



# Creating and Processing Value Added Food Products in Arkansas

**Dr. Renee Threlfall**

**Research Scientist**

**Food Science Department**

**UA System Division of Agriculture**



# Food Systems and Production

# What is a Food System?

---

All the components including production, processing, distribution, sales, purchasing, preparation, consumption, and waste disposal

- Local systems support local economy



# What is Value-added Production?

---

- Taking a raw commodity and changing its form to produce a high-quality end product.
  - Diversifies businesses
  - Maintains food supply throughout the year
  - Easy to store and distribute in commercial markets





# Creating Food Products



# Creating Food Products

---

- Are you a grower or entrepreneur that wants to add value or diversify a business operation?
- Do you have an idea or concept for a food product?
- Do you have investment capital (\$500-1,000)?
- Do you have time?



# Skills for Food Entrepreneurship

---

- Passion for your product or business
- Ability to follow directions
- Organizational skills
  - Paper work and record keeping
- Good work ethics
  - Love to clean





# Concepts for Your Food Product

---

- Have you finalized the recipe at home?
- Will the product change when produced commercially?
  - YES!





# Commercial Food Regulations

# Food Products Sold to Consumers

---

- In Arkansas, some food made at home if *products fall under the Arkansas Food Freedom Act*
- Most food made in licensed, inspected facilities



# Who Regulates Food Production?

---

- United State Food and Drug Administration
  - Regulates most food and beverages, except meat and poultry
- United State Department of Agriculture
  - Regulates meat and poultry
- Arkansas Department of Health
  - Regulates food safety in the state
  - Ensures the food sold is wholesome and represented honestly





# Facilities for Food Production

# Permitted Facilities

---

- Facilities that have been inspected and approved by Arkansas Department of Health.
- New or remodeled facilities will require a Plan Review by Arkansas Department of Health

# What to Look for in a Facility

---

- Providing a certified and inspected facility for production
- Offering support for the development of product
  - Convert recipes to commercial production quantities
  - Information on ingredients, packaging and labeling
- Assisting with food processing regulations and documents

# Regulation Assistance

---

- FDA registration forms
- Arkansas Department of Health License to operate a food processing operation
- Recall and allergen control plans
- Process authority for required certification for acidified and low acid products
- Food Safety Modernization Act (FSMA) safety plans
- Product liability insurance



# Licensed and Inspected Kitchens

---

- Church kitchen
- School kitchen
- Restaurant
- Private facilities
  - Co-packers, own, rent
- Public facilities
  - Hubs, incubators, other



# Arkansas Commercial Kitchen Facilities

Facilities inspected and approved by Arkansas Department of Health



Little Rock



Rison



Springdale



Fayetteville



West Memphis



# Equipment for Food Production

# Utilities

---

- The utilities available in the facility dictates the type of equipment needed to purchase for your business.
  - Water (hot and cold)
  - Natural gas
  - Steam (boiler)
  - Electricity (120, 240, 480V)
  - Compressed air



# Equipment Capacity

- Determine capacity of the equipment needed (bottles per minute, kg/hour)
- Small (e.g. restaurant): widely available for a reasonable cost
- Medium (e.g. average startup company): not commonly available, *but what is often needed*
- Large+ (e.g. established food processor): available, but extremely expensive and may be too large



# New Versus Used Equipment

---

## ➤ New

- Built to order
- Expensive
- Long service life
- No prior product history
- Up to date safeguards and operator protection

## ➤ Used

- In stock
- Lower cost (about ½)
- Service life unknown
- Prior history with products that may be dangerous or incompatible
- Safety protection could be outdated, missing or disabled

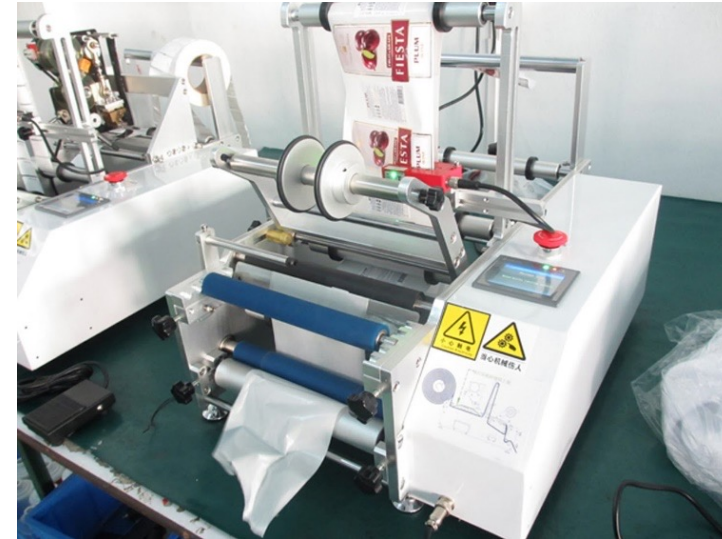
# Equipment Types

- Size reduction
- Blanching
- Finishing
- Cooking
- Pasteurization
- Drying



# Equipment Types

- Mixing
- Baking
- Filling
- Package sealing
- Labeling





# Final Thoughts on Equipment

---

- Choose equipment that fits your needs
  - Make sure the equipment works for you
  - Do research
- Equipment is the largest capital investment.
- Design a process flow chart identifying all the steps in your process
  - For each step identify equipment that maximizes throughput and minimizes labor



