



HELLENIC REPUBLIC  
National and Kapodistrian  
University of Athens



# From natural product chemistry to natural ingredient discovery and exploitation

Konstantina Vougiannopoulou, PhD.

Department of Pharmacognosy and Natural Product Chemistry,  
Faculty of Pharmacy, University of Athens



# Outline

- Presentation of the research group
- Natural products and cosmetics
- The Agrococos project – a success story
- Industry-Academia – the future

# Our group

- The University of Athens was founded in **1847**, being the oldest in the Balkan region and the Western Mediterranean
- The research group of **Prof. Leandros Skaltsounis** is natural product chemistry oriented with focus on cosmetic-nutraceutical applications and drug discovery
- One of the most active research groups, with **more than 30 members** (post-docs, PhD candidates, research associates, technicians)



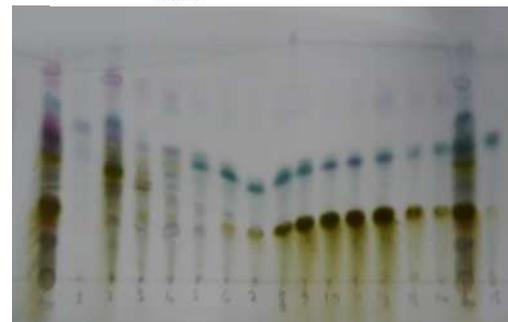
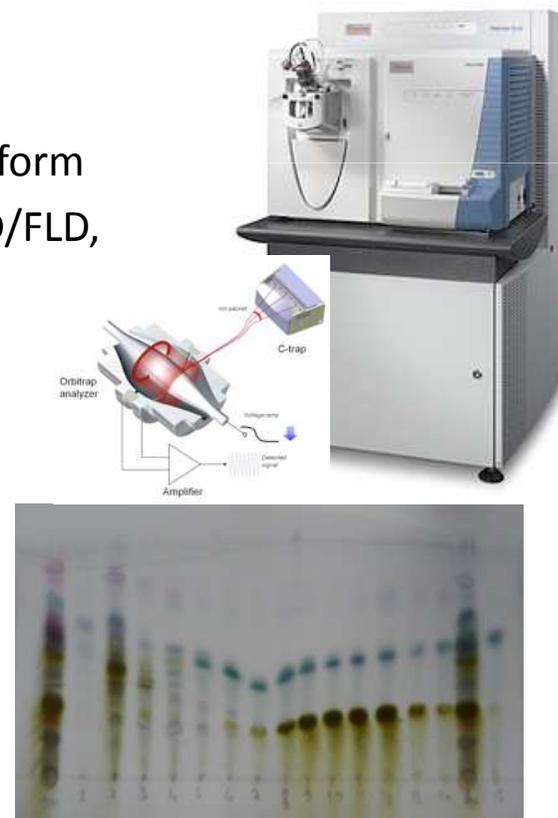
# Infrastructure and resources

Our group has a range of state-of-the-art infrastructure for:

