Thessaloniki 14/12/2011

Today we have our first meeting in office of Prof. A. Roubos at Technological Educational Institution of Thessaloniki. The subject of meeting is the review of proposal and familiarization with the terms of Cradle to Cradle.

C2C has solid principles. Materials used in commercial and industrial processes are categorized as biological and technical. Technical are toxin and non-toxic ones. Biological materials can enter the biological cycle in natural environment. Technical materials can enter the technical cycle and be re-used in the same or other uses or upgraded.

Certification

The products can be certified. The criteria are:

- Materials health (green=low, yellow=medium and red=high hazard index, grey=non enough information)
- Materials re-use (reclaim at the end of life of product)
- Energy source (renewable energy demanded)
- Water use and water recharge quality
- Social accountability

Certification levels

There are four levels for certification: Basic, Silver, Golden and Platinum.

Overall comments: The C2C approach is very interesting. It has a holistic approach of the industrial production taking under consideration all aspects such as materials, environment, energy and human factor. There is a lot of work to be done since all of the above mentioned factors are suitable for improvement.

Prof. Athanasios Roubos

Dr. Ilias Kalfas

Dr. Konstantinos Roubos

Thessaloniki 09/02/2012

Today we have held a meeting in office of Prof. A. Roubos at Technological Educational Institution of Thessaloniki for the purpose of studying the food industry in the area and for the location of appropriate industry for C2C implementation.

Food industry sector in Central Macedonia - Greece

Food industry in central Macedonia is a dynamic sector. The infrastructure is well developed and concentrated in prefectures of Thessaloniki, Imathia, Pella, Serres and Halkidiki. Agricultural products that are processed are mainly milk, beetroots, peaches, cotton, honey, grapes, tomatoes, corn and olives.

Table 1. Processing companies in the area of Central Macedonia, Greece

Processing companies	Thessaloniki	Chalkidiki	Imathia	Pella	Kilkis	Serres	Pieria
Olive oil mills	6	43		1		17	6
Table olive factories	8	75		3		5	4
Wineries	60	15	22	4	9	16	5
Dairy industries		3			9		
Vegetables processing	18	1	52	31	17		6
Frozen vegetables and fruits	5	3	3	6		9	
Rice mills	14					5	

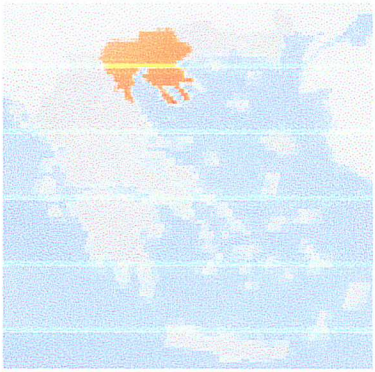


Figure 1. Map of Central Macedonia, Greece (orange area)

One of the most significant environmental issues in the area is that of food processing units waste and waste treatment. Especially for olive oil plants there is a lot of concern regarding the waste in Mediterranean basin. The olive tree can develop in a relatively narrow geographical zone in both north and south hemispheres.

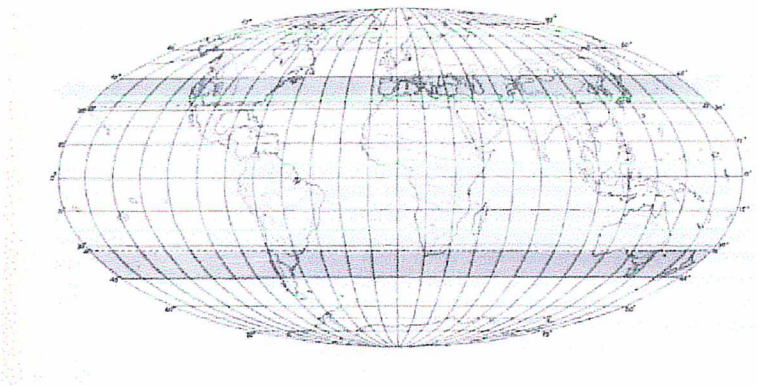


Figure 2. Zones appropriate for olive cultivation in north and south hemispheres

Most of the world production is in Mediterranean coastal area while there are also quantities produced in North and South America, North Africa and Australia.