# Food Packaging

# Types of Food Packaging

- Jars
- Cans
- Pouches and vacuum packages
- Plastic cups, trays
- Bottles
- Clam shells
- Plastic bags
- Overwrap PVC film on tray



# Functions of Food Packaging

---

- Preserve the product
- Protect the product from physical damage
- Protect the product from environmental contamination
- Limit the oxygen around the product
- Limit the loss of moisture in the product

# Cost of Packaging

---

- Jars \$0.50- \$1.60/each
- Cans \$0.97- \$2.37
- Bags \$0.08-\$.10 each; Cook-in bags higher
- Trays \$0.05 - \$0.30
- Cups \$0.80
- Labels Black and white \$0.12; Color \$0.18
- Box label \$1.12- \$2.30

# Final Thoughts on Packaging

---

- Packaging is very important to your product shelf-life and location.
- Packaging can be very expensive.
- Packaging is used to communicate with consumer and serves to promote your product.



# Food Labeling

# Federal Requirements of Labels

---

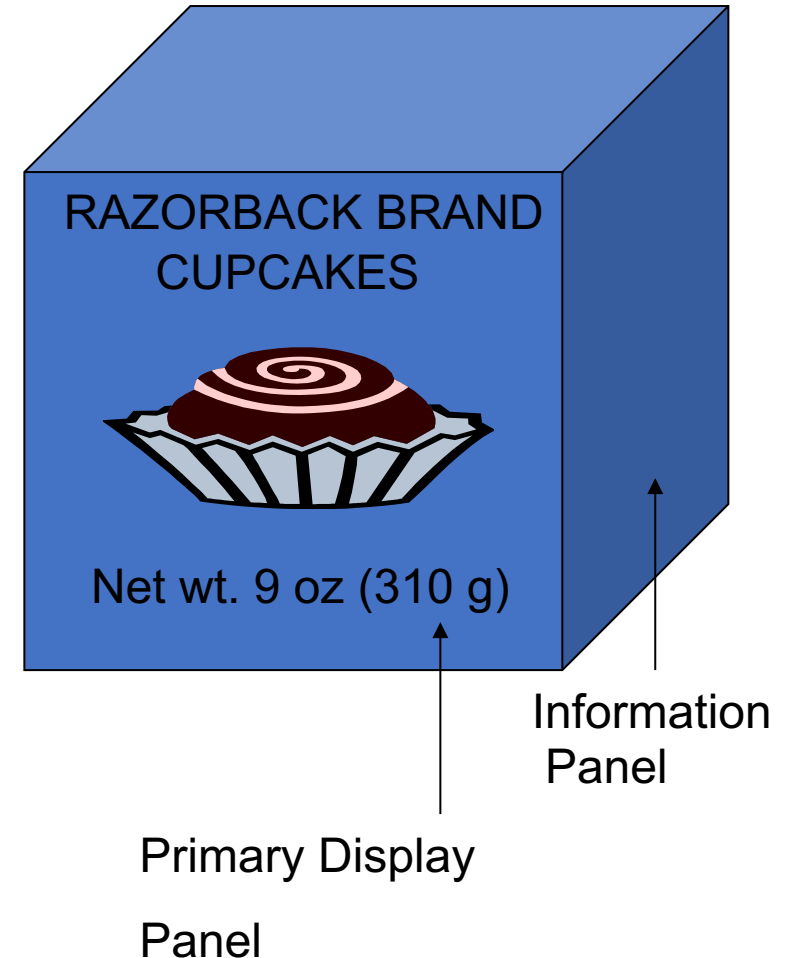
- Statement of identity
- Net quantity of contents
- Nutrition facts panel
- Ingredient statement
- Name and place of business of the manufacturer, packer or distributor



# Anatomy of a Label

---

- Principal Display Panel
  - Most likely to be seen by the consumer at the time of purchase
  - Includes statement of identity and net quantity of contents
- Information Panel
  - To the right of the Principal Display Panel
  - Name and address of manufacture, ingredients statement, and nutrition facts panel



# Nutrition Facts Panel

## Servings and Calories

**Serving Size** is based on the **amount of food that is customarily eaten at one time**. All of the nutrition information listed on the Nutrition Facts Label is based on **one serving** of the food.

