

## ORIGINAL ARTICLE

# Cereal food technologies – India and Africa trends and the need for collaborative and networking programmes

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cereal technology; grains; international collaboration; millets; sorghum.

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**Abstract**

India and Africa share many common food trends such as rapid urbanization and a growing demand for convenience and health-promoting foods. Notably in Africa, these food demands are currently being met by relatively simple value addition to grains through small and medium enterprises. However, achieving improved staple food security will require more complex technologies, higher technical skills and a better organized food pipeline. Thus, in Asia and Africa there is an acute need for collaborative and network programmes in grain science and technology. The recent creation of an ICC India Task Force to make India-International grain science collaboration and networking a reality is a critical step to achieving these goals.

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## India and Africa food trends

Food consumers and the food markets in India and Africa have much in common. Several common trends can be identified:

- (1) Rapidly growing economies – approx. 5% per annum
- (2) Many young consumers – high disposable income
- (3) Rapid urbanization – growing middle class with aspirations
- (4) Most urban households have two ‘bread winners’ – resulting in a demand for convenience foods
- (5) Strong traditional food cultures – respect for tradition grains such as sorghum and millets, to the extent that in India they are becoming referred to as ‘Nutrigrains’
- (6) High levels of malnutrition – especially among young children, both protein-energy malnutrition and micro-nutrient malnutrition
- (7) A rapidly growing problem of Western-type lifestyle diseases (obesity, cardiovascular diseases and non-insulin

dependent diabetes) – especially in the newly urbanized

## Cereal food technologies

Up until very recently, in Africa small industrial food processing has been virtually unknown, except in South Africa. Now, as a result of these trends, there is an enormous growth across the continent in small and medium food processing enterprises based on cereals, particularly sorghum and millet (Taylor & Emmambux, 2008; Taylor *et al.*, 2010). Three levels of technology can be identified which give progressively increasing value addition in terms of meeting consumer demands for nutritional quality, convenience and hedonic reward:

- (1) Clean grain and simple flours in small labelled packages for supermarket sale
- (2) Flours plus other ingredients, i.e. fortified with micro-nutrients, other grains (multigrain products and flavourants (sweeteners and acidulants)

(3) Ready-to-eat and ready-to-drink products, generally products where the starch has been pre-gelatinized and hydrolyzed into sugars, including: pre-cooked flours, snackfoods, formed foods (e.g. pasta products), cookies and bread products, beverage powders and beverages

However, with increasing value addition, the technologies required become more complex and demand much higher levels of technical skills and a much better organized and controlled food pipeline from grain production, post-harvest, food processing and distribution (Taylor & Duodu, 2010).

### The need for collaborative and network programmes

The critical need is to actively address the ever-increasing staple food insecurity problems associated with growing populations and rising incomes, particularly in Asia and Africa. Fortunately, today more than ever there is pressure for international scientific collaboration with institutions in India in the area of research and development. The Indian government has supported the development of good research infrastructure, and particularly hosting of international students. Importantly, concerning grain-related research, there are world-renowned and highly respected Indian scientific organizations including the Council for Scientific and Industrial Research, Indian Council of Medical Research, Indian Council of Agricultural Research, Department of Science and Technology, and Department of Biotechnology, plus institutions based in India, especially the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), that can make a difference.

### Areas for international collaborative and networking programmes

No less than 12 critical areas can be identified where Indian and international grain scientists need to network and collaborate:

- (1) Conservation of the biodiversity of the many Nutri-grains in India and in the region
- (2) Capacity building and team building in future researches in India in the area of grains by global networking
- (3) Co-products utilization from grain processing

- (4) Tertiary product value addition
- (5) Product development to meet the demand of nutrition and encourage Nutri-grains in many innovative ways
- (6) Exploration of adaptable, accessible, and affordable and available cost-effective technologies
- (7) Sharing of knowledge and participation of industry
- (8) Development of projects that are sustainable beyond their funding duration
- (9) Projects which address reaching out to the public on the knowledge base of grain science
- (10) Projects that merely require incremental additions to make them happen with the involvement of organizations like ICC
- (11) Fundamental research but with the pipeline for the end result for appropriate technology emerging out of it
- (12) The infrastructure built up in India for grain research the past 50 to 60 years is phenomenal. Today, several such Indian institutions are networking together, as with similar institutions in Africa and Europe. These institutions need to synergize to build further capacity in grain science and integrate the network programmes.

### Conclusions

In countries with developing economies, the development and implementation of grain science and technology are going to be the driver to achieve the goals of improved staple food security, improved nutrition, and the development of food processing small and medium enterprises. Arising from the 1<sup>st</sup> ICC India Grains Conference in partnership with ICRISAT, the recent creation of an ICC India Task Force to make India-International grain science collaboration and networking a reality, is a critical step to achieving these goals.

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