PROMOTION OF COARSE CEREALS THROUGH VALUE ADDITION AND POTENTIAL MARKET DEMAND OF MILLET FOODS

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Need for food fortification

- **Restore**
  - nutrients lost in processing

- **Replace**
  - nutrient in substitute food

- **Correct**
  - obvious deficiencies in population
Value addition to Millets

- **Composite flour recipes**
  - Breads
  - Baked bread…
  - Steamed bread…
  - Biscuits (cookies)
  - Biscuits…

- **Non-composite recipes**
  - Boiled Products
  - Sorghum/pearl millet rice…
  - Porridges
  - Breakfast porridge…
  - Stiff porridge…
Contd…

- **Beverages**
  - Non-fermented drinks-mageu…
  - Fermented drinks-commercial mixes…
  - Malt Drinks …
  - Opaque Beer/Local Beer …
  - Lager Beer …

- **Snacks**
  - Pop sorghum…
  - Composite Flour Recipes
  - Breads
  - Baked bread (20% sorghum/pearl millet: 80% wheat)
Resistant starch derived from processed ragi

- The long-held belief that dietary starch, when consumed in the form of processed foods, is completely digested and utilized in the small intestine for energy release has been challenged and debated (Stephen, Haddad, & Phillips, 1983).

- In support of this, the dietary fibre (DF) content of processed foods was rather higher than the corresponding material before processing, indicating that some DF is being introduced during processing. It is now recognized that as much as 30% of the total apparent DF in wheat bread is undigestible starch (Cummings & Englyst, 1987a and Englyst & Macfarlane, 1986).

- This fraction of starch, which escapes digestion in the gastrointestinal (GI) tract but later gets fermented in the colon, is generally referred to as resistant starch (RS).
The beneficial effects of RS fermentation in the large intestine are so numerous that the present trend in functional foods is to introduce RS in varying proportions (Cummings & Englyst, 1987b and Shetty & Kurpad, 1986).

Ragi (finger millet, Eleusine coracana) is a minor millet consumed by the economically weaker section of the population, especially by South Indian rural folk.

It is rich in DF and calcium, and is used after various processing treatments (Malleshi & Hadimani, 1993). Malted ragi is a very useful material for the preparation of beverages and health foods, such as infant food and enteral food formulations (Meera, 1997).
Extrusion cooking is a process of value addition of cereals and other grains for the production of the value added products, the extrudates. The flour is conditioned to a moisture content for about 22% (wb), one hour prior to the extrusion. During conditioning, millets flour to a level of 20% is added to increase the expansion, crispiness and acceptability. Extrusion is done at barrel temperature and screw speed 115°C and 225 rpm, respectively.
Extruded products

- **KURKURE PLANT:** Kurkure are extruded snacks, Kurkure are made by extrusion process. The Kurkure corn meal is moisturized in the flour mixer with water and fed to the Rotary Extruder. In the extruder, due to excess heat and pressure from the screws the meal gets heated and the moisture content gets reduced. The meal passes through the Extruder and gets cut by the cutting knifes into required lengths. The Kurkures are fried in cooking oil and then cooled before flavoring. Seasoning is sprayed on the Kurkure to improve their taste.
Pasta is a popular Italian food item. It comes in various shapes and sizes. They are made by semolina flour. The flour is extruded into the shape of the Pasta to be made like Macaroni, Vermicelli, and Spaghetti etc and dried.
The leaves of the moringa tree (Moringa oleifera) are edible. They are cooked and consumed in many Asian, African and Latin American countries. The leaves are an exceptionally good source of vitamins A, B and C, of various minerals and of the sulphur-containing amino acids methionine and cystine.

There is no ready-to-eat snack food available with this highly nutritious ingredient. So, scientists at Kansas State University wanted to use extrusion processing to develop expanded snack products based on the moringa leaf. They succeeded in producing an expanded snack using moringa leaf powder and a steam-based extrusion technique. They found that moisture content was critical in producing this product.
Development of value addition Drudgery reduction & Income and Employment Generation

- Elimination of drudgery of women by introducing mechanical mini-milling system
- Introduction of value addition technology for novel product development
- Capacity building among farm women on nutritional quality of millets, in product development and marketing
- Organising women’s group into Self-Help Groups for collective ownership and management of value chain infrastructure and process
Thank You all