FoodOn 2.0: Scalable Knowledge Infrastructure for Interoperable Food Data Across Domains

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Explore FoodOn

foodon.org

github.com/FoodOntology/foodon

1 WHAT IS FOODON?

FoodOn is an open-source OBO Foundry ontology that bridges food and life science data by linking food concepts to interoperable ontologies and external resources, including taxonomic, anatomical, and chemical knowledge domains, enabling cross-domain queries from organism to nutrient.

40,000+ terms covering food items, taxonomy, anatomy, nutrients, and food processes

Community-driven · GitHub

OWL · OBO Foundry · Open Source

FAIR · Interoperable · Reusable

2 FOODON 2.0: WHAT'S NEW?

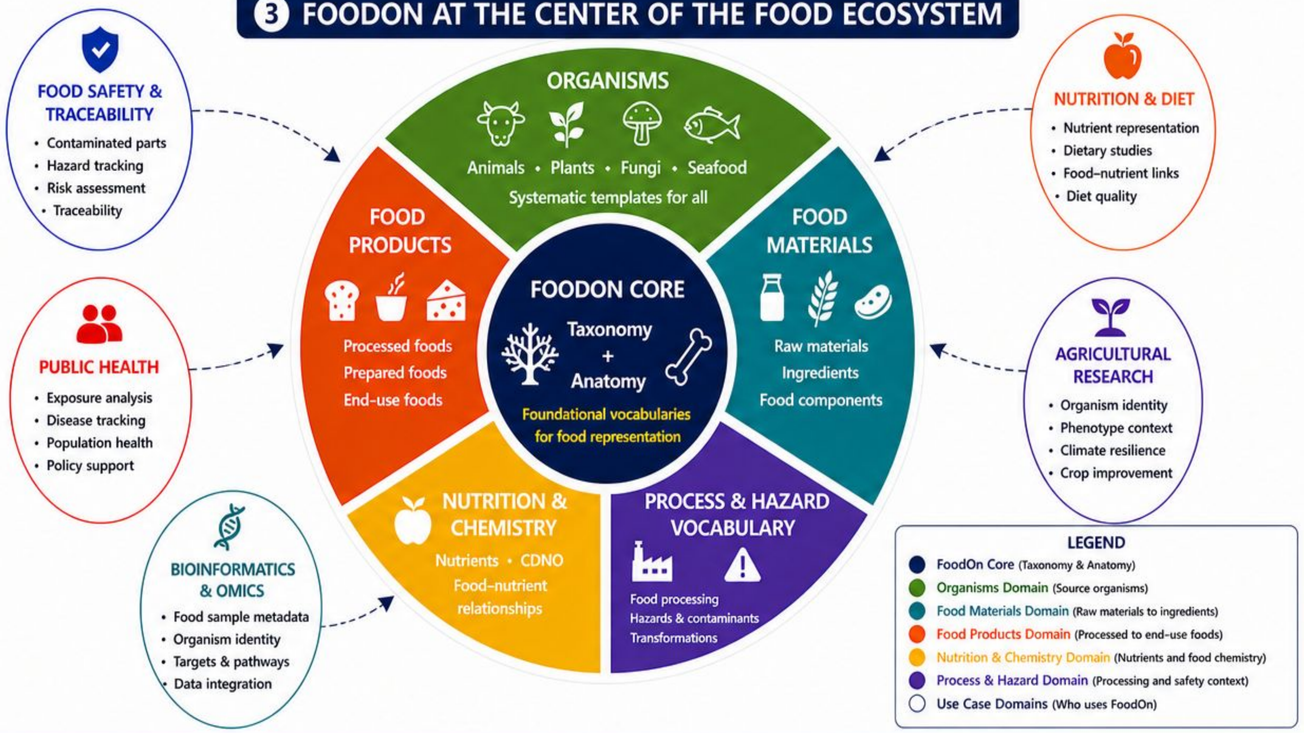
Refined upper-level structure
Clear conceptual separation of: organism → material → product

Systematic template-based modeling
Scalable patterns for: Animals, Plants, Fungi, Seafood

