**Interview – ANEO – 03-11-2021 – Jaen**

**Thank you for your time. To start, could you introduce ANEO and the role of ANEO in the olive sector?**

ANEO, is the National Association of Pomace Oil Companies. We represent 74 percent of the work centers and 92 percent of the crude pomace oil production here in Spain and a fraction of 100 percent in refined pomace oil in a national association, mainly here in Andalusia. There is a small presentation to explain a little about the sector. And what are we doing here? We have the representation of where the orujeras are mainly located, practically the entire province of Jaén. Here in Seville, here in the north of Malaga, Córdoba, all of Andalusia. The yellow marks are those associated with us and those in black and blue are not associated with us. And here you have the ones in Portugal, the main ones in Portugal.

This is the evolution of the olive sector. I don't know if you've seen it already. This graph is the evolution of the olive grove area from 1970 to 2018, where you can see how in the last years there has been an increase of more than a thousand hectares. (we have the graphs/presentation he showed)

Seventy thousand hectares is what has increased. This here, is the evolution of olive oil production with its peak due to excess production. What we have done in this graph is to compare the evolution of oil production with the production of pomace. As you can see, this first area is when what used to be old presses existed. And this second area passed at least when it was and was the three-phase system of oil, pomace and alpechin. What happens is that for every kilo of oil they have added a kilo of water to be able to process it. In the 90s, early 90s, there was a horrible drought and it made no sense to waste so much water. And the two-phase system was invented, which was what was incorporated from here. The two phase system creates olive oil and wet, fatty pomace (orujo). And this has brought a major development in the amount of pomace that is being produced. Here you have the same graph, the same data, but put in a different way, as in the period of each year the production of oil increases, which is really growing in the production of everything. The olive oil is only 20 percent of the weight of the olive, the other 80 percent of the weight of is wet fat pomace. That is 80 percent with 70 percent humidity.

First it is stored in large ponds, because the amount that enters is very large in a very short period of time (3-4 months). It is impossible to process all in a short period of time. The orujeras are conditioned not for the peak moment, but to be working throughout the year. Then it is stored in mass and as the mass is removed, the first thing that is done is to remove the bone. The following is a review, a physical extraction, as if it were a mass of it. And this is the same process.

The difference is that here, the in the blender, the oil has to be removed from the olive mass. It is heated up until a temperature of 25 degrees, not more. This is called cold extraction. It is important for a good quality, to preserve the aromas, that it won’t be warmer that 25 degrees. This way, less oil is extracted than with a higher temperature, but the quality is better. (this happens in the primary mill). At the orujera, the same process is done, to remove the remaining oil content that is still in the orujo, but this is done at a higher temperature, up to 40 degrees, to remove more oil from the orujo. That oil goes to a refinery (lower quality). Then the remaining mass is going to a dryer, and after that to a chemical station, where it is treated with the same instruments that are used for vegetable oil, such as sunflower and rapeseed.

Everything is done with that structure, the same process. Here you extract the crude oil and here the orujillo, which is the biomass that is left at the end of the process. And there are two typed or orujeras, once that have cogeneration and once that don’t. San Miguel (in Villacarrillo) has cogeneration, about 50% of the orujillo that is produced is consumed in the same facility, the rest is sold. Those that don’t have cogeneration sell 100% of the orujillo. *He shows the characteristics of the olive pits and of orujillo, they have a production of 435.000 ton of olive pit (national numbers, but ANEO represents almost all orujeras).* 25% of the olive pits are used by the companies themselves and 75% is sold, to households and small industries for heating.

The production of orujillo is 1.5 million of tons, which is consumed by the facilities themselves. And the rest is sold to biomass power plants and it is also exported.

He brought a printed version of a presentation, which we have. Here we can see all the information he is explaining in this part.

