

A natural colourant cum nutraceuticals-supplement derived from *karonda*

The old adage 'first to feast is the eyes' underlines the importance of colours in our life. People's perception towards food items is generally influenced by their appearance. Colour is an important component of appearance, which govern the quality of foods. Colour of a food or beverage play a profound role in flavour perception. One way of colouring food through natural means is addition of a strongly coloured food to the intended food item, which is to be coloured. This is a common approach practiced in home-cooking. However, for industrial food production such approach may not be desirable due to issues like low concentration of pigments in most foods (which leads to addition of a large amount of pigmented food items to get the desired shade), unwanted flavour and insoluble matter (e.g., peel and seeds). Therefore, pigments are extracted to overcome such potential glitches. The naturally extracted pigments/colours are perceived by the consumer as safe to consume than the synthetic colours. Further, an added advantage of using such colours derived from natural sources is that they are bioactive.

Karonda or Cranberry Bengal currant (*Carissa carandus* L.), a hardy, evergreen, spiny and indigenous shrub widely grown in India, is mostly used as a bio-fence. To some extent, it is also used as a condiment or additive to Indian pickles and spices. It has been reported to have antioxidant, antirheumatic, antibacterial and anticonvulsant activities. The health benefits of fruits are attributed mainly to the presence of some phytochemicals, which are referred as antioxidants. Despite, its multiple usefulness, it remained an underexploited fruit, probably, due to its small berry size and sour taste. However keeping in view the rising awareness among the consumers for health foods, alternative form of utilization may be devised to encourage its increased consumption by the general public. *Karonda* genotype, CIAH Selection-1, which turns dark red upon maturity; could be a likely candidate as a source of natural food colourant and antioxidants for its potential domestic and industrial application.

A natural 'food colourant cum nutraceuticals-supplement' was prepared from the ripe *karonda* fruits. For colour extraction, after washing and cleaning ripe fruits were cut into halves. Seeds were removed before subjecting fruits to dehydration at 55 °C. The dehydrated fruits were later grounded into powder with an electric mill with 0.5mm sieve. Powdered fruit pulp was cold extracted thrice with ethanol and supernatant were pooled together, filtered through 2.5µ filter and later air dried at 45 °C. The dried concentrated 'colour pigments' which predominantly contained anthocyanin and phenolics were then dissolved in water to get ready-to-use 'food colourant cum nutraceuticals-supplement'. Benzoic acid @ 600ppm was added to enhance the shelf life of the product. The formulation had been christened as 'Lalima'.

To make it user-friendly, the formulation was packed in 10 ml plastic dropping bottles. This packed bottle had pigments extracted from the 10g dried fruits. 01 ml of this pigment suspension formulation is sufficient to give pleasing red colour to one serving (100 ml) of any colourless beverage such as lemon based beverages. One serve of such supplemented beverage may additionally contain 469.2 µg anthocyanin (cyaniding-3-glucoside equivalent), 14.1 mg phenol (gallic acid equivalent), 12.7 mg flavonoids (rutin trihydrate equivalent), with total antioxidant activities (CUPRAC) to be 390 µM Trolox Equivalent. Lemon sherbet supplemented with 'Lalima' was found to be more acceptable in terms of flavour and appearance among the testers than the plain lemon *sherbet*. The development of technology for value addition of the food items through alternative uses of *karonda* would help regulate the availability of such antioxidant rich sources for nutritional security.



Figure 1. Lemon *sherbet* fortified with 'Lalima', a 'natural colourant cum nutraceuticals-supplement' derived from *karonda* genotype CIAH Selection-1.

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