SUSTLIVES

SUSTaining and improving local crop patrimony in Burkina Faso and Niger for better LIVes and EcoSystems

Brief description of the SUSTLIVES project

SUSTLIVES (SUSTaining and improving local crop patrimony in Burkina Faso and Niger for better LIVes and EcoSystems) is a delegated cooperation program that started in August 2021, lasting four years. Supported by funding from the European Union, the program is implemented in Burkina Faso and Niger by the Italian Agency for Development Cooperation, in close partnership with CIHEAM Bari (Mediterranean Agronomic Institute - Bari), Bioversity International and a solid network of partners from the academic world and civil society (peasant organisations, women's associations, local NGOs). The program is part of the global initiative DeSIRA (Development Smart Innovation through Research in Agriculture), which aims to contribute to the agro-ecological transformation in the Sahel, towards inclusive, sustainable and adapted agri-food production models to ongoing climate changes.

*SUSTLIVES is a multi-actor action research and partnership project aimed at valorising **neglected and underutilized crops (NUS)**, through the strengthening of the research and innovation capabilities of AKIS (Agricultural Knowledge and Innovation Systems) actors, the **development of inclusive supply chains** (particularly of women and young people) and the improvement of national and regional policies to support the sector.*

*In fact, given the strong impact of climate change on local communities and their agri-food systems, it is proving increasingly necessary to rethink the food production model through a holistic approach that can enhance **resilient and nutritious crops**, of which women often hold the local savoir faire. This approach, when based on a rigorous academic research process and a productive exchange with the rural communities of the intervention areas, could allow a real increase in productivity and ensure nutritional security for thousands of people.*

INTERNSHIP PROGRAM DESCRIPTION

Topics:

The internship will address the following topics of interest of different tasks of the project Sustlives:

- ***guardian farmers;***
- ***community seed banks;***
- ***techniques of multiplication and conservation of genetic material;***
- ***agronomic, morphological and qualitative characterization of plant species;***
- ***nutritional and functional aspects of NUS;***
- ***chemical analyses of food components exhibiting health promoting features***
- ***food security;***
- ***food safety;***
- ***potential processing, product development and marketing.***

INTERNSHIP PROGRAM DESCRIPTION

Institute of Food Sciences – CNR, Avellino

Rosa Siciliano

- ***DAY 1 (16/10/2025)***
  Welcome meeting and introduction at CNR-ISA-Avellino (Michelangelo Pascale, Rosa Siciliano)
  - presentation of the main activities and projects carried out at the Institute of Food Sciences
  - presentation of *trainers* from Burkina Faso and *Niger*, selected for this stage, and overview of their background, topics of interest and their contribution to the SUSTLIVES project
  - presentation of the CNR-ISA staff involved in the SUSTLIVES project
  - overview of the main activities programmed for the stage at CNR-ISA

- ***DAY 2 (17/10/2025)***
  Nutritional features of foods with a specific focus on selected NUS (Marika Dello Russo, Annarita Formisano)
  - Introduction to the main issues of human nutrition with particular attention to the nutritional needs of women and children.
    LAB EXPERIENCE:
    Methods to assess nutritional status and identify critical factors to achieve a healthy nutritional status.

- ***DAY 3 (20/10/2025)***

  Presentation of the SUS-MIRRI Project - Strengthening the Italian Research Infrastructure (MIRRI) for Sustainable Bioscience and Bioeconomy

  The ISACC microbial collection

  Microbial detection and identification of food-borne microorganisms by genetic and genomic approaches (Anna Reale)

  - Introduction to conventional and advanced techniques to detect food-borne microorganisms: Polymerase Chain Reaction (PCR) and Next-Generation Sequencing (NGS).

    LAB EXPERIENCE:

    Microbial isolation; DNA extraction; 16SrRNA region amplification and sequencing.

- ***DAY 4 (21/10/2025)***

  The role of diet and polyphenol-rich foods for the optimization of cardiometabolic disease prevention (Annalisa Giosuè, *Nutrition, Diabetes and Metabolism Unit, Department of Clinical Medicine and Surgery, "Federico II" University, Naples, Italy****)***

  - Introduction to principles of healthy and sustainable diets and t
  - The role of polyphenols in the optimization of the prevention of cardiometabolic diseases.

