vWISE : Annex 3 : Intermediate / Final activity report

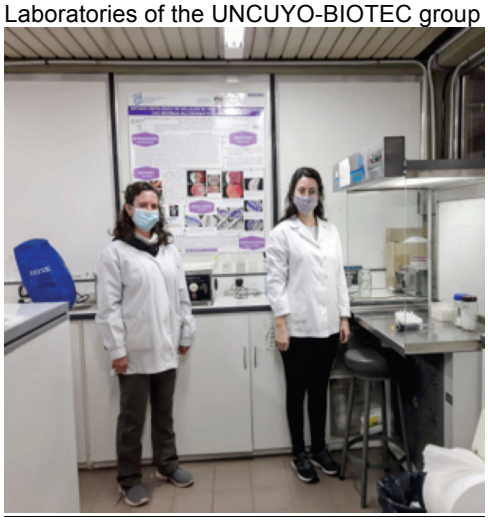
WP number	3
WP tittle	Wine and vine microbiota for innovation in winemaking and sustainability in the context of the global climate change
Beneficiary / Partner	University of La Rioja (UDLR) / National University of CUYO (UNCUYO)

Visiting Researcher

Name	Fernanda Ruiz-Larrea
Position	Professor
Home institution	UDLR (Spain)
Host institution	UNCUYO (Argentina)
Mobility period (From … to…)	11 August 2021 to 01 October 2021
Scientific contact at the host institution	Dr. Vilma Morata. Professor of the Faculty of Applied Sciences to Industry (FCAI) - UNCUYO

Prof. F.Ruiz-Larrea at UNCUYO-FCAI

Laboratories of the UNCUYO-BIOTEC group



F.Ruiz-Larrea and V. Morata at UNCUYO-FCAI

1: General progress of the project :

Based on the research mobility project, please indicate if the project:
a) has fully achieved its objectives and technical goals for the period;
b) has achieved most of its objectives and technical goals for the period with relatively minor deviations;
c) has failed to achieve critical objectives and/or is not at all on schedule.
If you answered b) or c) please include a detailed description of the modifications in the report

A: Objectives and technical goals proposed for the period (secondment nr.27 from 11/08/2021, to 01/10/2021)

Regarding **WP3:**

1) The first proposed objective was to initiate the collaboration between both research groups:
- the Argentinean group of Biotechnology of Prof. Vima Morata (UNCUYO-BIOTEC group) at the Faculty of Applied Sciences to Industry (FCAI) of UNCUYO (San Rafael-Mendoza, Argentina),
- and the Spanish group of Microbial and Enological Biotechnology (UR-BIOTEC) of Prof. F. Ruiz-Larrea at the UDLR-ICVV (Logroño, Spain).

to check the natural biodiversity of the microbiota of vine and wine as a source for improving wine quality.

2) The proposed technical goal of this secondment was to implement innovative technologies for taxonomical analyses of the natural microbiota of Argentinean vines and wines in the frame of WP3.

3) Third objective of the secondment was to initiate the screening for the selection of indigenous microbial strains that could provide useful enological applications.

Regarding dissemination (**WP5**) and transfer of knowledge and career (**WP6**), the global objective of the vWISE project was to disseminate know-how and knowledge.

4) The proposed objective for the secondment related to WP6 was to provide support to early-stage researchers at UNCUYO-FCAI and to design in collaboration with their supervisors, experiments and activities that they will be able to develop during their secondments in the laboratories of UDLR-ICVV in Spain.

5) The proposed objective related to WP5 was networking and consolidating the collaborative links between both institutions, through participation in Seminars and workshops at the host institution.

B: Achievement of the proposed objectives
The objectives and technical goal proposed for the period were fully achieved as described below.

