खाद्य विज्ञान एवं प्रौद्योगिकी विभाग

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डॉ. नीलम उपाध्याय

वैज्ञानिक (वरिष्ठ वेतनमान)

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Letter of Justification

The juice expelled from carrot, a globally produced root vegetable, leaves behind carrot pomace (a bio- and horticultural waste) which is potentially rich source of micro-nutrients and carotenoids. However, it is discarded as waste or used as animal feed. It holds potential to be channelized to food chain by a couple of technological interventions. These bio-wastes contain appreciable amounts of neutraceuticals. These are once extracted and made into suitable delivery system; it can find various applications in food, pharmaceuticals and cosmetics. In this regard, carotenoids were extracted from carrot discards to further utilize them for such applications.

Primarily in the first phase, flaxseed oil was used to extract the oil-soluble carotenoids (Tiwari et al., 2019) thereby oil rich in 'green' carotenoids was aimed at preparing stable emulsion based delivery system. The oil rich in carotenoids was converted to emulsion based delivery system using natural emulsifiers (Tiwari et al., 2021), in the second phase. The resultant emulsion can potentially be used as a source of both carotenoids and omega-3 fatty acid of flaxseed oil origin. Hence, further in the third phase, this emulsion was converted into freeze-dried powder, and applied as natural functional colorant in the preparation of flavored milk (Tiwari et al., 2022). The powder form as delivery system used in this study to develop flavored milk (type of water based food) can help to protect the carotenoids against degradation while at the same time it may also improve its bioavailability. The final carotenoid rich powder can be further applied to various other food commodities. Also, it can be taken as a source of supplement for β-carotene and omega-3 fatty acid. It can also be used as an ingredient in pharmaceutical and even in cosmeceutical applications. Apart from this, the originally extracted carotenoid rich oil extract can be used directly in oil based foods such as mayonnaise, table spreads, ice-creams, frozen desserts etc.

The study concludes that carotenoids can be very effectively extracted from natural bio-waste using green bio-refinery concept for an array of water based and oil based food applications.

References:

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