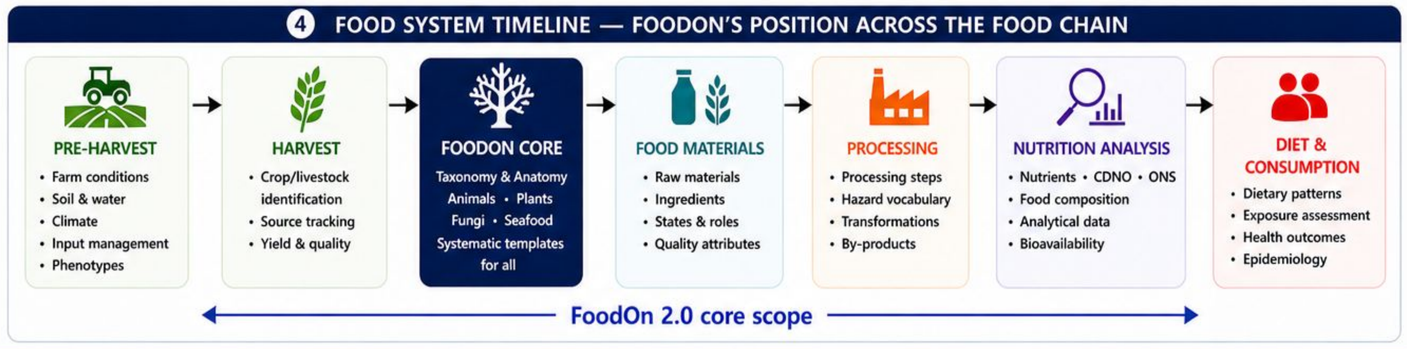
Expanded biological foundations
Extensive alignment with UBERON, PO, and NCBITaxon

Reusability and Community
Reusable patterns and Collaborative curation accelerate development and long-term sustainability.

3 FOODON AT THE CENTER OF THE FOOD ECOSYSTEM



4 FOOD SYSTEM TIMELINE — FOODON'S POSITION ACROSS THE FOOD CHAIN



5 FOODON 2.0 IMPACT

- Interoperable food data across nutrition, agriculture, safety, and omics domains
- Wikidata integration enables cultivar-level coverage for the first time
- Refined hierarchy (organism → material → product) enables precise food state and role representation
- Systematic templates replace ad hoc curatio, reducing errors and making future expansion reproducible. Validated across USDA, PTFI datasets.
- Open source, OBO Foundry compliant, community-governed, FAIR, and freely reusable

6 DATASET INTEGRATION

Real world datasets FoodOn mapped to:
USDA SR Legacy Database
USDA Foundation Foods
Periodic Table Food Initiative (PTFI)
Wikidata (Cultivars)
FDA Seafood
Integrated Taxonomic Information System (ITIS)]

Scan the QR code to access the web resources

7 FUTURE WORK

Mapping between FoodOn and FoodEx2
For improved interoperability and standardized food data exchange

LLM-Driven Automation
Leveraging LLMs to automate food term mapping and ontology alignment

Multi-ingredient & Processed Foods
Extend templates to cover composite food products.

8 HOW TO GET INVOLVED

Contribute terms: Submit new terms or report gaps via GitHub Issues or Pull Requests
github.com/FoodOntology/foodon

Use FoodOn: Freely available in OWL/OBO format via OBO Foundry:
obofoundry.org/ontology/foodon

Join: Open community calls, welcome to all contributors.

Contact us:
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9 REFERENCES

FoodOn: Dooley DM et al. (2018). npj Science of Food 2:23
OBO Foundry: Smith B et al. (2007). Nature Biotechnology 25:1251
LanguaL: Møller A & Ireland J. (2018). *Journal of Food Composition and Analysis*
ROBOT: Jackson R et al. (2019). Journal of Biomedical Semantics 10:17

TAKE-HOME MESSAGE

FoodOn 2.0 provides core food vocabularies (taxonomy & anatomy) that connect to broader ontologies and power diverse applications across the food system — from farm to health.

Open Ontology OBO Foundry

Scalable & Systematic

Interoperable & FAIR

CIDGOH

Genome British Columbia
Genomics positively impacts life, every day.

USDA