The proposed Ontology of Quantitative Research (OQR) lets scientists express the meaning of data and models and supports automated invocation of computational methods from a conceptual level. In this way, the model fills the gap between humans interpreting textual information and computers processing the underlying data and mathematical models. An important part of OQR is the Ontology of Units of Measure and related concepts, such as quantities, measures, and measurement scales (UM). OQR is based on widely-accepted principles of the philosophy of science. Expressing a case of quantitative food research in OQR demonstrates the quality of the model. Applications in quantitative e-science tools and evaluations of these tools confirm the usefulness of the Semantic Web approach and to which extent the tools and the ontology already support quantitative research. Heuristic rules convert and annotate legacy data stored in a spreadsheet to a semantic representation.