(for this part I need to see the pictures/presentation to be able to transcribe) El orujillo, la producción media de un millón y medio de tonelada del cual él se auto consume. y el orujillo eléctrico es el orujillo que se vende a las centrales de generación a partir de la biomasa central eléctrica que se produce en Madrid y luego tenemos el resto que se exporta y se comercializa. Estamos hablando de 37 por ciento del total. Y es un poco lo que todo el conjunto del sector de la aceituna, que una media de cinco años de seis millones y medio. Lo que se ha recogido de media y medio te produce uno 370 de media en cinco años la producción de aceite de oliva, el resto de orujo graso húmedo que va a la orujera como 70 por ciento humedad de donde el 60 por ciento lo evaporamos. Este peso el 60 evaporado tres millones y pico de tonelada se hacen vapor de agua, producimos aceite de orujo crudo, el cual cuando va a la refinería de orujo en el proceso se obtienen dos subproductos que son las pastas, refinería y ácidos grasos que se utilizan para alimentación animal. Para cosmético tienen una seria comercial, se produce hueso, como ya hemos visto antes, se produce orujillos. Tobio biomasa de gran calidad y enología se utiliza sobre todo en grandes centros de producción de calor, como puede ser grandes empresas de demanda energética que necesitan mucha energía térmica para su proceso y para la central eléctrica que produce generación a partir de la biomasa producen la ceniza cuando tú quema el orojillo en la orujera es rico en potasio, con lo cual la ceniza que te quedan son rica en potasio. De este potasio se utiliza para hacer compost, para enriquecer el compost o para hacer como se ha metido a abono inorgánico. Típica bolsa de NPK nitrógeno, fósforo, potasio, potasio. Se puede sacar de aquí y luego tenemos pulpa de aceituna donde que sirve para alimentación animal como proteínas. Ya con eso cuando terminamos no queda nada. El punto final de todo el proceso.

**We understood that there are private and cooperative orujeras, which part are cooperatives and which are private?**

From the +/- 60 orujeras, 12 are cooperatives, the rest is private. The majority are private, that buy orujo from different mills.

**And are do the cooperative orujeras also belong to olive mills/cooperatives?**

Yes, normally they are primary cooperatives, a lot of them group together to sell the olive oil on the one hand, and they group together in another group, to sell/process the alpeorujo.

**Like San Miguel?**

No, San Miguel is a bit strange, because it is created by a cooperative, a cooperative that commercializes the olive oil, JAENCOOP, but San Miguel is a private company, with the cooperative in the governing council.

**Do the orujeras have contracts with olive mills?**

Yes, they buy in this period, from august until October/November, it is normal to go to mills, whether they are private or cooperatives, to offer money for the transport of orujo, to pay for the transport and also some money to pay for the orujo.

**Ok, and how do you decide on the price?**

It depends on different aspects. On the one side, there is moisture, also the quantity and the percentage of oil it contains and also if it contains olive pits. Those are the variables. Another factor is the price of the pomace olive oil and the price of orujillo, which are the primary products that are produced in the orujera. It is related to the price of pomace olive oil and also to the price of virgin olive oil. This year, the price of virgin olive oil is higher, then the price of orujo as well.

**We also understood that sometimes the olive mills need to pay the orujeras to take/transport the orujo (get rid of orujo)**

Well, that happened only once in the history!

**And why was that?**

Because the price of virgin olive oil in the past year was very low. And that meant that the price of orujo also was very low. In that situation, the orujeras were losing money, while working. We would lose 2 million euros per orujera, in the campaign of 2019/2020, so we asked the sector, let’s share this loss. And that is, luckily what happened. But now, the prices are better and so is the price of orujo. The olive mills of course want to get paid now for the orujo, and now there is competition, the mills are looking where they can sell their orujo in the best way. Now, the orujeras pay for the transport and also for the orujo. Every year this is different. I don’t know at what price now, that is not public information. It is the game of supply and demand.

**Y como es el mercado de orujillo, is it easy to sell your product?**

It all depends, again, supply and demand. About 4 years it was more difficult to sell the orujillo, then the patios were full with orujillo. This year, there is no kilo left in the patios, it is all sold. The prices of orujillo are rising. That is due to the CO2 emission rights, that companies need to pay. About 6 years ago, these were 5 euros per ton, in the past year, this was 20 euro per ton and now, it is about 50 euro per ton. That makes the use of orujillo much more interesting for, for example cement companies, because is you use biomass for energy, you have to pay less emission rights. The price of orujillo is now also almost 50 euros.

**And how is the market for the olive pits?**

That market is much more local, it is used a lot to heat houses, it is a product of high quality and once it is treated well, it is very clean. The price is about 70 euros per ton. The price is much more stable.

**And when did the orujeras emerge here?**

I think the first orujera was created in 1920, so it is already old. But they used to be much smaller, every village had an orujera. There we about 600 orujeras, what has happened is these 600 are now transformed into 60 larger ones. For the economy of scale.