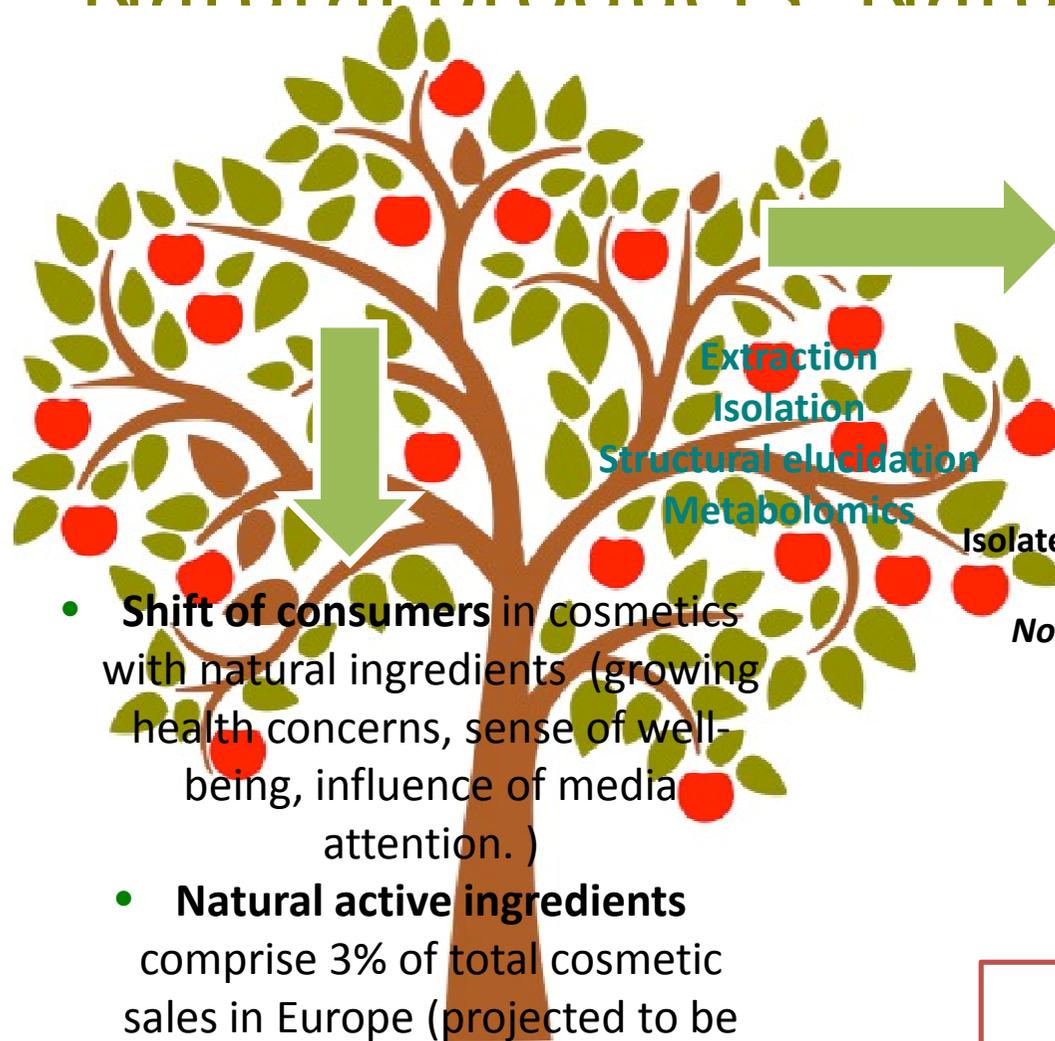
- **Extraction – isolation – purification**
  - Microwave/Ultrasound extraction, Supercritical Fluids Extraction, Countercurrent Partition Extraction/Chromatography, several MPLC/prep HPLC
- **Analysis and structure elucidation**
  - Bruker NMR 200, 400, 600 MHz, Orbitrap UHPLC-HRMS platform (ESI, APPI, APCI), SFC-MS, SPME-GC-MS, GC-FID, UHPLC-DAD/FLD, HPLC-DAD/ELSD/RI, HPTLC densitometric platform

## Access to natural resources:

- Global, Mediterranean and Greek **biodiversity** (plants, fungi, terrestrial organisms)
- Library of more than 3000 extracts/1500 compounds (natural products/organic synthesis)



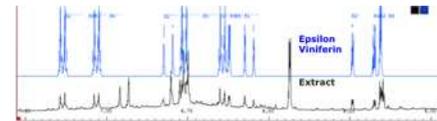
# Natural products Natural ingredients?



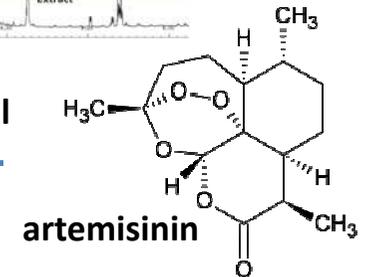
- **Shift of consumers** in cosmetics with natural ingredients (growing health concerns, sense of well-being, influence of media attention. )
- **Natural active ingredients** comprise 3% of total cosmetic sales in Europe (projected to be over 10% in the coming years)



Drug discovery



antimalarial



Isolated from *Artemisia annua*  
(Asteraceae)  
*Nobel on Medicine 2015*

ity related to  
plications

Anti-ageing  
Skin whitening  
Antioxidant

Extraction  
Enrichment  
**Determination of active components**



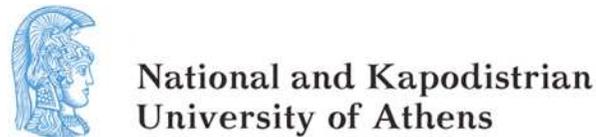
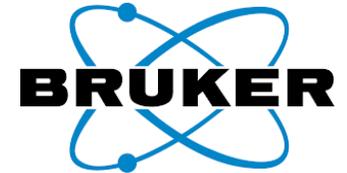
# AGROCOS: From Biodiversity to Chemodiversity: Novel Plant Produced Compounds with Agrochemical and Cosmetic interest

