

Specialization of the Process and Observation Ontology (PO2) with the Environmental Biorefinery Ontology (EBO) for experimental process data

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Abstract:

At the scientific level, the challenge is to develop and implement a data structuring model with a common vocabulary, and to provide scientists with a set of IT tools to manage their data throughout its life cycle, ensuring that it complies with the principles of Findable, Accessible, Interoperable and Reusable (FAIR) data management.

In the fields of biorefinery and food processing, the EBO Environmental Biorefinery Ontology and the PO2 Process and Observation Ontology describe transformation processes with different scopes, but with common objects of study. Both ontologies are based on high-level ontologies (Dublin Core, FOAF, SOSA, PROV-O, BFO, SOSA, IAO and TimeOntology). EBO is implemented in an EnviBIS information system, based on the OpenSILEX open-source software suite. EBO integrates the notion of PO2 stages and sequences. In addition, EBO draws on the RDA group's I-ADOPT ontology for the description of scientific variables. Applications are illustrated on the one hand with a composting bench where two bioreactors are replicated, and on the other with a cascade fermentation process where different conditions are applied.

This specialization of PO2 with EBO facilitates, in the short term, the exchange of information between the two EnviBIS and Bagatelet systems. In the longer term, it will enable the scientific community in this field to publish, share and exchange data using semantic web tools. The use of reference ontologies will enable the exploitation of environmental biorefinery data such as that from the INRAE LBE unit, and more generally of experimental data on transformation processes such as those from the INRAE Transform department.

Keywords: biorefinery, information systems, ontology, FAIR data, experimentation data, processes, transformation, interoperability