NoAW project

Innovative approaches to turn agricultural waste into ecological and economic assets

Horizon 2020 project : **2016-2020**

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The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688338.

What NoAW will offer ?

NoAW aims to pave the way for **a sustainable agro-waste bio-refinery concept** by shifting from an a-posteriori environmental assessment to **an early eco-design approach**.

NoAW targets to unlock the **potential of agro-waste to be converted into a portfolio of eco-efficient products**: **bio-energy**, **bio-fertilizers**, **bio-packaging** and **bio-molecules**, in symbiosis with urban waste conversion.

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Concept of NoAW:

The concept of the NoAW consists in involving all agriculture chain actors at the territory level in order to:

- **Develop innovative eco-design and assessment tools of circular agro-waste management** strategies and address related gap of dialogue, knowledge and data;

- **Improve agro-waste resources use efficiency** by upgrading the most widespread mature technology and by eco-designing **innovative bio-processes and products**;

- Ensure and accelerate the **development of new business concepts and stakeholders** platform for **cross-chain valorisation of agro-waste** on a territorial and seasonal basis.

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Major challenges:

NoAW will take up in a coherent manner, the five following major challenges for **ensuring sustainable agro-wastes uses**:

1. Inappropriate materials and knowledge flows management resulting in unbalanced nutrients distributions, contaminants accumulation and agro-waste conversion issues;

- *NoAW solution*: **territorial "cyclifiers"** i.e. stakeholders and materials streams connectors

2. Lack of adequate and early prediction of environmental and economic consequences of agro-waste management strategy and clear guidance to end-users;

- *NoAW solution*: **eco-design approach and multi-criteria decision tools**

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Major challenges:

3. Weaknesses of existing technologies for converting agro-wastes into biogas and bio-fertilizer;

- *NoAW solution*: **innovative eco-efficient AD technologies**

4. Bottlenecks for innovative building blocks, molecules and materials issued from agro-waste;

- *NoAW solution*: **breakthrough technology** on agro-waste conversion and bio-refinery concept

5. Lack of integration of agro-waste business in a circular economy concept;

- *NoAW solution:* a cross sectorial vision to bridge the gap between agro-waste science and business opportunity in order to **promote agro-waste industrial ecology concept**