- Granted under the 7<sup>th</sup> framework programme
- Call: **Food, Agriculture and Fisheries, and Biotechnology**  
Topic **Prospecting for novel plant-produced compounds (FP7-KBBE-2009-3)**
- Duration: 4 years
- Budget: ~ 4.000.000 €



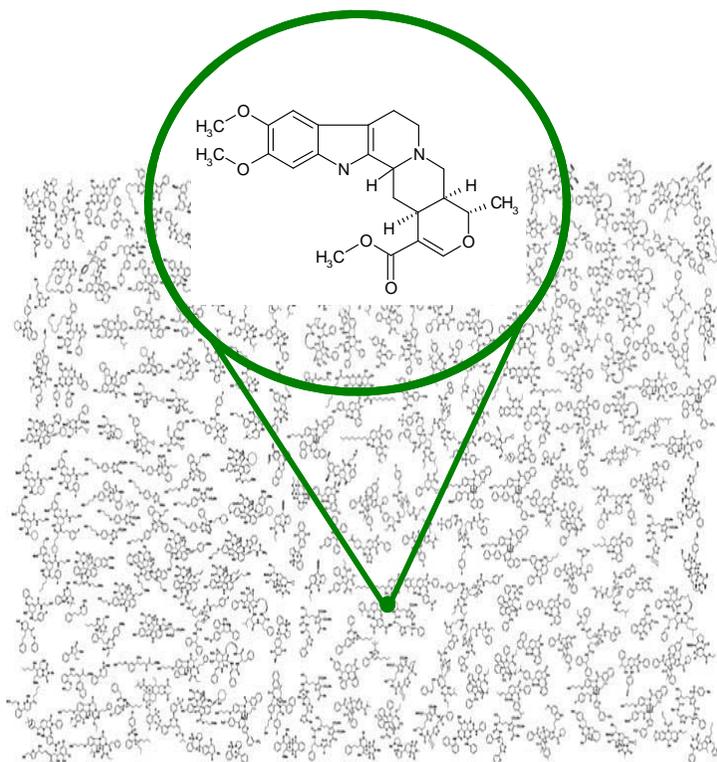
# Consortium

1. National and Kapodistrian University of Athens, **Greece** (NKUA, Coordinator) 
2. University of Basel, **Switzerland** (UNIBAS) 
3. Centre National de la Recherche Scientifique, **France** (CNRS) 
  - a. ECOFOG (**French Guyane**)
  - b. ICSN (**New Caledonia, Madagascar**)
4. Universidad de Panamá, **Panama** (CIFLORPAN) 
5. Council for Scientific and Industrial Research, **South Africa** (CSIR) 
6. BASF, **Germany** (BASF) 
7. KORRES SA, **Greece** (KORRES) 
8. Bruker BioSpin GmbH, **Germany** (BRUKER) 
9. National Center for Scientific Research “Demokritos”, **Greece** (NCSR) 



# Core target achieved

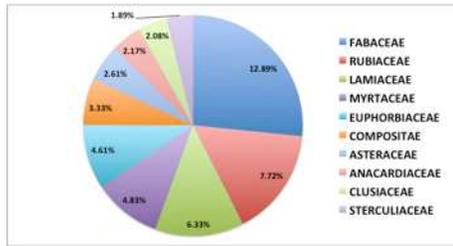
Discovery of plant derived small molecules with development potential as new cosmetic/agrochemical agents, from the global biodiversity.