  The role of sensory analysis in assessing food quality (Livia Malorni)

  - *Introduction to sensory analysis*
  - *Notes on the physiology of the senses*
  - *Sensory vocabulary*

  LAB EXPERIENCE:

  Taste and odor recognition test

- ***DAY 5 (22/10/2025)***

  Celiac disease and biotechnological solutions (Alessandra Camarca, Lucia Treppiccione, Francesco Maurano, Errico Picariello)

  - Addressing the immuno-toxicity of gluten and the protective effects of food-derived bioactive molecules on celiac disease and other intestinal inflammatory disorders by preclinical models:
    - ex-vivo organ culture of intestinal biopsies (Alessandra Camarca)
    - gliadin-specific T cell lines from gut of celiac patients (Alessandra Camarca)
    - biotechnological solutions and *in vivo* mouse model: results obtained in the ONFOOD project (Lucia Treppiccione)

    LAB EXPERIENCE:

    Visit to the animal facility of the Institute (F Maurano)

    Visit to the immunomorfology laboratory (Errico Picariello)

  Identification of foodborne microorganisms by MALDI-TOF mass spectrometry (Rosa Siciliano, Fiorella Mazzeo)

  - Introduction to principles and analytical protocols applied to the identification of foodborne microorganisms by MALDI-TOF mass spectrometry.

    LAB EXPERIENCE:

    Identification of lactic acid bacteria by MALDI-TOF-MS.

  Proteomics in Food Science (Fiorella Mazzeo, Rosa Siciliano)

  - Basic principles of mass spectrometry
  - Introduction to proteomics
  - Application of proteomics in food science

- ***DAY 6 (23/10/2025)***
  Chemical and functional features of lipids in NUS selected for the SUSTLIVES project (Floriana Boscaino)
  - Introduction to methodologies applied to the analysis of fatty acids present in foods
    LAB EXPERIENCE:
    Extraction and chemical characterization of the fatty acids present in the NUS selected as model for this internship (Vigna (*Vigna subterranea* L. Verdc)) by Gas Chromatography – Mass Spectrometry (GC-MS).

- ***DAY 7 (24/10/2025)***
  Analysis of VOCs and their role in food quality (Floriana Boscaino)
  - Introduction to methodologies applied to the analysis of the volatile organic compounds (VOCs) present in foods.
    LAB EXPERIENCE:
    Analysis of VOCs profile in the selected NUS by headspace solid phase micro-extraction (HS-SPME) coupled to gas chromatography mass spectrometry (GC-MS).

- ***DAY 8-9 (27-28/10/2025)***
  Functional properties of NUS selected for the SUSTLIVES project: antioxidant compounds and polyphenols (Virginia Carbone)
  - Introduction to chemical and functional features of phytochemicals (in particular antioxidant compounds and polyphenols) present in foods with a special focus on the selected NUS.
  - Introduction to the main methodologies applied to the analysis of polyphenols in foods.
    LAB EXPERIENCE:
    Extraction of phenolic compounds in the selected NUS (Vigna). Spectrophotometric method for the determination of total phenolic content.
    Separation, identification, and analysis of phenolic compounds by chromatographic techniques (High Performance Liquid Chromatography-HPLC) coupled to UV-VIS spectroscopy and/or mass spectrometry

- ***DAY 10-11 (29-30/10/2025)***
  The OnFoods project: The national partnership to promote healthy, sustainable food systems and dietary patterns (Gian Luigi Russo).
  Beneficial effects of food polyphenols on human health: from research results to commercial exploitation (Gian Luigi Russo).
  Biological assays for determining the antioxidant power of polyphenols in foods (M. Russo)
  - Description of analytical methods used to determine the antioxidant power of polyphenols or extracts enriched with natural bioactive molecules, both in vitro (using the FRAP method) and in vivo (using the DCFDA method).
  - Different types of cell viability assays utilized in human experimental cellular models to assess the effects of these antioxidants.
    LAB EXPERIENCE:
    Determination of antioxidant power of natural extracts from different Vigna accessions.
    Characterization of functional properties of antioxidant extracts from different Vigna accessions using cell viability assays.

- ***DAY 12 (31/10/2025)***
  Final Discussion