Food Additives: India & SWA Perspective

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IMPORTANCE OF FOOD PROCESSING

Feeding the World Today and Tomorrow: The Importance of Food Science and Technology

An IFT Scientific Review

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- Review Objective - to serve as a foundational resource
  - for public outreach and education
  - to address misperceptions and misinformation about processed foods
- Educate about application of science and technology to meet society’s food needs.
- The review underscores role of food additives in evolution of food industry
  - long history of the use of food additives - substances added in small quantities to produce a desired effect/technical effects
FOOD ADDITIVES - CRITICAL ROLE

- For centuries, additives have served useful functions in a variety of foods.

- ~2 million years ago – cooking, later augmented by fermenting, drying, preserving, and other primitive forms of food processing.

- Led to development of the early Food Industry
  - Freed people from foraging for food, and ensured adequate nutrition via consistent food supply year round.

- The Industrial revolution could not have occurred without a food delivery system that allowed people to leave the farms, migrate to the cities, and engage in useful production of goods and services for society.
THE STATUS TODAY

- Contemporary food science and technology have contributed greatly by integrating many other disciplines to enhance food safety
  - Biology, chemistry, physics, engineering, materials science, microbiology, nutrition, toxicology, biotechnology, genomics, computer science.

- Today, our production-to-consumption food system is complex, and the food is largely safe, tasty, nutritious, diverse, convenient, and less costly and more readily accessible than ever before.

- Food additives & advances in technology help make that possible.
WHAT IS A FOOD ADDITIVE?

● Technically:
  - In addition to the natural composition of foodstuffs, substances that may be incorporated, either directly or indirectly, during the growing, storage or processing of foods, when introduced purposely to aid in processing or to preserve or improve the quality of the product.

● Codex:
  - Food additive means any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result (directly or indirectly), in it or its byproducts becoming a component of or otherwise affecting the characteristics of such foods. The term does not include contaminants or substances added to food for maintaining or improving nutritional qualities.

● FSSAI:
  - SAME AS CODEX
WHY DO WE NEED FOOD ADDITIVES?

● To maintain product consistency
  - Emulsifiers give products a consistent texture and prevent them from separating. Stabilizers and thickeners give smooth uniform texture. Anti-caking agents help substances such as salt to flow freely.

● To improve or maintain nutritional value.
  - Vitamins and minerals are added to many common foods such as milk, flour, cereal and margarine to make up for those likely to be lacking in a person's diet or lost in processing. Such fortification and enrichment has helped reduce malnutrition.

● To maintain palatability and wholesomeness.
  - Preservatives retard product spoilage caused by mold, air, bacteria, fungi or yeast. Bacterial contamination can cause food-borne illness, including life-threatening botulism. Antioxidants prevent fats and oils in baked goods and other foods from becoming rancid or developing an off-flavor. They also prevent cut fresh fruits such as apples from turning brown when exposed to air.

● To provide leavening or control acidity/alkalinity.
  - Leavening agents that release acids when heated can react with baking soda to help cakes, biscuits and other goods to rise during baking. Other additives help modify the acidity and alkalinity of foods for proper flavor, taste and color.

● To enhance flavor or impart desired color
  - Many spices and natural and synthetic flavors enhance the taste of foods. Colors, likewise, enhance the appearance of certain foods to meet consumer expectations.
FOOD ADDITIVES – DRIVING INNOVATION

- **MAJOR DRIVER OF INNOVATION** in the Food Industry
- Some of popular products would not have been possible without food additives:
  - Eg. Non-nutritive sweeteners –
    - Low or No Cal Products
  - E.g. Fruit juice + Milk Beverage
    - Stabilizers used to prevent separation
    - Improve mouth-feel through the desired shelf life
CONCERNS ON FOOD ADDITIVES

- Food additives have been the subject of public policy, regulatory activity as well as public interest for decades.

- Misplaced concerns about the food industry’s motives in manufacturing processed foods have led to increasing negative perceptions among the general public:
  - Many concerns about additives arise because of the long, unfamiliar names similar to complex chemical compounds.
  - Motive of economic adulteration
  - Misbranding
  - Improving the perceived quality
  - Use of unsafe additives, colorants
  - Or using safe additives beyond permitted limits
India & SWA - Perspective
Status & Way Ahead
**SWA – World’s one of the most populous region**

