Kuttu (Buckwheat): A Promising Staple Food Grain for Our Diet

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Abstract: Buckwheat is a multifarious pseudocereal with high nutritional benefits including absence of gluten, richness in water soluble fibres, presence of high quality proteins, unsaturated fatty acids and appreciable mineral and vitamin content. Buckwheat has excellent amino acid composition that is complementary to cereal grains. It is very high in lysine, having nearly twice the amount found in wheat and rice. Buckwheat seeds contain various phenols, bioflavonoids including rutin and sugar cyclitols, flavonoids which act as anti-inflammatory, anti-allergic, provide protect against cardiovascular disease and treat Diabetes mellitus. Buckwheat can thus prove to be a promising grain and an important introduction in the future food basket in context of its high nutritional value.

Keywords: kuttu, pseudocereal, buckwheat, staple food.

In most northern and western states of India, the buckwheat flour is known as *kuttu ka atta* and is consumed on fasting days, especially during Navaratri (religious days according to Hindu religion). Buckwheat is an important pseudocereal with excellent nutritional profile, high in lysine, mineral content, vitamins, bioflavonoid rutin, and quercetin (Rana, 2004). Buckwheat proteins show a strong supplemental feature with other proteins to improve the dietary amino acid balance especially in biological activities of cholesterol lowering property and antihypertension effects.

The most attractive ones among these compounds are flavones, flavonoids, phytosterols, D-chiro-inositol and myo-inositol. Buckwehat is also emerging as a healthy substitute to gluten containing grains in a gluten free diet as buckwheat seeds are naturally gluten free (Mann et al., 2012; Huang et al., 2014). The main constituent of the developing seeds of buckwheat are galactosides of D-chiro-inositol, fagopyritols, used in the treatment of blood-sugar levels regulation. Fagopyritols are useful in regulating the non-insulin dependent diabetes mellitus and their derivatives are used in the treatment of Polycystic ovary syndrome (Obendorf et al., 2012).

The most active compound in buckwheat leaves is a flavonoid rutin, which shows a wide range of employment in medicines by enhancing the anti-inflammatory and anti-microbial activities. Rutin preserves the insulin signaling and regulates the disorders related to glucose and lipids levels. Interestingly, studies have revealed role of flavonoids as UV- B absorbants where rutin, quercetin and quercitrin act as UV-B absorbing compounds and protect the cells by preventing UV radiation from reaching and damaging the vital molecules, such as nucleic acids, and especially DNA (Hader et al., 1998, Bjorn, 1999, Germ et al., 2002).

The diterpenes exhibit vaso-relaxant action and hamper the contractility of the muscles and show therapeutic use in cardiovascular diseases. The glycosides and alkaloids present in kuttu seeds are used as anti-microbial agents and the former in treatment of cancerous cells. Hence, buckwheat is very crucial in treating many chronic diseases due to its chemical composition, rare components as well as their functional effects.

An attempt was made to unravel the untapped information on the nutritional composition of buckwheat growing in different agro-climatic conditions and facilitate its introduction in the future food basket. Buckwheat seeds were sown in the month of September 2015 and flowering was observed in end of December 2015 (Fig. 1). The preliminary screening studies of bioactive components performed with the mature seeds of this plant showed the presence of alkaloids, glycosides, coumarins, diterpenes and flavonoids. These secondary metabolites have been reported to be of high medicinal and functional value.

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Figure 1. Buckwheat seeds and plants growing in Deshbandhu college garden.

With respect to the cultivation of buckwheat, the plant often experiences root rot disease caused by the fungal growth of *Rhizoctonia solani*. This affects the crop yield with poor economic returns. It is suggested that instead of using chemical based pesticides to suppress this fungal growth, environmental friendly alternative should be explored. Therefore, the use of weed based botanicals is proposed to be a promising initiative to suppress the fungal growth and enhance crop yield.

The project also carried out molecular characterization of the gene *Fagopyritol synthase* which synthesises a sugar cyclitol called fagopyritol. This was done using *in silico* approach that exhibited the variations within *fagopyritol synthase* isomers and highlighted the importance of proper characterization of the enzyme for utilizing better synthesis and production of fagopyritols. The latter possess high medicinal value.

Ongoing studies have revealed high dietary value of Buckwehat flour along with intensive market prospects. These prospects, if actually realized, are more than that of the present day cereal grains. Therefore, enhanced utilization and promotion of this nutrient rich grain in the mainstream, as a staple crop, could be an important and profitable initiative. The crop is already gaining interest in the world market as a health food. This would certainly lead to better food security by reducing our dependency on major crops for food and non-food uses. It will also diversify income generating opportunities for small and medium-scale farmers and consequently can prove as a promising pseudocereal in context of its high nutritional value and can therefore help feed the starving world.

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