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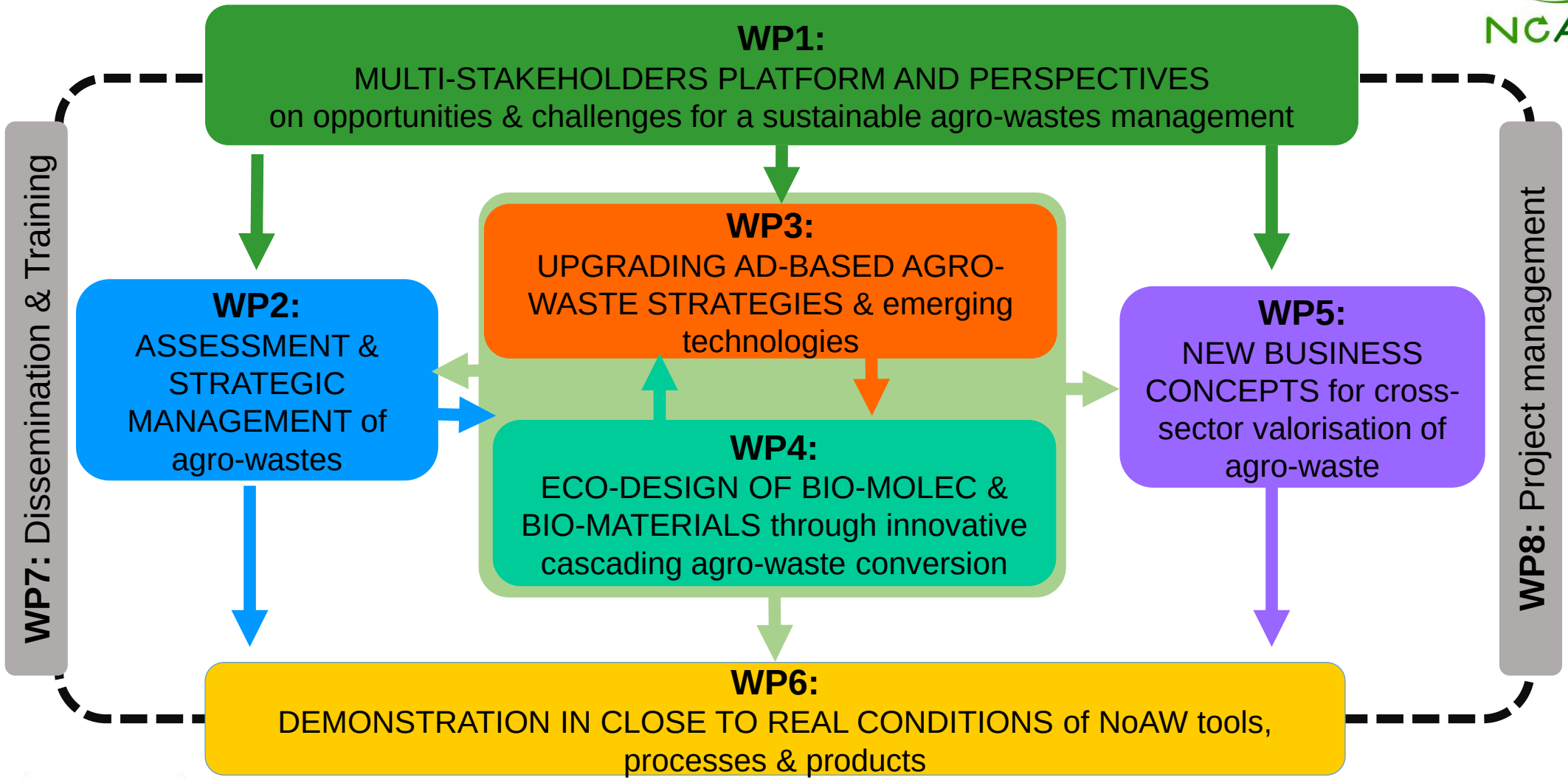
Structure of NoAW:



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WP1: Multi-stakeholders platform and perspectives & challenges for a sustainable agro-wastes management

- **Objectives:**
  - Establishment the Knowledge Exchange Stakeholder Platform (KESP)
  - Create opportunity to build and share resources, data, experiences, knowledge, skills and ideas
- **Achievements:**
  - **KESP platform established**, has already 29 members
  - **Tools for data management** are operational
  - Method for **analysing waste and losses of agro food supply chains** was developed.
  - Surveys to **analyse stakeholders perception and opinion** were carried out.
  - **GIS** (Geographic Information system) **application is operational** and is being applied in the case study work of the technical work-packages
  - **Key indicators and methodologies** for assessing the impact of waste management was identified and will be the basis of further work

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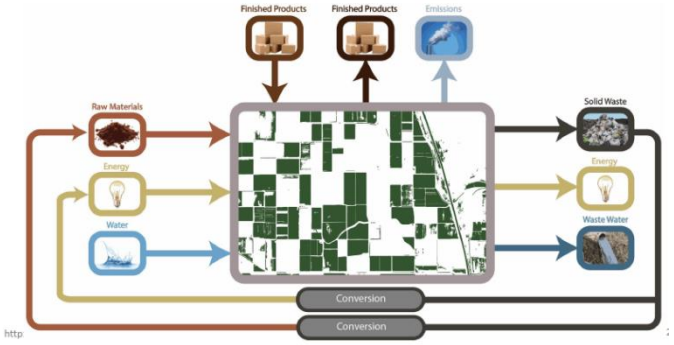
WP2: ASSESSMENT & STRATEGIC MANAGEMENT of agro-wastes