1810 plant species

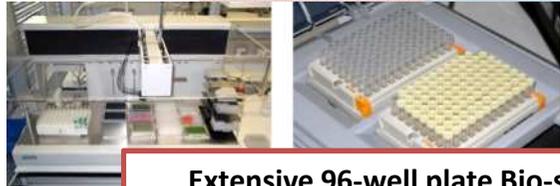
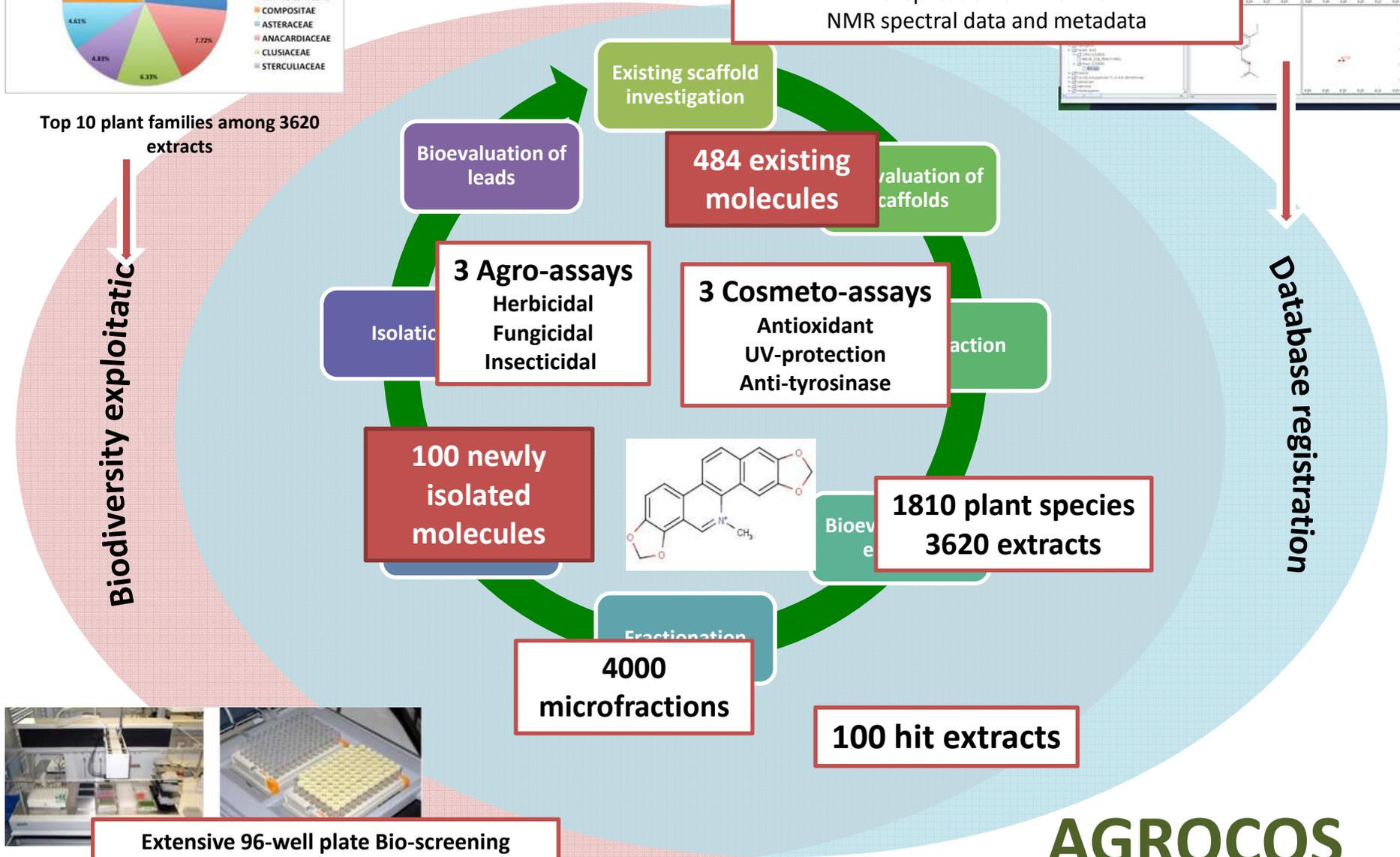
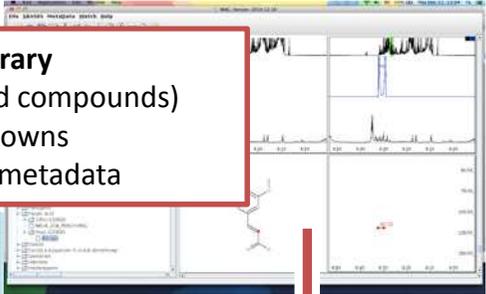
3620 extracts

100 hit plants



Top 10 plant families among 3620 extracts

**NPs AGROCOS Library**  
 600 NP entities (extracts and compounds)  
 Dereplication of knowns  
 NMR spectral data and metadata



**Extensive 96-well plate Bio-screening**  
 3620 Extracts  
 600 compounds  
 4000 microfractions

# AGROCOS results





## RESULT:

Launch of a full skincare antiaging line based on Agrocos findings / antiaging properties of Fagacea

**Stay tuned, in pharmacies & department stores around the world in 2016!**



# Development Cosmetics

www.korres.com/default.aspx?page\_id=1483

Home - Research ... European Medicin... Home | European ... Home - Eurostat

HERBS / COOPERATIONS / EXTRACTS / RESEARCH  
**KORRES**

How we started | Our Heart | Greek Flora | Developing Natural Formulations | The Products | Around The Globe

