

Starting a Food Business: Product, Process, & Packaging Analysis & Development

Product Analysis & Development

You may know the ingredients used and how it is made, but there is other information about the product you need before deciding to start a food business:

- The pH and/or water activity of your product;
- The components of the food product critical to maintain quality and safety for optimal shelf life;
- The conditions best for storage, distribution and consumer use of the product.

Importance of pH & Water Activity: These are terms and product properties you will need to know in order to communicate with other people in the industry and to understand how your product may be regulated.

Low-acid Foods: Without proper handling, these foods allow the growth of the potentially deadly toxin produced by bacteria known as *Clostridium botulinum*. Low-acid foods such as meats and most vegetables, have the following characteristics:

- pH (acidity) greater than 4.6;
- a_w (water activity, a measurement of free moisture in food) greater than 0.85.

Acid Foods: This category includes foods such as fruits, jams and jellies that have a natural pH below 4.6.

Acidified Foods: This category includes foods such as pickles, salsa, relish and barbecue sauces that have the following characteristics:

- pH adjusted through processing to become less than 4.6;
- a_w greater than 0.85.

Identification of Critical Food Components for Quality & Safety: What food components (such as color, texture, flavor, aroma and moisture) are critical for maintaining the quality of this product? Is this a high-fat product that could turn rancid if exposed to heat, light and/or oxygen?

- Is this a dry product that needs protection from moisture?
- Is this a moist product that could dry out during storage?
- Are there nutrients in this food that could deteriorate when exposed to light, heat or moisture?
- Will spoilage bacteria be of greater concern than mold or yeast?
- Can bacteria that cause illness (called pathogenic bacteria) grow in this product?
- How much protection can packaging provide without being too costly?
- What temperatures are necessary for storage of this product? What potential is there for temperature abuse?

Consider running consumer or trained sensory panels during product development. Consider contacting someone to do an accelerated shelf-life test for you.

Process & Packaging Development

Production Requirements:

- What raw materials are needed? How much is needed? Where and how will it be stored?
- Who will provide the raw materials? How will quality be controlled?
- What equipment is required to assemble the raw materials? Is it capable of providing the output you need?

- How much floor space will the equipment require? How much energy? How much labor? How much training would the labor require?
- Can you buy new equipment or purchase used? Can you lease equipment?
- Should you hire a contract manufacturer?

Sanitation: Sanitation includes the physical, chemical and microbiological cleanliness of the manufacturing area, buildings, equipment, personnel, water supply, waste disposal, raw product and finished product. There are two important reasons for establishing and maintaining a good sanitation program.

Economic: Poor sanitation can lead to spoilage that results in production losses.

Legal: The Food and Drug Administration (FDA) has the power to seize products and criminally prosecute any individual or company for unsanitary conditions.

Packaging: The four basic functions of a package are to contain, protect, inform and facilitate the use of the product.

Contain:

- Primary — the package has direct contact with the product (an example of this is a pouch for a dry cake mix).
- Secondary — contains and/or unitizes primary package(s) (an example of this is the carton containing the cake mix pouch).
- Tertiary — refers to the shipping package (an example of this is a corrugated shipping case containing several cake mix boxes).
- Quaternary: unitized shipping package (an example of this is a pallet load of stretched, wrapped, shipping cases filled with cake mix boxes).

Protect: The package protects the product from the following hazards:

- Dirt, germs, insects, rodents, bacteria, yeast and mold
- Sunlight
- Gases – such as oxygen, carbon dioxide and ethylene
- Aroma and flavor compounds

- Fat, oil and/or grease
- Physical, cosmetic or functional damage
- Product tampering

Inform:

- Legal/regulated information on the package label includes net quantity declaration, ingredients listing, nutritional label, health claims, and reduced-calorie or "lite" statements. These fall under Fair Packaging and Labeling Act, and Nutrition Label and Education Act.
- Emotional/motivational/selling information is intended to gain attention and help sell the product such as purchase incentives (tear-off coupons), recipes, contests, logos, color, overall design, photographic images and illustrations.

Consider if any of the logos or designs interfere with existing trademarks or trade dress.

Facilitate Use of Product:

- Easy open/reseal features
- Ease of stacking and storage
- Serve and eat from same package
- No-drip spout
- Microwaveable
- Easy to dispose
- Portion-controlled dispensing

It is also important to address environmental concerns related to the package such as ease of disposal, source reduction, and whether the package is recyclable or reusable.

Distribution:

- How do you expect to distribute your product? Truck, rail, air, overseas?
- Do you have warehouse space? Do you need to rent? How much space will you need?
- Will your packaging withstand the distribution chain you choose? Have you over- or under-packaged?
- Do you have sufficient and safe space for loading/unloading?

Laws & Regulations

During the development phases, adherence to the laws and regulations that apply to the product is

critical. The details of most laws and regulations can be found in the Code of Federal Regulations (CFR). It is necessary to read through the sections that apply to the product being developed and determine how to comply with the regulations. State regulations will also apply to the product and production process.

All foods are covered under CFR title 21. United States Department of Agriculture (USDA) requirements for meat and poultry are covered under CFR title 7. Determine if the food product must be registered with FDA, or if it is a meat product, with USDA.

Regulations Include:

- Details of what and how information should be presented on the label
- Approved additives, their functions and limits
- Standards of identity
- Good Manufacturing Practices
- Nutritional labeling and claims
- Approved packaging materials
- Processing and preservations methods

- Classification for recalls
- Health and sanitation standards

Universal Product Codes (UPC):

These are the bar codes that are scanned for pricing, but they do much more than that. They can also be used for tracking and shipping information, warehouse and inventory control, and other important data. There are standards that must be followed.

This information has been reviewed and adapted for use in South Carolina by W. Scott Whiteside, Extension Associate, Packaging Science; P.H. Schmutz, HGIC Food Safety Specialist; and E.H. Hoyle, Extension Food Safety Specialist, Clemson University. (New 03/02.)

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