- **Objectives in first period**
  - Develop decision support to guide technology development and
  - Choose the best strategy for valorisation of agro-industrial wastes
- **Achievements**
  - Methodologies to be used in decision support including **system boundaries and attributes** were defined and adapted
  - **Hybrid TM-LCA** methodology established
  - Methodology for **MCE** of planned activities is defined
  - **Approach established for LCA** at early development stages



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WP3: UPGRADING AD-BASED agro-waste strategies & emerging technologies

- **Objectives in first period:**
  - Optimised use of nutrients in anaerobic digestate from agro-waste
  - Improve biogas technologies: enlarge possible feedstocks for biohythane production, biogas upgrade, sustainable PHA production
- **Achievements:**
  - **Nutrient studies** on filed showed that NIR application helps the better use of nutrients for AD digestate
  - **Pilot plant**s were established:
    - for innovative technology → for producing Hydrogen, biogas, PHA and bio-methane in the same plant
    - for enlargement of platform of feedstocks by using pre-, post treated ligno-cellulosic biomass

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WP3: UPGRADING AD-BASED agro-waste strategies & emerging technologies

Nutrient studies

Pilot plant -hydrogen, biogas, biomethan & PHA production

Pilot plant –for pre- & post treatment of feedstock

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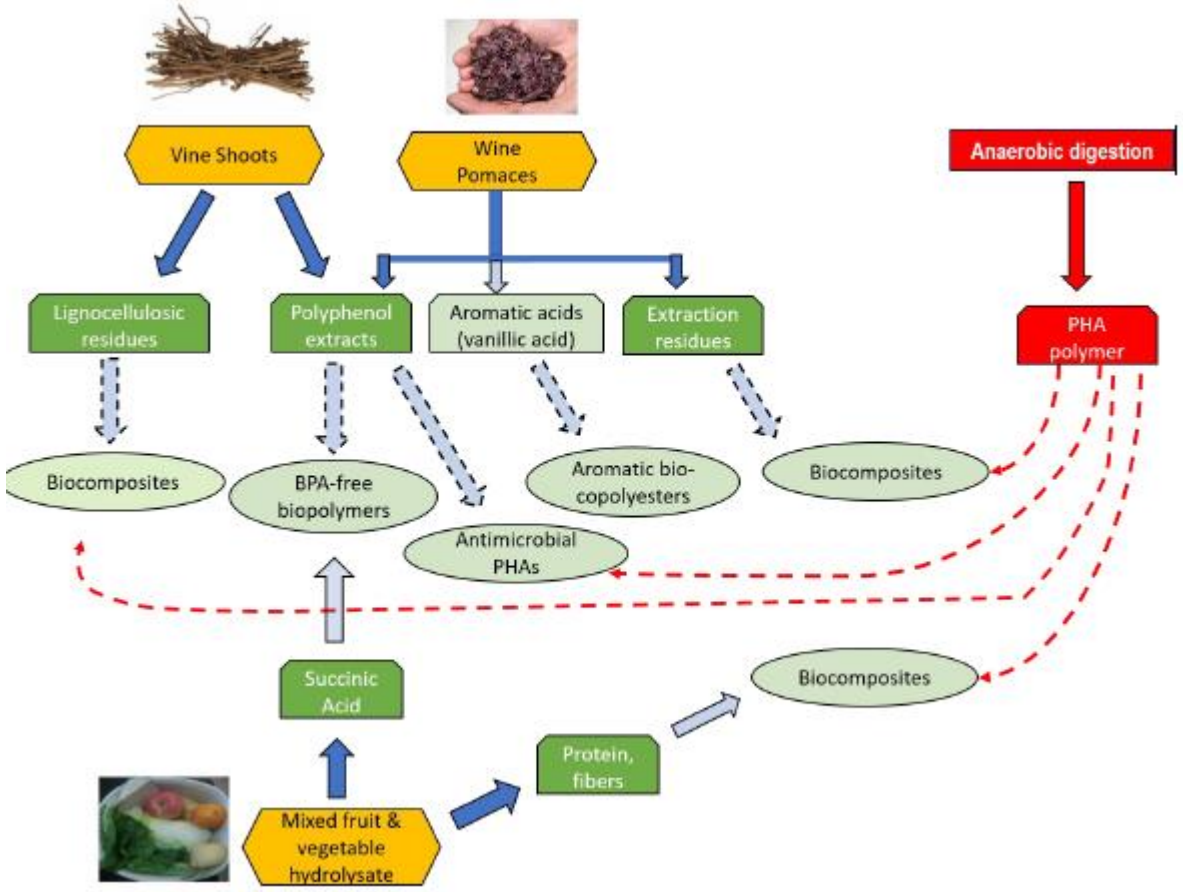
WP4: ECO-DESIGN OF BIO-MOLEC & BIO-MATERIALS through innovative cascading agro-waste conversion