FACE | HAIR | SUNCARE | MAKE UP | FRAGRANCE | BODY | MEN | DAILIES | HERBAL PHARMACY | BEST OF

LOG IN  
CREATE AN ACCOUNT  
NEWSLETTER  
SEARCH  
BASKET

EN GR

## NEA ΚΑΣΤΑΝΙΑ ΑΡΚΑΔΙΚΗ

ΑΓΩΓΗ ΚΑΤΑ ΤΩΝ ΡΥΤΙΔΩΝ ΣΕ ΟΛΕΣ ΤΙΣ ΔΙΑΣΤΑΣΕΙΣ  
ΒΑΘΟΣ · ΠΛΑΤΟΣ · ΕΠΙΦΑΝΕΙΑ

NEA ΚΑΣΤΑΝΙΑ ΑΡΚΑΔΙΚΗ

Καστανιά αρκαδική, ένα από τα κορυφαία αντιοξειδωτικά φυτά παγκοσμίως αλληλεπιδρά με τη μεγαλύτερη έρευνα που έγινε ποτέ σε φυσικά αναπλαστικά (έρευνα AGROCOS) λόγω της δραστηρής λουπεάλης, που στοχεύει στις ρυτίδες. Τα εργοστάσια KORRES δημιούργησαν ένα καινούριο μόριο καθαρής λουπεάλης σε πλέγμα Υαλουρονικού οξέος, που μπαίνει για πρώτη φορά σε καλλυντική φόρμουλα, δράση σε όλες τις διαστάσεις των ρυτίδων: Άξιο, λαμπερό, σφριγηλό δέρμα άμεσα.

Η ΣΥΓΚΟΜΙΔΗ  
CLICK HERE

EST. KORRES 1996  
CASTANEA ARCADIA  
CHATAIGNIER D'ARCADIE  
ΚΑΣΤΑΝΙΑ ΑΡΚΑΔΙΚΗ  
ATHENS

**AGRO COS**  
FROM BIODIVERSITY TO CHEMODIVERSITY



## PharmaGnose is a spin-off company of the University of Athens



HELLENIC REPUBLIC  
National and Kapodistrian  
University of Athens

**Academic staff members from**

- University of Athens
- Agricultural University of Athens
- NCSR Demokritos

**Experienced researchers**

# The team

## Main staff involved

- 7 Academic staff
- 5 Experienced researchers

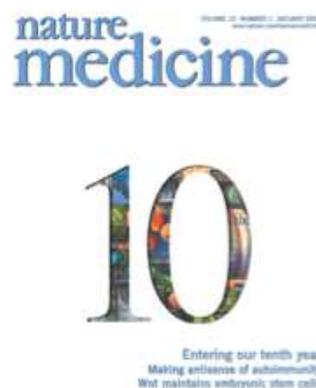
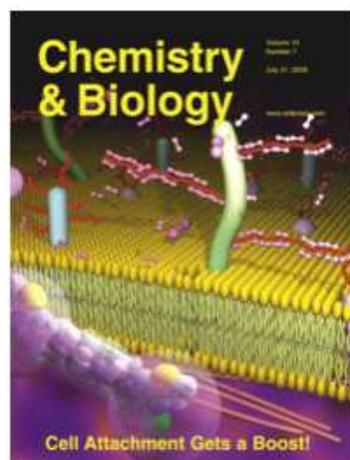
## Available human resources

- Highly qualified experts in research and development (chemists, pharmacists, physicists)
- Highly trained technical staff
- Financial manager



# Publications

- 230 Publications in international journals (Nature Med., Oncogene, Chem.Biol, Org. Lett. J.Med.Chem, J. Agric. Food Chem., J.Nat.Prod., Phytochemistry, Tetrahedron Lett., etc)
- 12 Monographs & Review articles
- 270 Seminars/Posters in international conferences
- Supervision of >20 PhD thesis



# Infrastructure 1/3

## Laboratories With State of the Art equipment

### Extraction (*Classical & Innovative technologies*)

- Maceration unit
- Accelerated Solvent Extraction unit
- Supercritical Fluid Extraction unit
- Microwave Assisted Extraction unit

### Isolation

- High Speed Counter Current Chromatography
- High Performance Liquid Chromatography
- Medium Pressure Liquid Chromatography

### Synthesis & *in silico* studies

- Buchi Syncore apparatus (combinatorial synthesis)
- Silicon Graphics workstations
- Linux cluster & Software



# Infrastructure 2/3

## Analysis

- Analytical HPLC with Diode Array, Evaporative Light Scattering & Refractive Index detectors
- LC-MS with ESI & APCI ionization sources
- UPLC with DAD detector
- High-Resolution MS + ESI, APCI & APPI ionization sources
- SFC-MS
- GC-MS systems + EI and CI ionization sources, GC-FID apparatus
- Head-space analysis
- HPTLC Camag platform

