QR-Based Product Portal – Comprehensive Documentation (Revised)

# 1. Overview

This portal is a niche, deeply explanatory QR-based product education platform that gives users detailed information about the products they consume. By scanning a QR code on a product, users are taken to a product-specific page containing nutritional values, ingredients, additives, and even adulteration-related information. The portal also uniquely provides insights into how cooking methods affect nutrient composition, offering best-use suggestions for every consumable item.

# 2. Core Features

- Ingredient Intelligence: Functions, uses, and descriptions of every ingredient.

- Additive Transparency: Safety, function, E-numbers, global regulations.

- Nutrient Label Breakdown: Macronutrients, micronutrients, and their health roles.

- Cooking Impact Engine: Shows how boiling, frying, roasting, etc., alter nutrition.

- Best Use Suggestions: Contextual recommendations for oils, spices, fruits, vegetables.

- Adulteration Awareness: Alerts and tests for common adulterants in food items.

- Scan & Compare: Future feature to compare two similar products based on nutrition.

# 3. User Flow

1. User scans a QR code which carries a unique product ID.

2. If logged in, redirected to product information page.

3. If not, redirected to register/login page and returned after authentication.

4. Product page shows structured and educational breakdown.

# 4. Content Structure on Product Page

- Product Overview (Name, Image, Brand, Description)

- Ingredient Table (Name, Function, Purpose)

- Additives Table (E-Code, Name, Role, Global Safety Info)

- Nutrition Label Table (Macronutrients, Vitamins, Minerals, Function)

- Cooking Impact Section (Nutrient loss/gain per method)

- Recommended Usage & Preparation Tips

- Adulteration Details if applicable

# 5. Cooking Method Impact Example – Potato

| Method | Vitamin C | Potassium | Resistant Starch | Calories |  
|------------|-----------|-----------|------------------|----------|  
| Raw | 100% | 100% | 100% | 77 kcal |  
| Boiled | -50% | -25% | -80% | 86 kcal |  
| Fried | -60% | -30% | -90% | 312 kcal |  
| Roasted | -55% | -20% | -85% | 140 kcal |

# 6. Sample Ingredient – Sunflower Oil

| Use | Recommended | Reason |  
|--------------|-------------|------------------------------------------|  
| Deep Frying | No | Polyunsaturated fats break down easily |  
| Stir Frying | Yes | Stable at medium-high heat |  
| Salads | Yes | Light flavor and rich in Vitamin E |

# 7. Nutrition Reference Tables

Vitamins:

| Vitamin | Alias | Function |  
|---------|---------------|------------------------------------------|  
| A | Retinol | Eyes, skin, immune system |  
| B1 | Thiamine | Energy conversion |  
| B6 | Pyridoxine | Brain and nerve function |  
| B12 | Cobalamin | RBC production, nerve protection |  
| C | Ascorbic Acid | Immunity, antioxidant, collagen synthesis|  
| D | Cholecalciferol | Bone health, calcium absorption |  
| E | Tocopherol | Antioxidant, cell protection |  
| K | Phylloquinone | Blood clotting and bone metabolism |

Minerals:

| Mineral | Function |  
|-----------|--------------------------------------------|  
| Calcium | Bone and teeth, muscle contraction |  
| Iron | Oxygen transport, hemoglobin |  
| Potassium | Fluid balance, nerve signals |  
| Magnesium | Muscle/nerve function, blood pressure |  
| Zinc | Immunity, skin, DNA repair |  
| Selenium | Antioxidant, thyroid support |

# 8. Trusted Data Sources

- USDA FoodData Central (API + CSV)

- ICMR-NIN Indian Food Composition Table (IFCT)

- FSSAI – Additive regulations, permissible limits

- Codex Alimentarius – Global food safety standards

- Research Journals – Nutrient loss by cooking studies

# 9. Future Scope

- Scan & Compare Mode

- Personalization based on dietary preference

- Ingredient origin and traceability

- Multi-language support