Current scenario and prospects of Roselle seed as functional food

Ghazala Riaz

University of Delhi, India

Abstract

Functional food is becoming a part of an average consumer's diet. The key reason for this is the growing awareness of the consumer towards health and nutritional benefits of food for diseases prevention and health improvement. This, in turn has intensified the interest of the researchers in identifying new cheaper sources especially of plant origin that could serve as functional food. Globally, Roselle (Hibiscus sabdariffa L.) plant is gathering attention due to the inherent therapeutic properties in different parts of the plant that is calyces, leaves and the seeds. Roselle plant is basically grown for its fibber's and calvces and the latter is used for making herbal tea, beverages, jam, jelly and natural colouring material. Roselle seeds are usually described as a by-product and have little food or industrial uses although they have the potential to be used as functional food or functional food ingredients. The present study focuses on the traditional uses, nutritional composition, anti-nutritional factor, antioxidant activity and the studies validating therapeutic uses of Roselle seed so as to explore their potential uses as a functional food. The electronic database using PubMed, Scopus and using the keywords Hibiscus sabdariffa seed oil and protein, chemical composition of Roselle seed, anti-inflammatory antimicrobial, antioxidant, and toxicity. After scrutinizing the information from the collected literature, it was included in the study. The utility of Roselle seeds has been hardly ever studied as compared to the calyces and despite the seed being the good source of protein, fibre, oil and other health-promoting components like vitamins, minerals, amino acids and unsaturated fatty acids, there is a dearth of information about the Roselle seeds. Hence more studies should be conducted to provide the insight to exploit the Roselle seeds as functional ingredients and validation of their traditional therapeutic uses. Background and Objective: Searching non-traditional sources of edible oil is crucial in Egypt. Roselle (Hibiscus_sabdariffa L.) is a vital medicinal plant in Egypt, where all its parts are utilized except the seeds that are completely discarded. The aim of the present research was to study the possibility of consuming Roselle seed oil (RSO) as edible oil. Materials and Methods: The composition of RSO from fatty acids, total phenolic, flavonoids and tocochromanols was

assessed. In vitro antioxidant and ABTS scavenging activity and the oxidative stability of RSO were evaluated. Oral acute lethal toxicity test of RSO was studied in mice to assess its safety. Two experiments were carried out on rats, in the first experiment two balanced diets were fed to two groups of rats one contained 10% RSO while the other contained the same percentage of sunflower oil as reference oil for 4 weeks. At the end of the experiment, plasma lipid profile, malondialdehyde (MDA) and liver and kidney functions were assessed. In the second experiment, dyslipidaemia was induced in rats then rats were fed either 10% RSO or 10% sunflower oil diet. At the end of the second experiment plasma_glucose, lipid_profile, interleukin 6 and MDA were assessed. Data were statistically analysed using one-way analysis of variance ANOVA followed by Duncan's test. Results: The RSO showed to possess high safety and in_vitro antioxidant_activity. Major fatty_acids were linoleic, oleic and palmitic. Total tocopherols and tocotrienols were 96.2 and 3.48 mg/100 g oil, respectively. Total phenolic and flavonoids contents were 56.31mg GAE and 4.99 mg catching g^{-1} oil, respectively. Induction period of oxidative stability of RSO was 24.88 h. All assessed parameters of first rats experiment showed insignificant changes when rats fed on RSO diet was compared to those fed on sunflower oil diet. In the second experiment, significant improvements in all parameters were noticed when dyslipidaemia rats were fed on either RSO or sunflower diet with superiority to RSO concerning MDA and interleukin.

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