**Servings Per Container** shows the **total number of servings** in the entire food package or container. One package of food may contain more than one serving.

**Calories** refers to the **total number of calories**, or “energy,” supplied from all sources (fat, carbohydrate, protein, and alcohol) in one serving of the food.

**Calories from Fat** are not additional calories, but are **fat’s contribution to the total number of calories** in one serving of the food.

## % Daily Value

The **% Daily Value (%DV)** shows **how much of a nutrient** is in one serving of the food. The %DV column doesn’t add up vertically to 100%. Instead, the %DV is the percentage of the Daily Value (the amounts of key nutrients recommended per day for Americans 4 years of age and older) for each nutrient in one serving of the food.

## Nutrients

The Nutrition Facts Label can help you learn about and compare the **nutrient content** of many foods in your diet. The Nutrition Facts Label must list: total fat, saturated fat, *trans* fat, cholesterol, sodium, total carbohydrate, dietary fiber, sugars, protein, vitamin A, vitamin C, calcium, and iron.

## Footnote with Daily Values

The standard footnote at the bottom of the Nutrition Facts Label indicates that some of the %DVs are based on a **2,000 calorie daily diet**. However, your Daily Values may be higher or lower depending on your calorie needs, which vary according to age, gender, height, weight, and physical activity level. If there is enough space available on the food package, the Nutrition Facts Label will also list the **Daily Values and goals** for some key nutrients.

Nutrition Facts	
Serving Size 1 package (272g)	
Servings Per Container 1	
<b>Amount Per Serving</b>	
<b>Calories</b> 300	Calories from Fat 45
<b>% Daily Value*</b>	
<b>Total Fat</b> 5g	<b>8%</b>
Saturated Fat 1.5g	<b>8%</b>
<i>Trans</i> Fat 0g	
<b>Cholesterol</b> 30mg	<b>10%</b>
<b>Sodium</b> 430mg	<b>18%</b>
<b>Total Carbohydrate</b> 55g	<b>18%</b>
Dietary Fiber 6g	<b>24%</b>
Sugars 23g	
<b>Protein</b> 14g	
Vitamin A	80%
Vitamin C	35%
Calcium	6%
Iron	15%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:	
	Calories: 2,000    2,500
Total Fat	Less than 65g    80g
Saturated Fat	Less than 20g    25g
Cholesterol	Less than 300mg    300mg
Sodium	Less than 2,400mg    2,400mg
Total Carbohydrate	300g    375g
Dietary Fiber	25g    30g

# Final Thoughts on Labels

---

- Hire a graphic designer with experience with food labels to design your label
- Find a printer with experience with food labels
  - Use standard label stock to minimize costs
  - Print in larger quantities to reduce costs





# Evaluating Cost for Farmer's Ratatouille; A Value-Added Food Product from Surplus Produce

# Grant Overview

---

- In 2021, the University of Arkansas System Division of Agriculture (UA System) received a grant from the United States Department of Agriculture (USDA) Agriculture Marketing Service (AMS) Farmers Market Promotion Program (FMPP)
- Expanding Farmers' Opportunities in Northwest Arkansas



# Project Goals

---

Partner with horticultural produce growers in Northwest Arkansas to develop value-added products from their surplus produce (unsold or second-grade) with a focus on **shelf stable value-added products**

- The recipe for the product will be developed by a team at Brightwater Center for the Study of Food
- The product will be made using a food manufacturing facility, the UA System Arkansas Food Innovation Center (AFIC).
- A team at the University of Arkansas Walton College of Business will develop a business plan to guide the new venture.
- These services will be provided at no cost to the selected partnering growers.
- The value-added products can be sold by the grower at the Farmers Market or other venues.

# Project Team

## UA System Food Science Department



Dr. Renee Threlfall,  
Research Scientist



Dr. Jeyam Subbiah,  
Department Head



John Swenson,  
Manager  
Arkansas Food Innovation Center



Andrea Myers,  
Program Technician

## Brightwater a Center for the Study of Food



Dr. Steven Jenkins,  
Faculty member and  
Department Chair

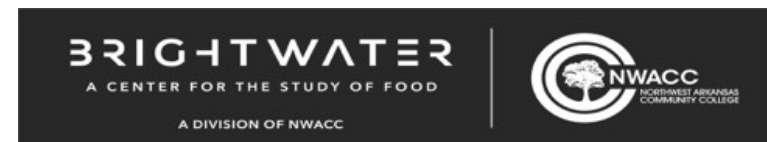
## UA Sam Walton College of Business



Dr. Rogelio Garcia  
Contreras,  
Director  
Social Innovation at  
the Strategy, Entrepreneurship, &  
Venture Innovation Department