## Structural elucidation

- NMR spectrometers
- Mass Spectrometers
- FT-IR
- UV/Vis
- Polarimeter, melting point apparatus



# Infrastructure 3/3

## Formulation

- Spray
- Two lyophilization units
- 2D barcoding system for encoding & storage

## Fermentation/Bioevaluation

- Incubators
- Bioreactor
- Autoclave
- Plate reader



## Pilot scale

- 1000 L Distillation/extraction unit
- 200 L Distillation unit
- 100 L essential oil distillator
- 500 L & 600 L extraction vessels
- Adsorption resin columns
- 100 L Vacuum dessicator
- 20 L Rotary evaporators
- Lyophilization unit
- 63 L reactor for medicinal chemistry preparations

# The services

- **Analytical Services**

**Method development for**

- **extraction, separation, isolation**
  - **structural identification**
  - **analysis of natural products**
  - **analogues development**
  - **and pilot scale production**
- **R&D - Contract research for early stage discovery process**

# The products

**PharmaGnose**

# MediSanto

**VINSANTO WINE FROM SANTORINI**  
 Vinsanto is an ancient winemaking tradition of Santorini that dates back thousands of years and represents an important part of the island's history. The winemaking style of Vinsanto can also be found throughout Italy and has historically been known as Italy's "Holy Wine". However, its origins lie in Santorini, which was a trading port throughout much of history. The island focused on the cultivation of wine that would be exported throughout the Mediterranean. Packages taken from the island were labeled, "Santo," to denote their origin. Wine from the island was denoted, "vin" or "vino" to denote the packages contents; thus, the term "vinsanto" was born. In order for a wine to be labeled Vinsanto, it must be predominately made from the Assyrtiko variety of grapes, at least in 51%, while the remaining 49% is made up of Athiri and Aidani and some small amounts of other locally grown white varieties. There is strong epidemiological evidence that light-to-moderate consumption of wine, but neither zero nor more than moderate intake, reduces mortality from all causes and also diminishes cardiovascular risk. The lowest risk of coronary heart disease is observed with 1 to 2 glasses of wine per day. Cardiovascular risk factors are associated with oxidative stress in the vasculature because of an increased production and/or impaired inactivation of reactive oxygen species. Wine's biological activity is attributed to the phenolic content of red wine, as shown by numerous scientific studies.

**What is MediSanto?**

**SPECIFICATIONS**  
 Total polyphenols **≥45%**

MediSanto is a standardized extract of Assyrtiko grapes. It is obtained through "green" extraction of the grape pomace using only water. It contains polyphenols, such as tannins, anthocyanins, catechins and epicatechins. Those polyphenols are widely known for their strong antioxidant properties.

**RECOMMENDED DOSE**  
 MediSanto is destined for food supplements and/or cosmetic formulations. It is a powdered extract and it can be comprised in various types of per os (capsules, softgels, sachets, drinks, tablets) and/or cosmetic formulations (creams, lotions, gels). It can be administered orally in a dose of 200-500 mg/day, or topically up to 3% in the final formulation.

**PharmaGnose**

# MediSanto

**POLYPHENOLS**  
 MediSanto (350 mg) 160 mg  
 Glass of red wine (125 ml) 125-500 mg

**FLOWCHART PROCESS**

1. grape pomace aqueous extraction
2. polyphenols adsorption in resin column
3. polyphenols recovery & concentration
4. spray-drying
5. analysis & standardization

**PRODUCT INFORMATION DATASHEET**  
 Botanical Dietary and Cosmetic Ingredient

**BOTANICAL PRODUCT INFORMATION**  
 Product name & code: MediSanto  
 Common or usual name of product: Grape pomace extract  
 General product information: Grape pomace extract standardized to more than 45% total polyphenols

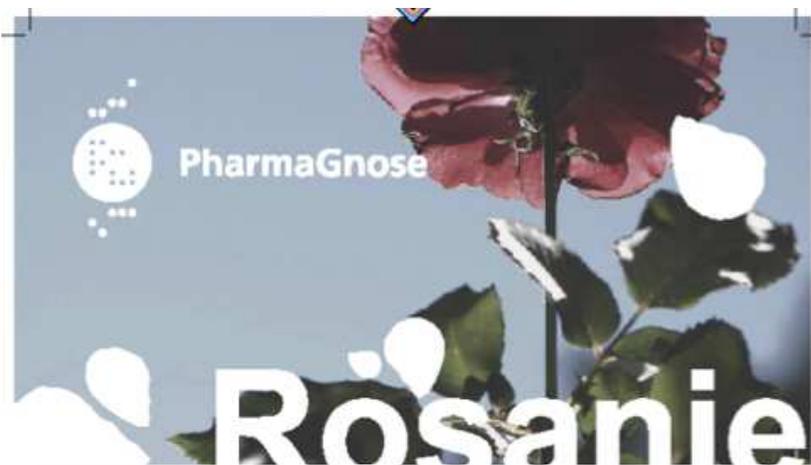
**BOTANICAL MANUFACTURING INFORMATION**  
 Name & address of manufacturing site: Pharmagnose  
 Mode of manufacturing: Flow chart attached  
 Agricultural process: Santorini grapes traditional cultivation

