

## Deriving Innovations Through Intervention of Newer Technologies in Integrated Manner for Value Addition and Development of Value-Added Products in Agri-Food-Nutrition and Health Sectors

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Agriculturists did a lot from food deficiency to food sufficiency and now the era has been changing to quality nutrition and its impact on health. Many new technologies have been evolved to improve the nutritional and functional qualities of food viz. biotechnology, nanotechnology, information technology, nutri-genomics and agri-processing etc which can manipulate genetic pathways or engineering strains of proteins to possess novel functionalities and to make these nutrients available, value addition and processing in the form of designer food is gaining popularity. New technologies such as Nano-Bio-Information technology strengthening the efforts towards the applications of nanotechnology through innovation in Nano-systems design and use of biotechnology, bioinformatics and system biology in an integrated fashion for the development of functional foods and value-added products. The innovations based on frontier sciences and technologies hold immense potential for harnessing the rich biodiversity of India for solving the problem of chronic malnutrition through strengthening crop, food bio-fortification programmes and quality nutritional availability of processed products. The main aim of agri-processing is not only for product research and development of local produce into value added agricultural products but also generate the income of farmers, food security and employment generation.

The world population is continuously growing and much more effort and innovation will be urgently needed in order to sustainably increase agricultural production, improve the global supply chain, decrease food losses and waste and to ensure that all who are suffering from hunger and malnutrition have access to nutritious food. In an estimate roughly two billion people suffer from a shortage of vitamins and minerals. Another 1.4 billion are over-

weight or even obese as a result of unhealthy diet – not only in rich countries, but increasingly also in developing countries and emerging economies. Roughly half of the world's population does not receive an adequate diet. It is therefore not only a matter of increasing agricultural production, but of providing a balanced, healthy and sustainable diet for everyone. Some of the major issues emerged are

- a) Abundant food and nutritional insecurity,
- b) Increased demand for food,
- c) Unsustainable use of natural production factors such as soil, biological diversity and water,
- d) Degradation of approx. 60% of ecosystem services,
- e) Dependence of intensive agriculture on high energy but could be energy self-reliant,
- f) Lack of preparedness for practicing agriculture to cope with unpredictability and adaptation to climate change,
- g) More than 50% pre- and post-harvest losses of crops besides > 35% food processing losses. To overcome all these there is need of value addition and processing.

Value addition is the process of changing or transforming a product from its original state to a more valuable state. It involves taking any product from one level to the next. Value addition activities in the rural areas tend to increase local employment and income and usually have a positive impact on the local economy mainly due to forward and backward linkages. We produce a lot of goods but mostly primary products that aren't processed and value added. If they go that level, the chances for them to export their products will be a lot better. Mainly the agri-processing innovations are dependent on the following:

- 1) Primary Agriculture: Relies on agricultural productivity of different commodities;
- 2) Secondary Agriculture: Relies on conversion of Agri-Resources into value added products mainly food products;
- 3) Tertiary Agriculture: Relies on isolation of novel molecules, genes, proteins and metabolites for enhancing the quality of life.

In order to harness nutritional benefit of a crop and to develop it as a functional crop for biofortification, processing and value addition, novel technologies which are capable of assessing a complete biological network must be employed. The World Health Organization (WHO) recognizes that maintenance of optimum global public health requires not only prevention of early onset of chronic diseases but also promotion of a healthier aging and ultimately prolongation of life. Going back to a well-recognized dogma of ancient Indian Siddha literature and Hippocrates 'food is medicine and medicine is food,' diet and dietary habits have been established to play important role for exalted health benefits based on different properties of foods. Thus, growing demand for healthier food products is stimulating innovation and development at the international scale. Exposing traditional Indian agriculture to modern technologies, creating large scale processed food manufacturing and food chain facilities and consequently generates employment and export earnings.

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