



## Erasmus+-Project:

*Water is life – Let's preserve it!*



**THE USE OF WATER IN LOCAL DAIRY INDUSTRIES  
AND MINERAL WATERS**

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**MOBILITY TO ITALY**

**IISS BOJANO – IPSEOA VINCHIATURO**

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**19<sup>TH</sup> – 25<sup>TH</sup> MARCH 2017**

This e-booklet has been built by the students involved in the Erasmus+ Project during their staying in Molise Region in Italy guided by their teachers. Each student has been part of a team with an assigned work to fulfill during the week.

The leading theme of the week was:

## **THE USE OF WATER IN LOCAL DAIRY INDUSTRIES AND MINERAL WATERS.**

The students in groups covered a higher number of topics due to the number of fieldtrips and discoveries made.

**Group 1 : How does a Dairy Factory work?** (Teachers: R. Mini, C. Maglieri, D. D'Aversa)

Russo Marco, Marucci Stefano, Vitantonio Mattia,

Dzhuliya Stoykova, Isabelle Galow, Leonie Preß

**Group 2 : Water-mill Corona – Casalciprano Museum**

Rocco Simone, Junia Poenig, Stigliani Michele, Steevy Guillou

**Group 3 : Altilia – The Archeological site and the importance of water at Roman Times**

D'Amico Alessandra, Capozzi Annalisa, Testa Alessandro, Andréa Simeon, Manon Coupaud, Julien Le Moal,

**Group 4 : Agnone**

Lerro Andrea, Victor Petrov, Giugliano Andrea, Alexandre Fery

**Group 5 Tunnel I.T.E.** (Teachers: D. Mainelli, T.Spina, P Iannetta, MT. Mangione, R. Paolucci)

Taddeo, Iacovantuono Julia Lindstam Emma Karlsen

**Group 6 Macroinverti liceo scientifico**

Buccini Pietrangelo Calabrese, Zornitsa Ivaylova Hristova, Desislava Ognyanova Pesheva, Eva Ivova Petkova

**Group 7 Di Iorio- Stappj**

Di Iorio Emanuele Frida Lanas , Prioriello Mariya Vladimirova Hristova

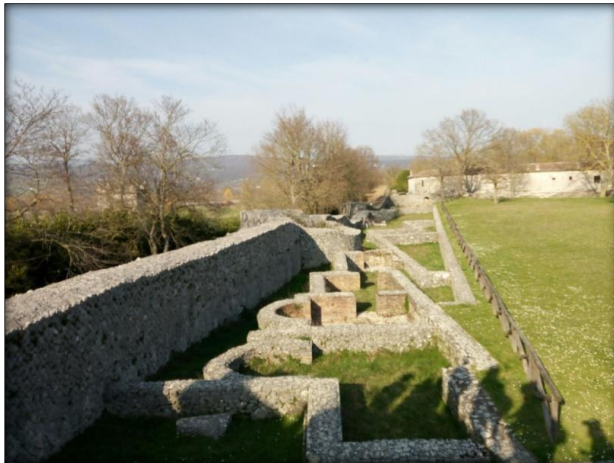
**Group 8 Santa Maria del Molise Mills**

Evangelista, Laurenti, Casandra Hoymoller, Eleanor Magnusson, Malatesta, Natalie Preß

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*This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”*

**Altilia** is the modern name for **Saepinum**, a Samnite town located c. 15 km south of the modern Campobasso in south central Italy. It was on the ancient road from Beneventum to Corfinium.



**Public Baths**



Figure 1-2: As in all Roman towns, here we can see the , they were used by ordinary people but also by people who went to the theatre.

**The Water Mill**



Figure 3-4 Of the original plant it remains a rectangular tank where it was placed a hydraulic wheel, moved by the raining water coming from the cistern set outside the walls. In the room at the back it was placed the milling system. The axis of the wheel passed through a horizontal opening and it milled a gear in a housing next to the wheel; upon it there were the millstones moved by a vertical axis.

## The Sewerage

Figure 5 The sewerage was already present in the town structure. In the picture you see the hole in the ground for waste water

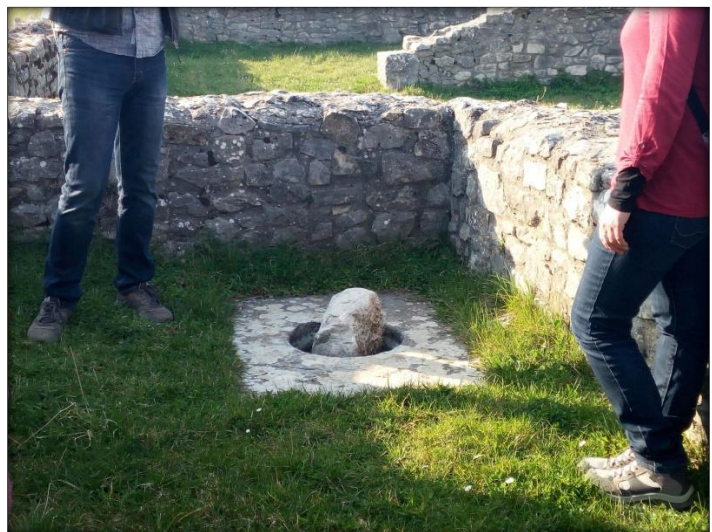


## Impluvium

Figure 6 This is the *impluvium*. It was the central part of the typical Roman house in correspondance with a hole in the roof and it collected rainwater. It was a Roman custom and the water was used to washing clothes and various domestic use.