**India**
- 1.3 Billion Inhabitants
- Per Cap GDP - USD 1528
- Median Age: 25.4

**Maldives**
- 0.4 Million Inhabitants
- Per Cap GDP - USD 6,567
- Median Age: 26

**Nepal**
- 30 Million Inhabitants
- Per Cap GDP - USD 707
- Median Age: 21

**Bhutan**
- 161 Million Inhabitants
- Per Cap GDP - USD 747
- Median Age: 23

**Bangladesh**
- 1.3 Billion Inhabitants
- Per Cap GDP - USD 1528
- Median Age: 25.4

**Sri Lanka**
- 9.1 Million Inhabitants
- Per Cap GDP - USD 2,923
- Median Age: 31
INDIA - Big & Growing

- Second-largest by population and most populous democracy in the world- 1.3 billion (UN, 2012), 18% of world population.
- Seventh Largest country by area - 3.3 million sq km area, 2.4% of world land.
- 28 states and 22 official languages (Major – Hindi and English)
- India is the largest English speaking nation and 2nd largest pool of English speaking Scientists and Engineers in the world
- The economy is the 9th largest by nominal GDP and 3rd largest by purchasing power parity (PPP).
Current Trends

• **Increasing Consumer & Media focus on Food Safety**
  • Understanding pathogenicity and control strategies driving Good Manufacturing Practice (GMP) Standards
• **Increasing scales of operation will enhance affordability of Quality and Safety of Processed Food**
• **Greater sophistication in food service sector – popularity of Quick Service Restaurants (QSRs)**
• **Shift from 100% Inspection to Food Surveillance & Monitoring Systems**
Erstwhile Regulatory System – Food and Beverages

- **Ministry of Health and Family Welfare (MoH)**
  - Prevention of Food Adulteration Act (PFA)
- **Ministry of Food Processing Industries (MoFPI)**
  - Fruit Product Order (FPO)
- **Ministry of Consumer Affairs (MoCA)**
  - Bureau of Indian Standards (BIS Mark)
  - Weights and Measures Act (PCRO)
- **Ministry of Agriculture (MoA)**
  - AGMARK – For Agro Commodities / Spices
  - Milk and Milk Products Order; The Insecticides Act
- **Ministry of Commerce (MoC)**
  - Tea Board / Coffee Board / Coffee Act and Rules / Export Regulations
- **Ministry of Science and Technology (MoST)**
  - Irradiated Foods
  - GM and Organic Foods
Food Safety & Standards Act: No. 34 OF 2006

- NEW FOOD SAFETY AND STANDARDS ACT received assent of the President on 23rd August, 2006
  - signaled transition from the sixty year old Prevention of Food Adulteration Act (PFA)
- FSSA is an Act to consolidate the laws relating to food and to establish the Food Safety and Standards Authority of India (FSSAI) for laying down science based standards
  - for articles of food
  - to regulate their manufacture, storage, distribution, sale and import
  - to ensure availability of safe and wholesome food for human consumption
Food Safety and Standards Act - 2006

Food Safety and Standards Authority of India (FSSAI) established in 2008

www.fssai.gov.in
Food Safety & Standards Act: Integrates

- Food Safety and Standards Act, 2006
- Prevention of Food Adulteration Act, 1954
- Vegetable Oil Products (Control) Order, 1947
- Edible Oils Packaging (Regulation) Order, 1998
- Solvent Extracted Oil, Deoiled Meal, and Edible Flour (Control) Order, 1967
- Fruit Products Order, 1955
- Meat Food Products Order, 1973
- Milk and Milk Products Order, 1992
- Any other order under Essential Commodities Act, 1955 relating to food
Food Safety and Standards Act - “The WHY”

MOVING FROM

- Multiplicity of regulations, which at times conflicting and confusing
- Often Manufacturers had to seek clearances from various agencies
- Lack of application of scientific principles – such as risk assessment in setting safety regulations
- Regulatory regime especially the enforcement acted as a policeman
- The penalties levied were not linked to gravity of offence
- No defined process of alignment with global regulatory practices

To

- From multi-level – multi department control to single line of command
- Single reference point on all matters related to Food Safety and Standards – regulations and enforcement
- Science based standards and transparency to meet dynamic requirements of national / international food trade
- Driving self regulation compliance (FSMS)
- Provision of graded penalties depending on gravity of offence
- Alignment with international regulatory guidelines
- Integrated response on strategic issues – Novel / GM foods, Global trade
FSSAI - Robust Scientific Risk Assessment to drive Regulation & Rule Making Process

Food Authority (Apex Body) (As per Sections 4 & 5 – FSS Act 2006)
22 Member Body Headed by FSSAI Chairperson (Final Arbiter of All Regulatory Issues)

Final Output
Regulation / Rule

Scientific Committee finally responsible for the general co-ordination necessary to ensure consistency of the scientific opinion procedure

