Food AI Database Schema

BigQuery Data Warehouse Documentation

Overview

The Food AI database is a comprehensive health and nutrition data warehouse hosted on Google BigQuery. It combines data from USDA FoodData Central and Dr. Duke's Phytochemical Database to provide AI-powered nutrition intelligence and health recommendations.

Dataset	aialgotradehits.health_nutrition_warehouse
Project	aialgotradehits (Google Cloud Platform)
Total Foods	11,166 records
Nutrient Records	8,790 records
Phytochemicals	104,388 records
Health Activities	28,929 records
Traditional Uses	82,873 records

Data Sources

Source	Records	Description
USDA_SR28	8,790	USDA Standard Reference database with comprehensive nutrient data
DUKE_PHYTOCHEM	2,376	Dr. Duke's Ethnobotanical Database with phytochemicals

Table: foods

The central table containing all food and plant entries. Links to all other tables via food_id.

Column	Type	Description
food_id	STRING (PK)	Unique identifier for each food/plant
source	STRING	Data source: USDA_SR28 or DUKE_PHYTOCHEM
ndb_no	STRING	USDA NDB Number (for USDA foods)
fnf_num	INTEGER	Dr. Duke's FNF Number (for phytochem data)
food_name	STRING	Primary name of the food or plant
scientific_name	STRING	Scientific/taxonomic name
common_names	ARRAY<STRING>	Alternative names for the food
food_group	STRING	USDA food group category
plant_family	STRING	Botanical family (e.g., Rosaceae)
plant_part	STRING	Part used: fruit, leaf, root, seed, etc.
usage_type	STRING	FOOD, MEDICINAL, or BOTH
is_whole_food	BOOLEAN	True if minimally processed
is_medicinal_plant	BOOLEAN	True if used in traditional medicine
created_at	TIMESTAMP	Record creation timestamp

Table: food_nutrients

Complete nutritional profile for each food. All values per 100g serving.

Column	Type	Description
food_id	STRING (FK)	Links to foods table
energy_kcal	FLOAT	Calories per 100g
protein_g	FLOAT	Protein in grams
total_fat_g	FLOAT	Total fat in grams
carbohydrate_g	FLOAT	Carbohydrates in grams
fiber_g	FLOAT	Dietary fiber in grams
sugar_g	FLOAT	Total sugars in grams
calcium_mg	FLOAT	Calcium in milligrams
iron_mg	FLOAT	Iron in milligrams
magnesium_mg	FLOAT	Magnesium in milligrams
potassium_mg	FLOAT	Potassium in milligrams

zinc_mg	FLOAT	Zinc in milligrams
vitamin_c_mg	FLOAT	Vitamin C in milligrams
vitamin_a_iu	FLOAT	Vitamin A in IU
vitamin_d_mcg	FLOAT	Vitamin D in micrograms
vitamin_e_mg	FLOAT	Vitamin E in milligrams
vitamin_k_mcg	FLOAT	Vitamin K in micrograms
vitamin_b6_mg	FLOAT	Vitamin B6 in milligrams
vitamin_b12_mcg	FLOAT	Vitamin B12 in micrograms
folate_mcg	FLOAT	Folate in micrograms

Table: food_phytochemicals

Phytochemical compounds found in foods/plants with concentration data.

Column	Type	Description
food_id	STRING (FK)	Links to foods table
chemical_name	STRING	Name of phytochemical (e.g., Quercetin, Curcumin)
chemical_id	STRING	Normalized identifier
cas_number	STRING	CAS Registry Number
chemical_class	STRING	Class: flavonoid, alkaloid, terpene, etc.
plant_part	STRING	Plant part containing the compound
amount_low_ppm	FLOAT	Low concentration in parts per million
amount_high_ppm	FLOAT	High concentration in parts per million
amount_avg_ppm	FLOAT	Average concentration in PPM
reference	STRING	Literature reference

Table: food_health_activities

Health benefits and biological activities of phytochemicals.