**Ok, and how do you see the future of the orujeras? What are you plans for the future of this sector?**

I think the orujeras will become bigger and bigger, because the volume of the olive oil production and also the amount of hectares of olive production will increase, so that means that the amount of orujo also will increase, so bigger orujeras are needed to absorb the quantity. For example, I Portugal they have a problem, because there are not sufficient orujeras, so a lot of them send orujo to Extremadura. They will run into problems when the olive production will increase.

**And what are the major challenges in the sector, of orujeras?**

The main challenge, is to convince people that we are good (tells this as a joke). No, there are many challenges, for example that the environmental norms become more and more strict. We are adapting to the new products that are demanded by the sector. We also talked about products with higher added value, the challenge is to keep adapting to the necessities from the market, and the most important it to keep bringing services to the sector, the agricultural sector, so everyone grows together.

**And what do you see as challenges related to sustainability?**

Well, that is what I meant with the stricter rules, we keep improving. So for example, the change from the system with 3 phases to 2 phases was good, because for the waste water that was generate, in the 3 phase system, there was no solution, so they put it in a basin and it had to be evaporated, and that smelled really bad. The solution for that is that the olive mills brought it to the orujeras to evaporate, here we evaporate the major part of the waste water. So the orujeras adapted to a need that arose. We are now looking to solutions for the waste water that is generated in the orujeras, we need to reduce the energy that is used in the orujeras, and close the water cycle, instead of evaporating it, use it in the industry or in the field. That will benefit all.

**And are you already doing projects like that, to recuperate the water?**

Yes, that is what I was talking about with Eulogio here. In San Miguel, you will see an evaporator of alpechin, they have a system of evaporation, called Alfa Flash, they evaporate the waste water and that creates condense. So you have two products, water that can be used for irrigation and a concentration that can be used for fertilizers. That is a project we are doing, in terms of sustainability and more specifically to recuperate the water. Which fundamental for us.

**And if you could change or improve something in the sector, what would that be?**

Well, this, to better use the water, to reduce the labour costst/men hours, and reduce energy consumption. That will be good, also the developments that are going on now with biogas, to utilize the subproducts and make new products. But this will all be in addition to what we have now, because the system is well implemented now. But it is still interesting to see what we can still improve.

***Showing + explaining the biohub concept***

That is a good idea, because we also had some years when we didn’t know what to do with the orujillo, there was no demand, so it is always good to have another market outlet, an alternative. This can be a constant market outlet, so that a percentage of the production of every orujera will go to this, apart from the other market outlets we have.

So for example, I sell a part to Ence. Ence is a national company of cellulose (<https://ence.es/>). They have an energy plant based on pruning waste from eucalyptus and other pruning waste, that company produces a lot of energy from biomass, so that is a constant buyer, you know that they always will buy a certain amount of biomass.

So yes, it is an interesting project, you can do it. And also, the orujeras are located in the country side, that can also be beneficial to the project. It could be serving as centers to store the biomass, because they all have central locations. The transport will be much easier, because it is close to the field, they could be logistical centers. And that is important because the transport of biomass is the most expensive part, so the shorter the distance, the lower the transport costs.

**And how do you see your role and the role of the orujeras in this concept?**

Yes, like collection center and as provider of biomass/orujillo.

**And what would you think of, instead using orujillo, using the alpeorujo (from the primary mills).**

Well, the alpeorujo has 70% water content, you are looking for organic material, that is only 30%.

**The technology we are also investigating, HTL, can use biomass that have high moisture content.**

Well, then we would have a problem. Because if you would buy alpeorujoo, which is our primary material, that will affect the sector a lot.

**And what kind of benefits do you think this biohub could have for the sector?**

Well everything, so the sale of the product, if the orujera could receive more money for the sale of their product, that would be good. If the orujeras would earn more for the orujillo, well, the orujo will also increase in price, which will benefit the mills and finally the farmers. Another benefit is that you could plan better, because a part of the sale of your product has a stable outlet, it is not subject to the volatility of the olive price. That is always good for any business.

**And do you think this biohub could interrupt a system that already exists?**

That all depends on where you start. If you would use the alpeorujo instead of the orujillo, you would disrupt the secondary industry. If you would use the orujillo, there is no problem, it will be a benefit for us. If you would use the alpeorujo, you will enter in competition with an existing system. But if you would ask the primary mills, they would say that is great, so it all depends on who you talk to. From our perspective, the alpeorujo is our primary material, so what would be of interest to us? That you will use the orujillo, so we can valorize the products.