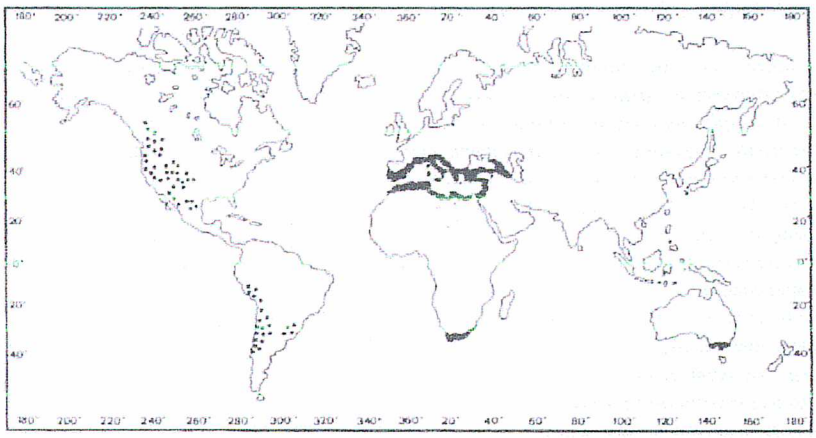
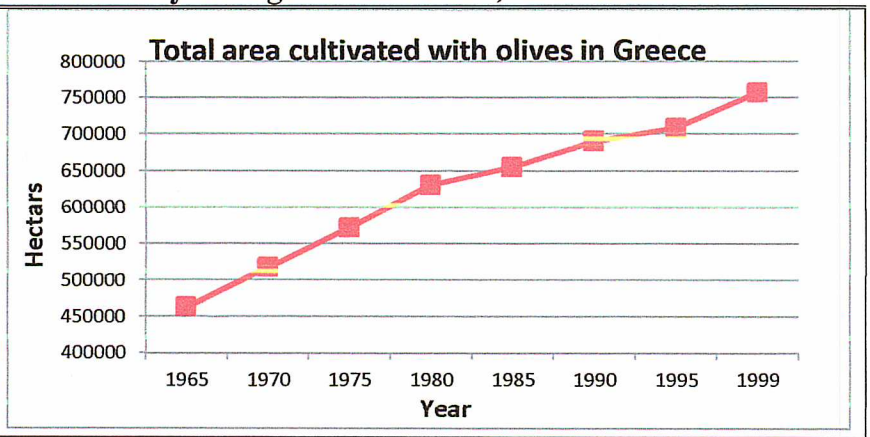


Figure 3. Places where olive is cultured around the world

The area that is used for olive cultivation has been constantly increasing in Greece over the latest 50 years. However this has led to the increase of environmental problems that are created by olive oil factories. Data are presented in Table 2.

Table 2. Total area covered by olive groves in Greece, and Chalkidiki

Year	Total area cultivated with olives in Greece
1965	463200
1970	518100
1975	572800
1980	631000
1985	655700
1990	690800
1995	708700
1999	757600



Greece is the third largest country for olive production in the world after Spain and Italy and olive is cultivated in 50 of a total of 54 prefectures of the country. The total number of olive trees that are now cultivated in Greece is estimated at about 130,000,000. There are 2000 olive press factories and refiners and 335 packers. Table olives are processed in 80 factories.

The total production is about 220,000 metric tons of table olives and 2,100,000 metric tons of oil olives, which yield about 430,000 metric tons of olive oil. Olive culturing contributes 2% to the total national income and 15% to the national agricultural income.

Olive cultivars are classified according to the use they are designated for. Therefore there are cultivars for fruit production, oil production and mixed use. Greek olive cultivars are presented in Table 3.

Table 3. Greek olive cultivars and their uses

Edible cultivars	*Oil production*	*Oil and edible cultivars (Mixed use)*
Konservolia	Lianolia	Perachoritiki
Amphisas	Koronaeiki	Megaritiki
Artas	Psilolia	Vovoditiki
Voliotiki	Ladolia	Chondrolia Aegina
Chondrolia Chalkidiki	Kritikia	Mitilinia
Kalamon	Soublolia	Kolovi
Kalamatiani	Lianolia Kerkira	Valanilia
Aetonichia	Korfolia	Manaki
Karakolia	Prevezana	Kothreiki
	Dafnofilli	Manakolia
	Koutsourelia	Korinthiaki
	Patrini	Throumba
	Patrinia	Thasitiki
	Ladolia	Chondrolia Evoia
	lianolia	
	Mastoeidis	
	Tsounati	
	Matsolia	
	Mouratolia	

Olive oil factories have attracted much of attention lately, as they can cause severe environmental damage due to their waste which cannot be easily managed. For this reason we consider it is of great scientific interest and also it is a big challenge to try implement Cradle to Cradle in an olive oil mill.

We still have to see which exactly company is appropriate for the pilot project. This decision depends on a range of factors such as the open-minded managers, the innovation potential they show, equipment they use etc.