Column	Type	Description
food_id	STRING (FK)	Internal reference (link via active_compound)
activity	STRING	Health activity (e.g., Antiinflammatory)
activity_category	STRING	Broad category of the activity
mechanism	STRING	How the compound produces the effect
source_type	STRING	NUTRIENT, PHYTOCHEMICAL, WHOLE_FOOD
active_compound	STRING	Chemical providing the benefit
evidence_type	STRING	CLINICAL, TRADITIONAL, IN_VITRO, RESEARCH
evidence_strength	STRING	STRONG, MODERATE, PRELIMINARY
effective_dose	STRING	Dosage if known

Table: food_traditional_uses

Traditional and ethnobotanical uses of plants across cultures.

Column	Type	Description
`food_id`	STRING (FK)	Links to foods table
`traditional_use`	STRING	Condition or purpose (e.g., Diabetes, Fever)
`preparation_method`	STRING	How traditionally prepared
`country_region`	STRING	Geographic origin of the use
`culture_community`	STRING	Specific culture or community
`body_system`	STRING	Body system affected (see list below)
`reference`	STRING	Literature reference

Body Systems:

Cardiovascular, Digestive, Endocrine, General, Immune, Integumentary, Musculoskeletal, Nervous, Reproductive, Respiratory, Urinary

Table Relationships

Primary Relationships:
• foods.food_id → food_nutrients.food_id (1:1)
• foods.food_id → food_phytochemicals.food_id (1:many)
• food_phytochemicals.chemical_name → food_health_activities.active_compound (many:many)

Important Note: The food_health_activities table links to foods through the food_phytochemicals table by matching active_compound to chemical_name. This allows finding foods with specific health benefits through their phytochemical content.

Sample SQL Queries

1. Find Foods High in Vitamin C

```
SELECT f.food_name, n.vitamin_c_mg
FROM foods f
JOIN food_nutrients n ON f.food_id = n.food_id
WHERE n.vitamin_c_mg > 0
ORDER BY n.vitamin_c_mg DESC
LIMIT 20
```

2. Find Anti-inflammatory Foods

```
SELECT DISTINCT f.food_name, a.activity, a.active_compound
FROM food_health_activities a
JOIN food_phytochemicals p
ON LOWER(a.active_compound) = LOWER(p.chemical_name)
JOIN foods f ON p.food_id = f.food_id
WHERE LOWER(a.activity) LIKE '%antiinflammatory%'
LIMIT 30
```

3. Find Foods for Digestive System

```
SELECT f.food_name, t.traditional_use, t.country_region
FROM food_traditional_uses t
JOIN foods f ON t.food_id = f.food_id
WHERE t.body_system = 'Digestive'
LIMIT 30
```

4. Find Foods Containing Quercetin

```
SELECT f.food_name, p.chemical_name, p.amount_avg_ppm
FROM food_phytochemicals p
JOIN foods f ON p.food_id = f.food_id
WHERE LOWER(p.chemical_name) LIKE '%quercetin%'
ORDER BY p.amount_avg_ppm DESC NULLS LAST
LIMIT 20
```

API Endpoints

Base URL: https://homeoherbal-api-1075463475276.us-central1.run.app

Endpoint	Method	Description
`/api/nl2sql/ask`	POST	Natural language queries (NL2SQL)
`/api/quick/nutrient-rich?nutrient=X`	GET	Foods high in nutrient X
`/api/quick/health-benefit?q=X`	GET	Foods with health benefit X
`/api/quick/body-system?system=X`	GET	Foods for body system X
`/api/quick/phytochemical?q=X`	GET	Foods containing phytochemical X
`/api/food/search?q=X`	GET	Search foods by name

`/api/stats`	GET	Database statistics

Sample Health Activities in Database

Antiinflammatory, Antioxidant, Anticancer, Antimicrobial, Antiviral, Antibacterial, Antifungal, Immunostimulant, Cardioprotective, Hypoglycemic, Hepatoprotective, Neuroprotective, Analgesic, Antipyretic, Sedative, Anxiolytic, Antidepressant, ACE-Inhibitor, 5-Lipoxygenase-Inhibitor, COX-2-Inhibitor, Antidiabetic, Antihypertensive

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Food AI - AI-Powered Nutrition & Health Intelligence