## The Toilet

Figure 7 The toilet was in the private bathroom and it was used by the richest Roman family.



# THE USE OF WATER IN LOCAL DAIRY INDUSTRY



## VISITING TAMBURRO AT BARANELLO

### Working phases

#### 1. **Milk supply:**

- Milk arrives early in the morning from places nearby. Then, they start working the milk by filtration.

#### 2. **Filtration:**

- Elimination phase of foreign particles and microorganisms.

#### 3. **Standardization:**

- In this phase milk composition is adjusted to achieve the most economically favourable balance of the cost of ingredients and the percent transfer of milk solid components to cheese while maintaining cheese quality.

#### 4. **Pasteurization:**

- mean the process of heating every particle of milk or milk product, in properly designed and operated equipment.

#### 5. **Coagulation:**

- In this phase milk is transformed in curd, i.e. from a liquid it becomes gel-like.

There are three distinct types of coagulation:

**rennet** is added to the curd – it is called renneting

**acid** the milk is left to become sour until it reaches  $\text{pH} = 4.6$ ; at these conditions the caseins and milk proteins precipitate

**mixed**

#### 6. **Maturation:**

- to get to an optimal condition, wait until correct acidity in curd for stretch

Curd maturation this phase is carried out only during the production of stretched curd

#### 7. **Dripping and cutting of the curd:**

- With the cutting, the curd is transformed in granules of different sizes depending on the kind of cheese that one wants to obtain:

**large granules** = high percentage of water = soft, fresh cheeses;

**small granules** = low percentage of water = hard, ripe cheeses.

There is a vast range of tools used for the cutting process: knife, metal curd-knife, etc.



### 8. *Stretching:*

- This phase is carried out only during the production of stretched curd cheese, cheeses characterized by an “elastic” string curd.



### 9. *Shaping:*

- the mass is worked into the desired shape. Instead, for all the other types of cheeses, after the breaking and scalding, the curd is put into appropriate moulds where it obtains its final size and shape.

### 10. *Brine:*

- The cheese can be salted when already dry or brined the cheeses are kept in a salty solution for a period of time that depends on their weight; usually 12 hours per kilo.



### 11. *Packaging:*

- Water is the liquid in which mozzarella is packed.



## RIO FREDDO TUNNEL



*In the tunnel of Riofreddo we find the springs of the Biferno River that can be considered the most important river in the Molise region. It is 85 km long, it springs in Bojano from Pietrecadute, a place situated at the feet of the Matese mountains.*



*The water of the springs of Maiella and Pietrecadute are carried out through a canal of 200 meters long towards Riofreddo and here, together with the water of the spring of Riofreddo, are conveyed into three main aqueducts : Aqueduct Molisano Destro, Aqueduct Molisano Sinistro and Aqueduct Campano.*



*The water that is conveyed, it is not treated, it is filtered by the calcareous massif of the Matese mountain. It can be considered a mineral water, pure and not contaminated thanks to the absence of big industries which could dump polluted substances in the environment.*







*The Campano aqueduct brings water to Campania region for its water supply. The aqueduct perforates the Matese, passing through Mount Mutria to arrive at Cusano Mutri in Campania. The tunnel is long 18 km. From Riofreddo other two aqueducts leave, the Molisano right aqueduct which serves many towns in Molise and the Bojano aqueduct which servers the area of Bojano and the near villages.*

***Emma from Sweden :***

***“I find it interesting because it is a productive way of controlling a large amount of water, which is very important for the people here. It was pretty cold inside the tunnel which reminds me of Sweden. What I also found interesting was how clean the water was when it came from the mountain”.***

***Julia from Sweden :***

***“I thought that the tunnel was very interesting. When I was standing outside of the tunnel I didn't understand how big and long it was inside before I came in. It was so long. And it was very cold inside , which reminds me of our climate in Sweden. It was -5 degrees, and that's as the same temperature in our country in the months of December, January and February.***

***I think it was very fascinating that the water reaches so many people and households. And also that the water which came from the mountains is so fresh and clear. This helps a lot because the water does not need as much time and less energy to filtrate , and the results is that people can get the water faster and it takes less on the environment.”***

# Macroinvertebrates: BEI experience in the sun

On 21<sup>st</sup> March we went to the sources of the Biferno river, in a site called “Pietrecadute” (fallen stones) in Bojano.



We had an experience with the BEI (biotic Extended Index) method which is used to evaluate the quality of the water.



In order to do that, we collected some macroinvertebrates with a net, put them in plastic pans and finally we observed them with a magnifying glass.





