Ragi - The nutrimillet in coconut gardens

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The local millets are going global as United Nations (UN) declared 2023 as International Year of Millets. The UN resolution put forward by India will increase the awareness on the cultural and historical positioning, nutritional benefits, hardy nature to thrive climate change and could add these small crops in the bigger value chain, including export. The gain from opportunities thus created, have to reach the small and marginal farmers who are toiling and nurturing genetic diversity of millet crops.

Millets are the small seeded grasses belonging to the family, Poaceae/Graminae. There are two major millets (sorghum and bajra) and six minor millets (finger millet, foxtail millet, little millet, proso millet, kodo millet and barnyard millet). Recently few more minor millets have been added to this group viz., tef, fonio, quinoa and brown top millet (IIMR, 2020). Among them, jowar (sorghum), bajra (pearl millet) and ragi (finger millet) are the major millets currently growing in India. Due to the richness in nutrient content, millets are commonly known as 'nutri-cereals or nutri-millets'. Finger millet or ragi was one of the major diet component in southern states, which were later replaced by rice. Of late, there is a revival in the consumption and cultivation. Major millets familiar to Kerala are Pearl millet (Bajra/ Kambam), finger millet (Ragi/ Muththaari/ Panjappullu), little millet (Chama), foxtail millet (thina), barnyard millet (kuthira valley), kodo millet (varagu) and proso millet (panivarku). They are hardy and withstand adverse climatic condition, with short duration of the crop in general (3.5 to 4 months).

Ragi or Finger Millet- small grain for rich diet

Ragi *(Eleusine coracana)* is a cereal crop cultivated and consumed in several countries like India, Srilanka and East Africa. The history of common man's food and diet is incomplete without millets. Mentions of millets are there in Korean Peninsula (3500-2000 BC) and in India, Yajurveda mentions priyangava (foxtail millet), aanava (barnyard millet) and syamaka (black finger millet) pointing to the historical connections

with culture. Food was mainly locally produced and consumed wholesome in earlier periods of civilizations, but gradually has undergone rapid and drastic changes in eating habits, food forms, diet components, fast and packed foods etc. Ragi or fingermillet is also valued for its properties and high nutrient contents as published by several researchers globally.

Ragi is known for its excellent storage properties and the character of improving the quality on storage. It is said that finger millet or ragi could be stored up to 50 years, hence it is highly valued during famine situations. Millets are tough crops, environment friendly in terms of resource use, sustainable, rich nutrition cheap and offers food security. Ragi is rich in Calcium and 100 g ragi contains 344mg calcium, critical for bones and teeth, and boon for people allergic to diary products. Finger millet is a very popular weaning food to infants showing its easily digestible nature. Ragi varieties are available in various colours- yellow, white, red, brown, tan, but mostly red coloured is preferred.

Ragi is a rich source of starch (59.5-61.2%), pendosans (6.2 -7.2%), cellulose (1.4 -1.8%) and lignins (0.04-0.6%), phosphorus (283mg), iron (3.9mg), trace elements and vitamins. Dietary fibre content is much higher (11.5%) than in commonly used cereals. Supplementing finger millet diets with greens and pulses improve nutrition levels, protein digestibility and nitrogen retention in children. Finger millet also have health benefits due to its antioxidant properties and is beneficial in lowering glucose and cholesterol. Millets have wound healing property, nephro protective and anti cataractogenesis properties and improves heomoglobin status. Fermented ragi drinks are also used as natural probiotic treatment for diarrhea.

Palakkad and Malappuram are the leading districts in Kerala in millet cultivation. Only ragi is cultivated in Kerala. Cultivation of ragi in the interspaces of coconut was successfully demonstrated and practiced under the Farmer FIRST Program (FFP) of ICAR-CPCRI, Regional Station Kayamakulam which resulted in good yield and profit. This farmer participatory effort in 80 acres of 19 wards of Pathiyoor panchayath (FFP location), Alappuzha district, proved the success and scope of millet cultivation in sandy loam soils.

Intercrop in coconut gardens

Finger millets can be cultivated during June - September or as summer crop utilizing residual moistre from December- January to March -April. 2 kg seed is required per acre and slightly less if transplanted. At Pathiyoor, the sowing season was found to be best during December. Initially direct sowing and transplanting methods were demonstrated. Transplanting of seedlings was found to be superior than direct sowing of finger millet seeds. Transplanted crops do not lodge in windy or rainy days. For nursery preparation for planting in one acre area, 200 square meter nursery plot is required. Ants were the major problem and seeds were completely damaged in some plots. The nursery area should be tilled finely and mixed with 100 kg organic manures and beds may be well prepared. Seeds sown need to be covered with thin layer of soil and three week old seedlings can be transplanted to the main fields. Seedlings may be

planted with spacing of 25 cm between lines and 15 cm between plants. The recommended nutrition for one acre is 2 tonne organic manure, 20 kg urea, 45 kg rajphos and 15 kg muriate of potash as basal dose and after 21 days 20 kg urea need to be given as top dressing. Nutrients may be applied based on soil test results for judicious application. Timely weeding and irrigation on the day of transplanting and on weekly basis ensures good growth and high yield.

