered for further *in vivo* studies to evaluate their antioxidant activities in humans.