**GENERAL SPECIFICATIONS**  
 Appearance: Indian red powder  
 Solubility: Soluble in water, ethanol and hydroalcoholic mixtures  
 Total polyphenols: ≥45% (Folin Ciocateau)  
 Origin/Obtaining method: Grape pomace/Chromatographic Natural Extraction  
 Shelf life: 24 months unopened stored in a cool and dry location  
 Others: MediSanto must be used after opening. Once open, it is recommended to keep the product closed, store in a dry place and keep out of the damp. As MediSanto is an entirely natural extract, there may be a slight variation in colour from batch to batch. This circumstance in no way signifies any alteration in the quality of the product.

**CONTACT**  
 PharmaGnose  
 address: Papathanassiou 24, 34100 Chalkida, Euboea, Greece  
 mail: info@pharmagnose.com  
 web: www.pharmagnose.com



# The products



**PharmaGnose**

# Rosanie

**Rosa damascena.** - *Rosa damascena*, the famous Damascene Rose, has been cultivated in Europe since the 13th century and its flower has been considered as a symbol of beauty and love. The fragrance of the rose was captured and preserved in the form of rose water by an ancient method that can be traced back to biblical times in the Middle East, and later to the Italian subcontinent. A Persian scientist, the alchemist Avicenna, is credited with the invention of the process of extracting rose water from rose petals in the early 11th century. Apart from the well-known essential oil, extracts of the petals have also been used in the form of decoction for its therapeutic properties by various ethnic groups. The petals possess anti-inflammatory properties and are toxic to the gastrointestinal system [1]. In the Israeli desertion "Zatree", famous in Middle East, rose is used for its general beneficial properties to human health [2]. A decoction has been used in gingivitis, lung diseases, as a stimulant of the nervous system, to leucorrhoea [3] and leishmaniasis [4, 5]. Also, *Rosa damascena* and its flavonoids could be beneficial for the cardiovascular system, due to the inhibitory activity of the aqueous extract against certain enzymes related to hypertension [6]. In ocular pathology, rose petals have been used in preparations and even finished products against infectious, inflammatory and allergic eye disorders [7, 8].

**Rose petals and essential activity.** - Antioxidant activity of essential extracts is proven [9-11], while aqueous extracts have been shown to exhibit anti-aging properties in *Drosophila* species [12, 13]. Hydrocortisone extracts present UV-protective activity via absorption of the radiation and have been tested in cosmetology preparations [14].

**Composition**

Rosanie contains mainly three flavonols (kaempferol, quercetin and rutin), phenylethanol and their glycosides:

- phenylethanol- $\beta$ -glucopyranoside- $\downarrow$
- quercetin-3-O- $\beta$ -glucopyranoside- $\downarrow$
- quercetin-3-O- $\beta$ -galactopyranoside- $\downarrow$
- kaempferol-3-O- $\beta$ -glucopyranoside- $\downarrow$
- kaempferol-3-O- $\beta$ -arabinofuranoside- $\downarrow$
- kaempferol-3-O- $\beta$ -glucopyranoside- $\downarrow$
- kaempferol-3-O-( $\Gamma$ -O-p-coumaroyl)- $\beta$ -glucopyranoside- $\downarrow$

**Total Phenolic Content**  
min. 20%

**Antioxidant activity (DPPH IC<sub>50</sub>)**  
<50  $\mu$ g/ml

**What is Rosanie?**  
Rosanie is a standardized extract of *Rosa damascena* petals. It is obtained through "green" extraction of the petals using only water. It is enriched in flavonoids, such as kaempferol, quercetin and rutin. Those flavonols are widely known for their strong antioxidant properties.

[1] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[2] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[3] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[4] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[5] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[6] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[7] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[8] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[9] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[10] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[11] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[12] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[13] Journal of Ethnopharmacology, 87(2), 141-150-155.  
[14] Journal of Ethnopharmacology, 87(2), 141-150-155.