Cultivation of Ragi in coconut gardens at Pathiyoor, Kayamkulam

Harvesting can be done when the panicles turn brownish, either earheads alone or the plant can be cut from the base. The harvested millet plants/ earheads should be heaped and covered with the straw or jute bags and then dried in sun for 2 to 3 days and threshed. The produce is cleaned, winnowed and packed for sale or for the use of the farm family. At pathiyoor 300-400 kg were realized in well managed plots and 100-250 kg under average management as intercrop in coconut gardens.

Drying Ragi

Potential for coconut - millet products

Millet and coconut are combination crops in coconut based cropping system and also a good diet combination providing health and immunity. Presently millets are marketed mainly as grains after threshing and drying. Since it is grown as an inter crop in coconut garden, both coconut and millets can be used for preparation of diversified value added products. Millets are rich in minerals especially calcium, iron and zinc which are recorded

to be very less in coconut meat. On the other hand, coconut is blessed with the goodness of healthy fat, dietary fibre, vitamins and amino acids. Fibre content in millets generally ranges from 2 to 10 percent. Healthy fat present in coconut especially lauric acid can aid in boosting immunity. Though coconut kernel or meat has 9-10 percent dietary fibre, quantity of consumption of coconut would be less. In this case, combining coconut and millet would definitely increase the fibre content. Besides, the healthy fat present in coconut which is lacking in millet, can be fortified in the integrated products. Coconut meat can be incorporated in two forms, as fresh gratings or desiccated coconut and as coconut milk residue/ defatted coconut meal. Characterization of coconut milk residue (CMR) revealed that the soluble, insoluble and total dietary fibre content in CMR is 2.7 per cent, 28.4 per cent and 31.1 per cent, respectively, which was more than that present in fruits such as orange, peach and pear (Ng et al., 2010; Gunathilake et al., 2009). There is a nutritious and simple preparation of ragi popular in Karnataka which known as 'mudde'. In Kerala, there are many ethnic foods prepared out of millet especially from ragi such as kanji (porridge), avalose podi (powders), puttu, kurukk, murukku, ilayada, uppumaavu, etc. Newer products like cake and chappathi prepared with millet are also available in the market.

Grated coconuts are an inevitable ingredient in the preparation of ragi puttu (steamed ragi powder).

Similarly, several ragi and coconut milk based preparations are popular in areas like Lakshadweep. Currently, coconut and millets based cookies and biscuits have started a boom in the market. In fact, ICAR- Indian Institute of Millet Research, situated at Hyderabad has published the recipe of sorghum based coconut cookies, and coconut laddu in combination with finger millet and pearl millet. ICAR-CPCRI also attempted to develop an extruded product by optimizing the levels of ingredients, and extrusion conditions. The optimized extruded snack consists of 41% rice flour, 25% corn flour, 19% foxtail millet and 15% coconut milk residue with a temperature of 117°C and 273 rpm screw speed. Further studies are in the pipeline. One of the technology licensees of ICAR-CPCRI (Ms. Pavithra) is marketing coconut and millet based cookies under the brand name 'Bommi & Co' in Coimbatore district of Tamil Nadu. There is a huge potential for coconut and millet based products both in Indian and international markets. New generation products like ragi cakes, ragi chocolate pudding, ragi halwa, ragi laddu, germinated ragi powder, nutrient mixes with ragi etc can be found in the market.

Millets are non acid forming food and easy to digest. It is considered to be one of the least allergic and most digestible grains available and is a warming grain as it helps to heat the body in cold or rainy season. Combination of millet and coconut meat can lead to better health and immunity. Constant efforts should be made to educate people about the nutritive value and health benefits of millet and coconut based food products. Coconut and finger millet was traditionally cultivated and was part of daily diet of common people. Reviving these traditional crops combinations with HYV varieties, dwarf varieties, hybrids under scientific management could be offering resilience against climate change risks. Balanced nutrition acquires critical position in national development through enhancing health, well being and immunity of all age groups. Millets are cheap and highly nutritious option for future and ethnic foods which are becoming popular choices in diets and food tourism not only as food items but also as better nutrition choices. The potential for coconut millet combinations in cropping systems and diet needs to be supported through appropriate policy support, upgrading value chain intervention and purposeful interventions from research and extension with social participation. ■

Orange Coconut Panna Cotta

Ingredients

Coconut milk - 1½ cup

Fresh Cream – ½ cup

Sugar- ¼ cup

China grass powder-2 tea spoon

Hot water- 4 table spoon

For preparation of orange layer

Orange juice- 2 cup

Sugar- 2½ tablespoon

China grass powder-2 tea spoon

Hot water- 4 table spoon

Mix hot water with china grass . Stir until the china grass dissolves completely. Heat orange juice in a pan. Add sugar to the solution and remove from the fire once the sugar completely dissolves. Half fill four glasses with the solution and keep in refrigerator for 40 minutes to set.

In the meantime, take china grass in a bowl, mix with hot water and stir thoroughly until it melts well. Heat coconut milk and cream in a saucepan, add sugar and mix well until it completely dissolves. Remove from fire and mix well. Pour this solution as top layer of the orange mix which was kept in refrigerator. Cover the same and keep in refrigerator for another 40 minutes. Panna Cotta is ready.