**We would also like to understand the relationship between the different actors that would work together to develop a new system like the biohub. *I’m showing the power-interest grid.* Where would you put the position of the orujeras?**

I would put it here, interest is high, it can be an interesting option for us, to create more market outlet for our product. (he points to a position near the cooperatives). We are close to the cooperatives. The orujeras can serve as collection centers, to store biomass in the patios.

**And what do you think of the position of the other actors?**

Starting with the national government, it depends which government. I think the Junta de Andalucia has the key, to make this happen or not. They will give permission, or not. The municipalities, yes I think that is correct. The biorefineries will be most interested. Also the maritime industry, since they are doing this project. What do you refer to with collectives of farmers?

**Well, unions like APAJA, UPA and COAG**

They can have interest, but not that much power. It will be good if they would be interested, because they move the people in the field/farmers. But they have low power. The cooperatives have more power. They have patios, they have physical space to store biomass and are located where the farmers are located. So thy will have a lot of interest. And also power, if they are interested, they can mobilize the farmers, and if they are against it, they can prevent it. To have them against you, that’s never good.

Transport, yes, but I don’t know why you put the biomass transporters that low, because they can have power and interest as well, the people that collect the biomass. They can have interest. Did you already talk to the people of APPA? Asosacion de Productores de Energia Renovables de España. (<https://www.appa.es/>). And the people from Avebiom?

**APPA no, but Avebiom yes**

The farmers I am not sure, yes they could have interest if they could sell the pruning waste, yes. And academia, yes they have interest, but not that much power.

Yes, so I think the positions are quite well put.

**Ok, so you would put the orujeras at the same level as the cooperatives?**

Yes.

**Do you know any other orujeras which we can talk to/visit?**

Well, you’re going to San Miguel, apart from that maybe Baeza (Eulogio has contacts), and La Carolina, which is smaller, there are no small orujeras, but this one is smaller, they have a different system. These are private.

**Siva: Right now you’re using all the residues to produce energy, so far it has worked, the industry is here already for a long time, with current developments and new laws coming up, like RED II, eventually, you have to change this model. Do you think this is the best way to use these residues, or are you open to change this value chain? Because there are people working on biochemical production, you have alternatives to produce electricity, but not to produce chemicals. One way or another, in 20/30 years, there should be a change. What do you think?**

I am not sure, I know the RED II and the new one, the RED III is coming, but the people, the mentality of the orujeras is to change little by little. Now we have a good product, to produce energy. The next one will be to produce chemicals, it will be a good market, but in the future. We know that this is probably the right way. We have an open mind for new things and this is possible.

**Siva: Oke, because why I’am asking this, the system will be forces to change, biomass to bioenergy, everyone agrees that this is not the best way to use it. Because you have other alternatives, to become more sustainable, business models need to change.**

But I think biomass, so if you use biomass from forest, this is not the way, the forest is so important, it is like a good person for us. We have other biomass, the waste of the industry, why not use it to produce electricity and other things. I think it is important to change the mind of the politics, they only think in forest, to produce electricity, this is wrong. But produce electricity from waste from the industry, this is good.

Eulogio: this is in contradiction, electric vehicles are now very much supported by everyone, the government. This is in contradiction with not producing electricity from biomass. Biomass from forest cannot be used for cleaner production. But biomass from residues is the future option for everyone, you are going to produce them every year and you have to manage them every year. In this sector, if the orujeras were not present, we would have to invent them. So I think that is a key point, residues must be always in the frontline of producing bioenergy and chemicals. I think Joaquin was saying that the sector is not changing very quickly, but it will change if we can offer some other options. It could be good to have a baseline, we can always use 50% of our biomass to produce biofuels, chemicals and the other 50% energy or other things.

Joaquin: I agree with you. There are some places where they use pomace cake to produce biogas, not in Spain because it is not possible, but in the North of Europe, in Germany, they use orujillo. We produce 1.5 million tons of orujillo per year, we must sell and use all of them.

**Siva: I have one more question, here you get water + pomace, you don’t get only pomace, so you should remove that water.**

No that is all here (he is showing something). We dry in the dryer, you’ll see that in the San Miguel orujera. It goes from 70% to 8%.

**How much energy do you consume in the plant?**

I don’t know, maybe you can ask Cristobal. In every site, the number is very different.

On the website you can find a list/more information about the orujeras present in Jaen. (<https://www.aneorujo.es/>)