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Utilization of *Moringa oleifera* leaves powder as a functional food ingredient in traditional food product

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■ **Abstract :** *Moringa oleifera* is a multipurpose and nutritious vegetable tree with a variety of potential uses and its leaf is most nutritious. Dehydration is carried out by three methods *i.e.* tray drying, sun drying shade drying. Drying of *Moringa* leaf powder not only increases the micronutrients but also increases the shelf life of its powder. The nutritional potential and antioxidant component present in *Moringa* make it suitable for preparation of various traditional products. So Moringa powder is fortified as functional food ingredient inparatha. The main ingredients in *Paratha* are wheat flour and refined wheat flour is deficient in protein, vitamins and minerals. Use of *Moringa* leaves powder in *paratha* not only increases the nutritional value but also help to resolve problem of malnutrition. It has many health benefits like antioxidant, it prevent skin diseases, diabetes, cancer, cold and flu, proper digestion, anti-tumour, anti-inflammatory, cholesterol lowering,anti-bacterial and anti-fungal properties etc. The objectives of this review to study the nutritional or proximate composition of *Moringa paratha* and evaluate its acceptability through sensory evaluation tests.

■ **Key words :** *Moringa oleifera* leaves, Health benefits, *Paratha*

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Moringa oleifera is a multipurpose and exceptionally nutritious vegetable tree with a variety of potential uses. In different regions it is known by the different names such as Horseradish tree, Benzeolive tree, Mulangay, Drumstick tree, Marango. It belongs to the family *Moringaceae* of single genus family with 13 known species (Khawji *et al*., 2010). These species are originated in India and Africa, are now grown around the world. Major production include Ghana, Senegal and Malawi, smaller production are in Newzeland and Fiji and more recent production in Nicaragua and Bolivia (Singh *et al.*, 2013; Kumar and Sathees Kumar, 2013). *Moringa oleifera* is a small native tree of the sub-Himalaya regions of North West India, which is now indegnious to many regions in Africa, Arabia, and South America. *Moringa oleifera* is grown in any tropical and subtropical regions of the world with the temperature around 25-35^0 C. It requires sandy and loamy leaves soil with a slightly acidic to slightly alkaline pH and net rainfall of 250-3000mm (Adejumo and Abayomi *et al*., 2012). Traditionally, besides being a daily used vegetable among people of these regions, the *Moringa oleifera* is also widely used species known and used for its name as "miracle tree".

As compared to other vegetables *Moringa oleifer*a leaves is most nutritious and it is available throughout the year. Even a common man can purchase and consume these leaves by cooking fresh leaves or in dry

powdered form. It has very high nutritional properties that would be useful as a food supplement, especially in those regulated communities.Besides *Moringa* being processed into medicine as it contains acetone which can be prepared into herbal formulation which is effective anti -malaria agent (Patil *et al*., 2010).

The leaves possess remarkable nutritional and medicinal qualities (Singh and Singh, 2011).The health benefitscontains high amount of vitamin-c which fights a host of illnesses including colds and flu, vitamin-A, which act as a shield against eye diseases, skin diseases, heart ailments,diarrohea, Calcium which builds a strong bones and teeth and helps to prevent osteoporosis. Potassium which is essential for the functioning of brain and nerves and proteins, the building blocks of proteins. These leaves could be of great boon to people who do not get protein from meat (Manzoor *et al.*,2007).

Fig. 1 : ***Moringa oleifera*** **leaves**

Moringa oleifera are considered as a rich source of phytochemicals (carotenoids, phenolic compound, and vitamin-c) and it act as a good source of natural antioxidants (Agamou *et al*., 2015). *Moringa* leaves are increasingly being used to resolve malnutrition problem in developing countries (Joshi and Mehta, 2010). Dehydrated *Moringa oleifera* leaves powder are rich source of micro nutrients than fresh leaves (Manzoor *et al*., 2007). *Moringa* leaf powder are rich source of iron and used as substitute for iron tablets, Hence it is used in treatment of anemia. *Moringa* leaf is most nutritious and drying of *Moringa oleifera* leaves powder not only increases the micronutrients but also it increases shelf life of its powder. Here in this review we have dehydrated the *Moringa oleifera* leaves by using three different methods sun drying, shade drying and tray drying by using three different treatments. The nutritional and antioxidant components present in the *Moringa* make it suitable for preparation of various nutritional traditional food products like *Paratha*, bakery products, snacks, sauce and soups to increase the nutritional value of these products due to rich source of vitamins, minerals, proteins; so it is mostly used to resolve the problem of malnutrition (Joshi *et al*., 2010).

The nutritional composition of *Moringa* is that it contains many essential nutrients for instance, vitamins, mineral, amino acids, β-carotene, antioxidants, anti-inflammatory nutrients, omega 3 and 6 fatty acids (Fahey, 2005; Hsu *et.al*., 2006; Kasolo *et al*., 2010). Due to rich source of nutrients it is considered as "mother's best friend". It is believed that *Moringa* leaves consist of high source of vitamin C, calcium, beta-carotene as well as protein. It works as an effective source of antioxidants (Dillard and German, 2000; Siddhuraju and Becker, 2003). Its leaves contain 4 times vitamin c found in orange, 10 times vitamin A in Carrot, 17 times more Calcium than milk, 9 times more protein in yogurt, 15 times more Potassium in Banana, 25 times more iron in Spinach (Rockwood *et al*., 2013).

Busani *et al*. (2011) studied that the plant leaves are rich source of nutrients and it is potentially used as food additive with multiple purposes. High nutritional content found in the dried leaves are important nutritionalindicators of the usefulness of plant as a likely feed resource. Dried leaves assists to concentrate the nutrients, facilitate conservation and consumption, as such, it can be used during the time when feed is scarce or can be transported to area where it is not cultivated and suggested that *Moringa* should be consumed in powder form. *Moringa* has been reported to possess some medicinal and herbal properties.

Fatima *et al*. (2013) studied that *Moringa* is an excellent multiuse plant used to improve the health and nutrition of communities and appear to be a most promising candidate from which specific nutraceutical bioactive products could developed. Fuglie (2001) described *Moringa* as an extremely valuable food source because of its high nutrient profile. Kolawole *et al*. (2013) studied to identify the potential of *Moringa* in production of cake and this will increase nutritional status of consumer, especially children and teenagers that are the major consumers of cake.

So, present dietary scenario necessities exploring the possibility of incorporation novel functional food ingredient in commonly consumed foods rather than in developing new food product. Hence, in this study we have dehydrated *Moringa oleifera* leaves in the form of powder for the purpose of value addition of existing product *i.e. Paratha*,

to reduce wheat flour usage and people become more health conscious regarding their food etc.

Conclusion:

Moringa oleifera leaf is a most nutritious and drying of *Moringa oleifera* leaves powder not only increases the micronutrients but also increases the shelf life of its powder. The nutritional potential and antioxidant components present in *Moringa* leaves makes it suitable for the preparation of various nutritional traditional products like *paratha*, and refined wheat flour and leaves powder not only increases nutritional value the high protein content present in *Moringa* preparation of *paratha* is deficient in protein vitamin, minerals. Use of this *Moringa oleifera l*eaves helps to resolve the problem of malnutrition in developing countries. And presence of various types of antioxidant compounds make this tree leaves a valuable source of natural antioxidant and a good source of nutraceutical and functional components as well.

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