**So, in the end, our water resulted to be CLEAN!**



*This experience was interesting and funny at the same time: we improved our knowledge in science while having good sunny time all together. We, the Bulgarian students, had never heard about BEI method and we are going to apply it in our country.*



***Paola Calabrese (Italy)***

***Eva Petkova (Bulgaria)***

***Cristiana Pietrangelo (Italy)***

***Desislava Pesheva (Bulgaria)***

***Carmen Buccini (Italy)***

***Zornitsa Hristova (Bulgaria)***

# WATER MILL CORONA

It is one of the few existing water mills along the River Biferno that has not been turned into a hydroelectric power plant. A stone decorated incised the construction date of 1872, but the mill is much older as shown by deeds deposited with the Archive of State of Campobasso.



The water coming from The River Biferno were lead through a channel to the mill and it is divided in three streams that give power to the three milestones inside the building. one of which mills was used for corn, one for wheat and one for oats and barley





Inside the mill are the few remains of another very important hydraulic machine: the “gualchiera”. This is an old wooden flying machine consisting of big hammers and served mainly to beat the "pannolana" (old fabric) to give it a softer consistency.



## Casalciprano open-air museum of rural Molise memory

Casalciprano is a small town that is home to the open-air museum of rural Molise memory. in this museum you can see some daily life scenes of the rural past: farming life, domestic work, mourning, celebration, games, superstitions, beliefs and emigrations.



in this photo you can see a typical festival and scenes from everyday life in the village







*Rocco Simone - Italy, Junia Poenig - Germany, Stigliani Michele - Italy, Steevy Guillou - France*

# SANTA MARIA DEL MOLISE

## THE MILLS



On March 21st we were in Santa Maria del Molise, to visit the watermills. The Watermills were built in the second half of the XIX century by the Marquis Morra.

Santa Maria is a small village in the south of Italy, that is rich in water, infact it was named also Capo Water. This watermills worked since 1965 and it was used to grind wheat and maize.

There were restorations that have taken place since 1991 for the three mills. It's a very suggestive area, in every seasons, but especially in summer, and in the sunny days, when you can find relax. Along the road that goes to Santa Maria del Molise we can see the three mills, the last is also know as "MULINO D 'I RAN"





After a long bus tour we finally arrived to Santa Maria Del Molise. The weather was in our favor with the shining sun and cloudless sky. The temperature was just right so you could sit in the sun, you don't get so many chances of that if you live in the northern part of Europe. The water puring down the rocks gave Santa Maria del Molise a feeling of calmness, there were benches to sit on and talk or to just sunbath. Santa Maria Del Molise was the perfect place to have a picnic. It's wonderful that the place is untouched. It's pure beautiful nature. Everyone seemed to enjoy the place and we're thankful that we got experience it.



Natalie Preß (Germany); Eleanor Magnusson (Sweden); Casandra Hovmöller (Sweden); Michela Malatesta (Italy); Giorgia Evangelista (Italy); Alessandro Laurenti (Italy).

# DI IORIO SPA WATER BOTTLING PLANT



This is the Di Iorio Spa water bottling plant. The company produces mineral water and soft drinks using ancient, traditional recipes.



Here's the main hall with some of the machinery used for the production of Di Iorio's products. The factory has two bottling lines: PET line for plastic bottles and Glass line



This is the first step of the production. These small plastic pipes called “preforms” are heated in an oven.



Then hot preforms are inflated with air to create Molisia bottles





Now the bottles are filled with Molisia mineral water and then they are labelled  
Filled bottles are packed with an heat-shrinkable plastic sheet



Now packed bottles are piled to create a pallet.  
After that, the pallet is ready for the shipping in Italy but also Europe, USA and Australia

Seeing how the bottled water is made was very interesting. I also think that the Molisia mineral water was very fresh and delicious. I will be very proud to see Di Iorio Spa again.

*Maria Hristova, Bulgaria*

The factory was very wet, it made me thirsty. I've never seen a bottle factory before so this was a new fun experience for me.

*Frida Modesty Viktoria Andersson Lanas, Sweden.*

I liked very much the whole production process. I learned how water is bottled and how a big company with high technology machinery works.

*Emanuele Di Iorio, Italy*

## MARINELLI PONTIFICAL FOUNDRY

The Marinelli Pontifical Foundry work can be dated back to 1040 as in that year it was already at work. In 1924, the foundry was awarded "the title of pontifical foundry" by The Vatican. The bell foundry is considered Italy's oldest family business and among the three oldest family businesses worldwide. The bells of The Marinelli Pontifical Foundry can be found all around the world: in New York City, Beijing, Jerusalem, South America, and South Korea. In this foundry you can notice the accuracy and the passion workers put in their job.



During our visit there we were shown a video which explained each step in the construction of the bells and strike upon them the final decorations'.





Inside the museum you can see various bells of all sizes and also affects the bell struck by a lightning that almost divided it into two parts.





The workshop, where the bells are produced.



Finally, the last part of the exhibition, which is a sort of mini concert of bells. It was extremely fascinating for the wide variety of sounds.



Lerro Andrea- Italy, Victor Petrov- Bulgaria, Giugliano Andrea- Italy, Alexandre Fery- France.