- **Objectives in first period:**

  - To develop cascading activities to convert agro-wastes and AD by products into biomolecules, chemicals, building block
  - Develop high value added final products in order to substitute non-renewal equivalents



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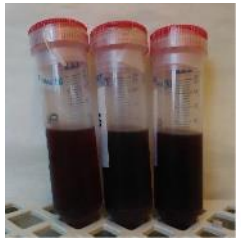
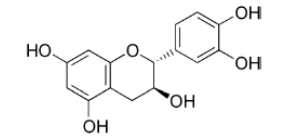
WP4: ECO-DESIGN OF BIO-MOLEC & BIO-MATERIALS through innovative cascading agro-waste conversion

- **Achievements**
  - **Valorisation of vine shoots**
    - Depolimeriziation of condensed tannins to prepare new building blocks as alternatives of petro-derived chemicals (e.g: bisphenol A)
    - Preparation of PHA & cellulose based bio-composites
  - **Wine pomace**
    - Polyphenol extraction for different procedure (valorising its antibacterial, antioxidants effects)
  - **Vegetable waste**
    - Production of succinic acid, a building block of biodegradable plastic
  - **Volatile Fatty Acids**
    - Three-fold concentration by membrane based technology
    - Production of PHA from VFA using photosynthetic organism





HORIZON 2020

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WP5: NEW BUSINESS CONCEPTS for cross-sector valorisation of agro-waste

- **Objectives in first period:**
  - Understanding existing business models and key success and failures factors for cross sector valorisation of waste streams
- **Achievements:**
  - **Inventory of existing clusters** and waste valorisation initiatives (worldwide):33 initiatives analysed
    - Long-list of success and failure factors (situation related)
  - Preparing **market/business analysis** of NoAW cases
    - Inventory of initiatives + status + prices (intended products WP3)
    - Preparation of tools + data for cost-benefit analysis

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WP6: DEMONSTRATION IN CLOSE TO REAL CONDITIONS of NoAW tools, processes & products

- **Objectives:**
  - Technological validation of one selected conversion chain and platform developed in WP3 and WP4

- WP6 starts in Month24 -> experimental work has not started
  - Task Advisory function of WP6 members in other WPs regarding up-scaleability
  - Leading the discussions into a direction to enable further industrial implementation

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WP7: Dissemination & Training

- **Objectives:**
  - ensure that the results of the project are communicated to the main stakeholders, through appropriate methods and format for them
  - which enable the effective use of the new knowledge.
- **Achievements:**
  - project website with two different levels of access was developed
  - activities such as papers, workshops, NoAW research summary sheets etc. also contributed to create awareness of the project and reached more than 13 000 stakeholders
  - Twitter, and LinkedIn pages ensure social media coverage, will reach different target audiences.
  - group young NoAW researchers is established (25 members)