2: Project achievement

A: Scientific highlights and research achievements

- Based on previous studies of the UNCUYO-BIOTEC group, they had collected the microbioma associated to the surface of red grapes of *Vitis vinifera* of the following varieties:
  Malbec
  Bonarda
  Cabernet franc
  during 2020 harvest in three vineyard plots of San Rafael-Mendoza region. Those samples were chosen for metagenomic analyses. This study will be part of the doctoral thesis of one Argentinean Ph.D. student that will perform a research stay at UDLR-ICVV.
- During this secondment nr. 27 of Prof. F. Ruiz-Larrea a number of meetings were carried out in situ at the laboratory of Biotechnology of UNCUYO-FCAI. It was concluded that the novel -omic technologies based on next generation sequencing (NGS) technologies, which provide massive data of DNA sequences, could be put in place with ease and were the most appropriate technologies to study the microbioma of Argentinean vines and wines.
- The achieved technical goal was the experimental design of the mentioned above project for the Ph.D. student's doctoral thesis that will be performed at the laboratories of UDLR-ICVV.

The protocols for high-throughput DNA extraction, and for PCR metabarcoding combined with Illumina primers were established.

- With respect to the third proposed objective of selection of indigenous microbial strains for enological applications, a Ph.D. thesis project was initiated to isolate and identify indigenous fungal strains of the species *Aureobasidium pullulans* from grapes of local vineyards collected during 2020 vintage. *A. pullulans* is well known for the production of extracellular enzymes such as pectinases that can become biotechnological tools for winemaking.

Therefore, the scientific objectives and the technical goal [objectives **1), 2)** and **3)** of the secondment] proposed for the period were fully achieved.

B: Transfer of knowledge and Training activities

Regarding the **4**th objective of providing support to early-stage researchers, related to WP6 and proposed for this secondment, it was as well fully achieved.

- During this secondment nr.27 a Postgraduate practical course of introduction to Metagenomics was delivered (https://www.unirioja.es/estudios/doctorado/783D/plan.shtml#3) Prof. F. Ruiz-Larrea was the organizer and one of the lecturers, and she shared with Prof. V. Morata the coordination of this course. It was attended by 20 researchers and Ph.D. students, who were successfully trained in the Illumina NGS technology and Bash programming. This course was delivered from 1 to 15 September 2021.

- During the whole stay at UNCUYO-FCAI a tutorial activity was performed on a daily basis by Prof. F. Ruiz-Larrea, and in collaboration with their Argentinean supervisors, a number of experiments and activities were designed, which the Ph.D. students will develop during their future secondments in the laboratories of UDLR in Spain.

- Four sessions of sensory analysis linked to enological practices of Ph.D. and Master Degree students of UNCUYO-FCAI and local producers of San Rafael department (province of Mendoza) were carried out at UNCUYO-FCAI premises during the secondment (dates: 25 and 26 August, 18 and 27 September). Prof. R. Carrion, who was permanent staff of UNCUYO-FCAI, organized these sessions. Prof. F. Ruiz-Larrea participated as one of the eighteen panel members of the sessions.

Wines had been elaborated from grapes of the varietals Malbec and Cabernet franc. New enological practices with the use of non-*Saccharomyces* yeast strains had been applied for the elaboration of some of these experimental wines. The altitude (from 1,037 m to 1,190 m

altitude), climate and "terroir" characteristics of a range of local vineyards of the San Rafael department correlated with sensorial differences among the elaborated wines. Climate change and the wide diversity of the "terroir" of the department of San Rafael (31,235 km^2) were evidenced and discussed during these sessions.

C: Dissemination of results

In relation to dissemination (WP5), networking and consolidating the collaborative links between both institutions UDLR-ICVV and UNCUYO-FCAI (objective **5**) the following activities were carried out:

- A press meeting was organized and took place at the UNCUYO-FCAI on September 3. The dean, vice-dean and secretary of the UNCUYO-FCAI, as well as both group leaders: Dr. V. Morata and Dr. F. Ruiz-Larrea, participated as speakers in this meeting (https://fcai.uncuyo.edu.ar/visita-larrea)

The interview was broadcasted by the regional radio station of San Rafael, and a press release in the daily journal "Diario San Rafael" (https://diariosanrafael.com.ar/doctora-en-bioquimica-realiza-un-intercambio-cientifico-en-san-rafael/) informed about the vWISE project and the staff international mobility in the context of biodiversity, viticulture, enology, innovation and climate change.