Prof. Athanasios Roubos

Dr. Ilias Kalfas

Dr Konstantinos Roubos

Thessaloniki 22/02/2012

Visit report

Today we visited Olive Oil mill of Averis LTD, in Galatista, Chalkidiki.

The factory has a capacity of processing 2500 tones/year but the real quantity processed for the moment is about 1000 tones.

For each liter of olive oil 6.5 to 7 kilograms of olive fruits are processed.

The mean annual waste quantity is about 1000 tones which consist of olive stone, olive fruit particles, water, olive oil and other organic compounds. There are installations for treatment of waste and also there is some production process for pellets from solid waste of olive fruit, the olive stone.

The total power that is installed in the factory is 100 hp.

They have developed a novel method for waste treatment which uses filters to remove total suspended solids. After their removal the liquid phase is used for fertigation and the solid phase can be used for several tasks such as human food and animal feed. The methods is patented as **EcoOliveCleaner** with patent numbers 20100100069 and 20100100027 respectively. Certificates are presented at the end of this report.

The company has a big experience in olive oil waste management and it can be a serious candidate for the C2C investigation for a pilot implementation project.

Prof. Roubos Athanasios

Dr. Ilias Kalfas

ΟΡΓΑΝΙΣΜΟΣ ΒΙΟΜΗΧΑΝΙΚΗΣ ΙΔΙΟΚΤΗΣΙΑΣ (ΟΒΙ)

ΠΙΣΤΟΠΟΙΗΤΙΚΟ

Βεβαιώνουμε ότι τα έγγραφα που συνοδεύουν το πιστοποιητικό αυτό, είναι αρχικά και αυτά αντίγραφα της κανονικής αίτησης για Δέσμευση Εφεκτικότητας, με αριθμό **20100100069**, που καταχθήκε στον Οργανισμό Βιομηχανικής Ιδιοκτησίας στις **05/02/2010** από την κ. **ΑΒΕΡΗ ΦΕΒΡΩΝΙΑ του ΑΓΓΕΛΟΥ** και κατοικεί στην οδό Σαρανταπόρου 29, Τ.Κ. 54640 Θεσ/νίκη.

Μαρούσι, 19/04/2010

Για τον Ο.Β.Ι.

Ο Γενικός Διευθυντής

Χαράλαμπος Σταμούλης

ΟΡΓΑΝΙΣΜΟΣ ΒΙΟΜΗΧΑΝΙΚΗΣ ΙΔΙΟΚΤΗΣΙΑΣ (ΟΒΙ)

ΠΙΣΤΟΠΟΙΗΤΙΚΟ

Βεβαιώνουμε ότι τα έγγραφα που συνοδεύουν το πιστοποιητικό αυτό, είναι αρχικά και αυτά αντίγραφα της κανονικής αίτησης για Δέσμευση Εφεκτικότητας, με αριθμό **20100100027**, που καταχθήκε στον Οργανισμό Βιομηχανικής Ιδιοκτησίας στις **15/01/2010** από τον κ. **ΑΒΕΡΗ ΑΓΓΕΛΟ του ΕΜΜΑΝΟΥΗΛ** και κατοικεί στην οδό Σαρανταπόρου 29, Τ.Κ. 54640 Θεσ/νίκη.

Μαρούσι, 20/01/2010

Για τον Ο.Β.Ι.

Ο Γενικός Διευθυντής

Χαράλαμπος Σταμούλης

Thessaloniki 09/03/2012

Visit report

Today we visited Olive Oil mill of Hatziandronis S.A., in Aiginio Pieria.

The factory has a capacity of processing 8000 tones/year but the real quantity processed for the moment is about 4000 tones.

For each liter of olive oil 5.5 to 6 kilograms of olive fruits are processed.

The mean annual waste quantity is about 2500 tones which consist of olive stone, olive fruit particles, water, olive oil and other organic compounds. There are installations for treatment of waste and also there is some production process for pellets from solid waste of olive fruit, the olive stone.

The total power that is installed in the factory is 120 hp.

The activity of pellets production from biomass (olive stone) is of double use. About 25 tons per year are consumed for olive oil mill needs (heating fruits) and the rest is sold to the citizens of the area for house heating during the winter.

An additional activity of the company is the collection of used oil from taverns and restaurants and the forwarding of those quantities to specialized companies that produce bio-diesel.

The company has a relatively great range of activities in comparison to usual olive oil mills and therefore it is a challenging task to investigate the possibilities of implementation of C2C to its operation.

Prof. Roubos Athanasios

Dr. Ilias Kalfas