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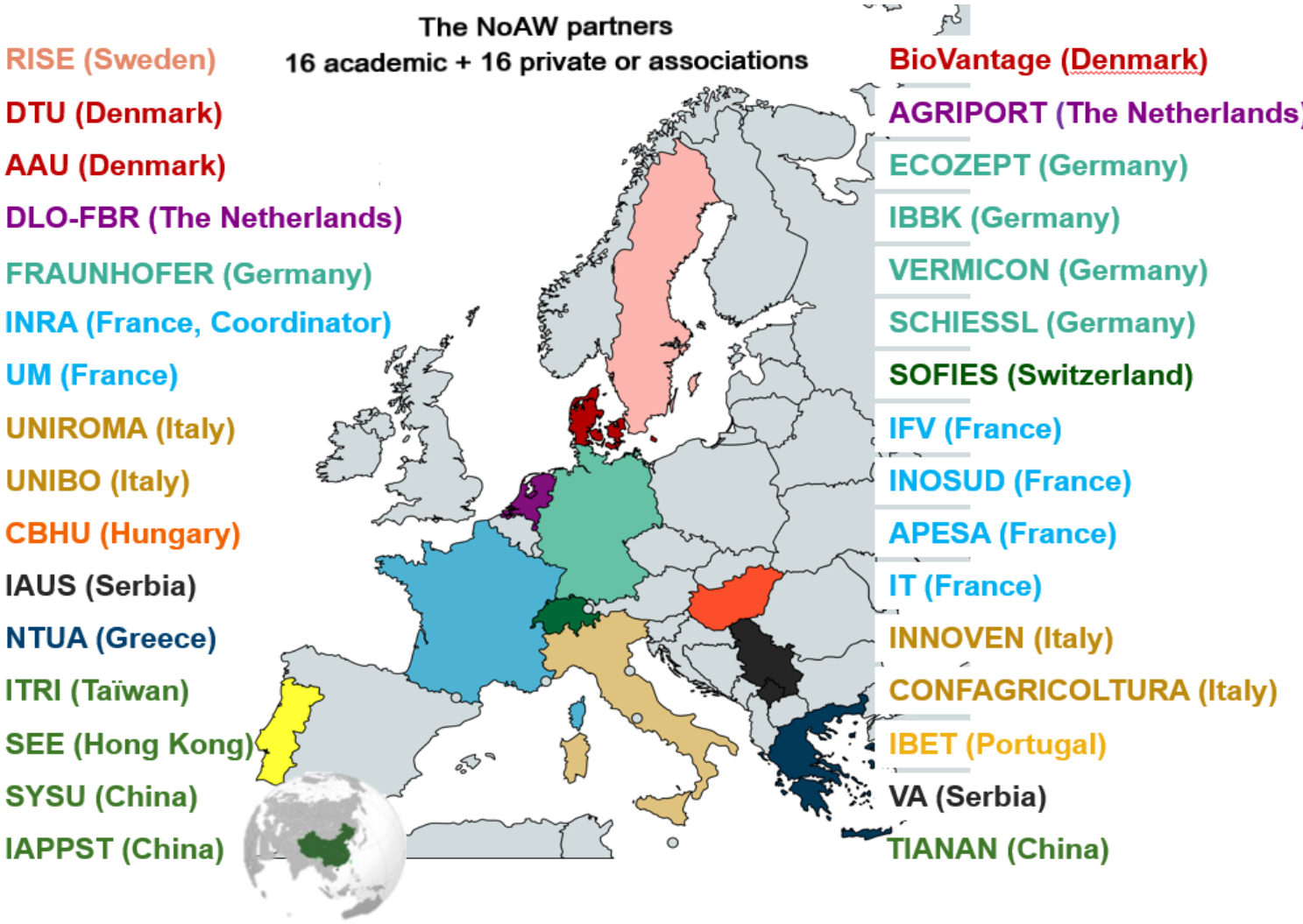
NoAW project partners



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Thank you for your attention

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