Rodrigo Salas  
Adjunct Professor



# Produce Grower

---

- Regional product growers asked about issues with surplus produce
- McGarrah Farms, Pea Ridge, AR had surplus of tomatoes and squash



Dennis McGarrah, owner and operator of McGarrah Farms located in Pea Ridge, AR



# Produce Grown and Pre-processed

---

- In Summer 2022, produce collected, washed, pre-processed, and frozen
  - 460 kg (1,014 lbs) tomatoes
  - 136 kg (300 lbs) summer squash



# Recipe Development

---

- Recipe for Farmer's Ratatouille created and finalized by April 2023



# Product Productions

---

- Product produced June 1, 2023
- 640 16 oz jars produced



# Farmer's Ratatouille

- Vegetable dish consisting of onions, zucchini, tomatoes, eggplant, and peppers, fried and stewed in oil and sometimes served cold



**GROWN BY**  
**McGARRAH**  
**FARMS**  
NORTHWEST  
IN ARKANSAS

16329 N. Old Wire Road, Garfield, AR 72732

**FARMER'S**  
**RATATOUILLE**

**Arkansas**  
MADE

16 oz (454 g)

**Arkansas**  
GROWN

Nutrition Facts	
4 servings per container	
<b>Serving size</b>	1/2 cup (114g)
Amount Per Serving	
<b>Calories</b>	<b>45</b>
*% Daily Value*	
<b>Total Fat</b> 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
<b>Cholesterol</b> 0mg	0%
<b>Sodium</b> 290mg	13%
<b>Total Carbohydrate</b> 9g	3%
Dietary Fiber 3g	11%
Total Sugars 3g	
Includes 0g Added Sugars	0%
<b>Protein</b> 1g	2%
Vitamin D 0mcg	0%
Calcium 67mg	6%
Iron 2mg	10%
Potassium 155mg	4%

**INGREDIENTS:** TOMATOES, SQUASH, ZUCCHINI, EGGPLANT, ROASTED RED PEPPERS (PEPPERS, WATER, SEA SALT, AND CITRIC ACID), GARLIC, BASIL, THYME, AND SALT

Produced at the Arkansas Food Innovation Center, Fayetteville, AR

\*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

# Types of Costs

---

Start Up Costs	Cost (\$)
Label Design	400
Nutrition Facts Panel	30
pH Reading	100
Process Authority Certification	150
Arkansas Department of Health Permit	35
<b>Total</b>	<b>\$715</b>

Ingredients	Cost (\$)
Tomatoes	0
Roasted Red Peppers	272
Squash	0
Eggplant	123
Spices	134
<b>Total</b>	<b>\$529</b>

Labor	Cost (\$)
Pre-processing	975
Production	780
<b>Total</b>	<b>\$1,755</b>

Other Expenses	Cost (\$)
Jars & Lids	649
Freezer Storage Bags	98
Labels	0
Insurance	300
Facility Rental	510
Freezer Storage	440
<b>Total</b>	<b>\$1,997</b>

# Total Costs

---

Total Cost	Year 1 Cost (\$)	Year 2 Cost (\$)
Ingredients	529	135
Other Expenses	2,068	1,997
Labor	1,755	1,755
<b>Total</b>	<b>\$4,996</b>	<b>3,887</b>



# Cost Analysis

---

- Year one
  - Cost was \$6.49/16 oz (454 g) jar
  - For 30% profit, cost would be \$9.27/16 oz (454 g) jar
- Subsequent years (if grower provides tomatoes, squash, red peppers, and eggplant)
  - Cost will be \$5.98/16 oz (454 g) jar
    - Cost decrease of \$0.51 as compared to Year one
  - For 30% profit, could would be \$8.54/16 oz (454 g) jar

# Cost Overview

---

- Year one was highest cost for the product
- In subsequent years, costs less because some items are one-time costs
  - Product Development
  - Label Design
  - Nutrition Facts Panel
  - Process Authority Certification
- Grow most of produce for recipe to reduce costs
- Work with local food hubs or community supported ag
- Build onsite pre-processing faculty
  - Wash, pre-process, and freeze





# Conclusion: Improving Economic Feasibility using Surplus Produce for Value-added Food Production

---

- Reduce labor costs
  - Create a recipe for mechanized production
  - Use interns or volunteers
- Use a different production facility to lower costs
  - Build on-farm production site
  - Use a church kitchen, restaurant, or co-op kitchen
- Reduce packaging costs
  - Use alternate packaging
  - Semi-production into larger containers for bulk use
- Work with several farmers or farmers markets with more surplus produce potential

# Thank You to our Sponsors!



UNIVERSITY  
*of* ARKANSAS  
AT PINE BLUFF  
1873



Funding for these webinars provided by the Arkansas Department of Agriculture through the USDA Specialty Crop Block Grant Program.