- One public seminar was delivered on September 21 2021 at UNCUYO-FCAI and simultaneously on line, entitled "UNCUYO-UDLR Collaboration for Innovation in Wine and Viticulture" (https://eu-lti.bbcollab.com/recording/0683af35901a477eb61c2e60da36e079). The aim of this seminar was to disseminate information about the vWISE project, its objectives, the involved activities, viticulture and wine making practices for adaptation and mitigation of global climate changes, for potentiating biodiversity and to achieve a sustainable development of the enological sector.
- One specific seminar on "Wine lactic acid bacteria and bacteriocins" was delivered in the Department of Biology and Food of UNCUYO-FCAI, addressed to researchers of the area of Microbiology.
- Two technical visits to local wineries in the department of San Rafael were made by Dr. F. Ruiz-Larrea and Dr. V. Morata.

La Abeja Winery. San Rafael-Mendoza, Argentina. Founded in 1883, it is San Rafael's oldest winery.

Bianchi winery. San Rafael-Mendoza. Foundend in 1928. International brand present in more than 40 countries.

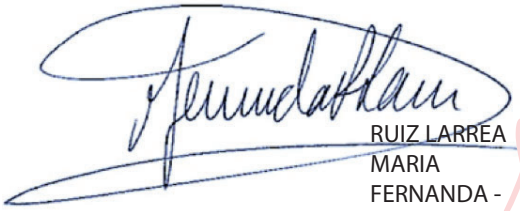
Therefore, the proposed objectives **4)** and **5)** for the secondment were fully achieved.

The achievements indicated in sections A, B and C were possible in spite of the COVID-19 pandemic and the international restrictions for mobility. The visiting researcher, Prof. F.Ruiz-Larrea, got a special VISA from the Argentinean Consulate and the Migration Department that allowed her entrance to Argentina and her stay for 2 months to carry out the vWISE project. She got the ticket to fly with Air Europa, nevertheless, they cancelled the flight twice due to strict restrictions of the Argentinean Government for international flights. Finally, the replacement flight was on the 11th August and the duration of the secondment was 1,7 months.

D : Qualitative indicators of progress and success

- 2 Ph.D. thesis projects in collaboration between UNCUYO-FCAI and UDLR-ICVV were designed during this secondment nr.27. Both projects were related to WP3.
- 1 Postgraduate practical course of Introduction to Metagenomics was delivered from 1 to 15 September 2021.
- Tutorials were delivered to four early stage researchers at the laboratories of Biotechnology of UNCUYO-FCAI on a daily bases.
- 4 Sessions of sensory analysis with their corresponding following debates were carried out at UNCUYO-FCAI with the participation of Dr. F. Ruiz-Larrea, UNCUYO-FCAI staff members, students and local producers of the department of San Rafael (province of Mendoza, Argentina).
- 1 press interview was carried out and one press release was published in the regional journal "Diario San Rafael", both aimed at public engagement about climate change, biodiversity and sustainable development of the enological sector.
- Two seminars were delivered at UNCUYO-FCAI by Dr. F. Ruiz-Larrea.
- Two technical visits were made to local wineries in the department of San Rafael by both group leaders .Dr. V. Morata and Dr. F. Ruiz-Larrea.

In summary, all the activities that were carried out during this secondment consolidated the vWISE network and the collaborative links between UNCUYO-FCAI and UDLR-ICVV

Visiting Researcher signature	Date	Place
		
Fernanda Ruiz Larrea	2021 November 8	Logroño, Spain

RUIZ LARREA MARIA FERNANDA - DNI 14245719W

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