

Role of underutilized crops for combating iron deficiency in Indian population

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Iron is an important micronutrient essential for production of red blood cells (RBCs). It is a vital component of haemoglobin that carries oxygen from the lungs to all parts of the body. Iron has an imperative role to play in the human body. It enables physical and mental growth and production of enzymes during recovery from illness or after strenuous exercise. A number of complications occur due to insufficient iron in the body. For example, iron deficiency during childhood and pregnancy adversely affects overall development, both physical and mental. It also leads to iron deficiency anaemia, a nutritional disorder, characterized by lack of haemoglobin in the blood.

In developing countries like India, the cause of iron deficiency anaemia is low bioavailability of iron in the diet. For instance, presence of vitamin C in the meal enhances the availability of iron to be absorbed by the body. The recommended dietary allowance (RDA) of iron for Indian¹ females is 35 mg (pregnant), 25 mg (lactating) and 21 mg (normal) compared to 17 mg for men. In case of infants, iron requirement is 46 µg/kg/day for 0–6 months and 5 mg for 6–12 months irrespective of body weight. Similarly, children aged between 7 and 9 years should have 16 mg of iron in their diet. Iron requirement in adolescents (13–15 years) is 32 mg (boys) and 27 mg (girls). But the human body is unable to absorb iron from all the food sources.

Nutritional anaemia is a worldwide public health concern putting pregnant women, infants, children and adolescents at risk. Anaemia in children increases morbidity from infectious diseases and may lead to impairment of various functions. Prevalence of anaemia varies in the Indian states. The National Family Health Survey (NFHS) 3 conducted in 2005–2006 by the International Institute for Population Sciences, Mumbai indicates high prevalence of anaemia among children throughout India. Available data report high prevalence of anaemia in non-pregnant and pregnant women as well. Men are also likely to be afflicted by anaemia.

The data on anaemia have correlation with the diet intake. Along the eastern coast of the country extending up to northern states like Bihar, Jharkhand and states in the Northeast, for example, rice is the main cereal. It is in these states that more than 60% women are anaemic. The relative percentage of iron available in rice is 0.8 mg/100 g. It may be one of the reasons, but does not hold true for other major rice-growing states like Haryana, Punjab and Uttar Pradesh. People in this region consume more wheat than rice. Wheat contains 6.26 mg/100 g

Table 1. Iron-rich underutilized crops and their relative contribution of iron to the recommended dietary allowance (RDA)

Crop	Iron (mg/100 g)	RDA (%)
Pseudo cereals		
Grain amaranth	7.6	40.5
Chenopodium	4.6	24.5
Jop's tear	5.0	26.7
Minor millets		
Finger millet	3.9	20.8
Foxtail millet	2.8	14.9
Little millet	9.3	49.6
Barnyard millet	15.2	81.1
Vegetables		
Kankoda	5	26.7
Antriplex	2.4	12.8
Minor pulses		
Rice bean	7.4–8.3	39.5–44.3
Faba bean	1.5	8.0
Adzuki bean	9.8	52.3
Winged bean	13.4	71.7
Sword bean	3.6	19.3
Hyacinth bean	11.7	62.6
Horse gram	7.0	37.3
Velvet bean	7.4	39.5
Fruits		
Chironji	8.5	45.3
Kerda	2.0	10.7
Phalsa	3.1	16.5
Pilu	8.0	42.7
Jambul	1.2–1.6	6.4–8.6
Jhar beri	7.0	37.3

Source: Refs 2 and 3.

of iron, which means intake of 100 g of wheat provides 48% of the recommended dietary allowance.

In order to address this problem, food fortification should be emphasized. There is a need to include iron-rich cereals and vegetables in iron-deficit diet. Recently, the worldwide focus has shifted to identifying underutilized crops or lesser known species in terms of trade and research. These crops are not widely cultivated and remain geographic specific. Moreover, these crops have high nutritional value. Secondly, the problem of over-exploitation of natural resources, extreme weather conditions and lack of economics in the rural areas could be addressed by promoting cultivation of these crops to attain sustainability and to combat micronutrient deficiencies. For this reason it has drawn the attention of researchers, farmers and consumers in the developing countries for both their nutritional and market value.

It is evident from the nutritional values (Table 1) that underutilized crops have high iron content. The government should create public awareness on the importance of these crops. Food prepared from underutilized crops should be incorporated in the meal campaign run by the government. All these measures may help in reducing micronutrient deficiencies in the country.

1. A Report of the Expert Group of the Indian Council of Medical Research, National Institute of Nutrition, India, 2009, pp. 1–334.
2. USDA nutritional database; <http://www.nal.usda.gov/fnic/foodcomp/search>
3. Pareek, O. P. and Nath, V., Coordinated fruit research in India Arid Zone-A two decade profile, National Research Centre for Arid Horticulture, Bikaner, 1996, pp. 1–104.

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