One Scientific Committee (As per Section 14 – FSS Act 2006)
Headed by Ex Director General – Indian Council of Medical Research. Other Members are Chairpersons of All Scientific Panels and Six Independent Scientific Experts not belonging or affiliated to any of the Scientific Panels

Scientific Opinion / Risk Assessment

Eight Scientific Panels

Food additives, flavourings, processing aids and materials in contact with food

Pesticides and Antibiotics Residues

Genetically modified organisms and foods

Functional foods, nutraceuticals, dietetic products and other similar products

Biological hazards

Contaminants in the food chain

Labeling, Advertising and Claims

Method of sampling and analysis
FSSA Rules & Regulations

From August 5, 2011

- All applicable food regulations brought under new framework – in a single integrated document

  - Food Safety and Standard Rules
  - Food Safety and Standards (Licensing & Registration) Regulations
  - Food Safety and Standards (Food Products Standards and Food Additives) Regulations - Appendix A – Table 1 to Table 15
  - Food Safety and Standards (Packaging and Labeling) Regulations
  - Food Safety and Standards (Prohibition and Restriction on Sales) Regulations
  - Food Safety and Standards (Contaminants, Toxins and Residues) Regulations
  - Food Safety and Standards (Laboratory and Sample Analysis) Regulations
FSS Regulations – 2011 – Key Features

Food Safety and Standards (Food Products Standards and Food Additives) Regulations

- **Food Products Continue to get Classified as**
  - **Standardized Food** (product standards are defined - E.g. Tomato Ketchup, Jams)
  - **Non-standardized** (product standards NOT defined – called as **Proprietary Food**) E.g. Energy Drinks

*Impacting the food additives provisions*
FSSAI – Product Approval

Since March 2012

- FSSAI mandated product approval requirement for all non-standardized (proprietary) products
  - Application to be made with fees

- Pro-s & Con-s
  - Formalized certain products – bringing relief on enforcement related issues
  - Requires disclosure of product composition
  - Even simple admixtures – e.g. a custard powder or a tea / coffee premix needed pre-market approval
  - Time consuming process (3 month to 1 year)
  - Lack of clarity
FOOD ADDITIVE APPROVAL PROCESS – INDIA

- Application in a structured format
- Details of additive requested:
  - Name of food categories
  - Level of usage
  - Technological justification
  - Current status under local regulations
- JEFCA and other safety evaluations
- Codex Approval Status
- Approval by other regulatory authorities
- Questionnaire to include information on:
  - Technical information such as chemical name, CAS No., chemical & structural formula
  - Specification for identity & purity of the substance
  - Chemical & physical properties
  - Method of analysis
FSSAI - Harmonization Exercise

In March 2013

- FSSAI embarked upon a major harmonization exercise
- Currently, several standards in Food Safety & Standards Regulations, 2011 have been drawn from provisions of the Prevention of Food Adulteration (PFA) Act.
- Based on regular requests for review of these standards taking into account
  - the latest development in food science across the globe,
  - food consumption pattern, new specifications,
  - presence of new contaminants and toxins as well as
  - use of new food additives and ingredients required by the producers and manufacturers in food business.
- Development of new standards and texts, where necessary while taking cognizance of the developments in an environment of open market in India.
- WTO encourages harmonization of national food regulatory standards, guidelines and best practices with those of the Codex and provide an equal opportunity to all stakeholders in food business.
INDIA – WAY FORWARD & PROGRESS

- Late to Adopt of Global best practices – Harmonization

- As a first step:
  - Progressed with evolving Food Category System similar to the Codex FCS – INDIA FOOD CATEGORY SYSTEM
  - Aligning the food additives permitted under various local regulations and orders under one single set of document in respective food categories – HARMONIZATION WORK

- Evolve an approval system for food additives based on principles of risk assessment as adopted by several national regulatory regimes – Continual Harmonization

- Some points to consider:
  - JECFA evaluations to form the basis
  - Adoption of current Table 3 under GSFA
  - Time bound approval (on lines of ANZ) for new additives
  - Develop a framework that integrates Codex Approvals with local regulations
TO SUMMARIZE

- Food additives have been used for many years to preserve, flavor, blend, thicken and color foods. These additives also help ensure the availability of flavorful, nutritious, safe, convenient, colorful and affordable foods that meet consumer expectations year-round.

- Food additives are strictly studied, regulated and monitored. Local regulations require evidence that each substance is safe at its intended level of use before it may be added to foods.

- Furthermore, all additives are subject to on-going safety review as scientific understanding and methods of testing continue to improve.

- Consumers should feel safe about the foods they eat.
Thank You