**PharmaGnose**

# Rosanie

**Information datasheet**  
Botanical cosmetic ingredient

**Botanical product information**  
Product name: Rosanie  
Common or usual name of product: *Rosa damascena* petals extract  
General product information: *Rosa damascena* petals extract standardized to more than 20% total polyphenols

**Botanical manufacturing information**  
Manufacturing site: PharmaGnose SA, Greece  
Mode of manufacturing: Flow chart attached  
Agricultural process: *Rosa damascena* traditional cultivation

**General specifications**  
Appearance: Indian red powder  
Solubility: Soluble in water, ethanol and hydroalcoholic mixtures  
Total polyphenols:  $\geq 20\%$  (Folin Ciocalteu)  
Origin/Obtaining method: *Rosa damascena* petals/  
Chromatographic Natural Extraction  
Shelf life: 24 months unopened stored in a cool and dry location  
Others: Rosanie must be used after opening. Once open, it is recommended to keep the product closed, store in a dry place and keep out of the damp. As Rosanie is an entirely natural extract, there may be a slight variation in colour from batch to batch. This circumstance in no way affects any attention in the quality of the product.

**Flowchart Process**



**Contact:**  
PharmaGnose  
address: Pnyfi-Stratou 24, 24100 Chalkida, Evros, Greece  
mail: info@pharmagnose.com  
web: www.pharmagnose.com

# The products



## Phyllolea

**The healing power of Olive leaf**

The first pressing of oil from olives, referred to as extra virgin olive oil, is credited with having an important role in the overall healthy nature of the Mediterranean diet. However, another part of the olive harvest, less known, imparts tremendous health benefits. That part of the harvest is olive leaf – a traditional medicine whose therapeutic uses date back centuries.

Olive leaf (*Olea europaea* L.) was firstly used medicinally in Ancient Egypt. It is constantly gaining recognition as a powerful defender against a variety of ailments and numerous scientific studies have been conducted to investigate their beneficial properties. Research into olive leaves has revealed that their health properties are attributed to a group of secondary metabolites they contain, namely biophenols that display a wealth of both structural variety and diversity of important activities. Among the bioactive compounds of olive leaves, oleuropein presents very interesting pharmacological activities. Studies have shown that oleuropein exhibits anti-ischemic, antioxidative, hypolipidemic, antiviral, antimicrobial, antiatherogenic, cardioprotective, antihypertensive and anti-inflammatory properties.

**Specifications**

Oleuropein is the principal secondary metabolite in **Phyllolea**, present in a minimum of 5%. Along with ligstroside and its demethylated derivative, which are also found in olive leaves, it belongs to the category of secoiridoids having a phenolic moiety. Further phenolics identified are hydroxytyrosol, tyrosol, acteoside (verbascoside), caffeic acid, p-coumaric acid and vanillic acid. In addition, olive leaves contain a significant amount of flavonoids, such as luteolin-7-O-glucoside, luteolin-7-O-rutinoside, apigenin-7-O-glucoside, diosmetin-7-O-glucoside, rutin, luteolin, diosmetin, and apigenin. The total phenolic content is min. 15%. This content in high added value compounds is behind the potent radical scavenging power that olive leaves' extracts exhibit.

**Recommended Dose**

**Phyllolea** is destined for food supplements and/or cosmetic formulations. It is a powdered extract and can be comprised in various types of per os (capsules, softgels, sachets, drinks, tablets) and cosmetic formulations (emulsions, gels etc.). It can be administered orally in a dose of 200-500 mg/day depending on the indication or topically, up to 2% in the final formulation.



## Phyllolea

**Flowchart Process**

- (1) Olive leaves subcritical water extraction
- (2) Polyphenols adsorption in resin column
- (3) Polyphenols recovery and enrichment
- (4) Spray-drying
- (5) Quality control

**What is Phyllolea**

Phyllolea is a standardized extract of koroneiki olive variety. It is obtained through a green recovery process that consists of subcritical water extraction and natural chromatographic enrichment.

**Oleuropein content min. 5%**

**Total phenolic content min. 15%**

**BOTANICAL PRODUCT INFORMATION**

Product name & code: Phyllolea  
 Common name of product (i.e. INCI name): *Olea europaea* (olive) leaf extract  
 General product information: Olive leaf extract standardized to more than 5 % oleuropein

**BOTANICAL MANUFACTURING INFORMATION**

Name & address of manufacturing site: Pharmagnose, 57 Km National Road Athens-Lamia, Inofyta, Greece  
 Agricultural process: Olive trees traditional cultivation  
 Recovery process: Subcritical water green extraction / natural chromatographic enrichment

**GENERAL SPECIFICATIONS**

Appearance: Phyllolea is a brown/green free-flowing powder  
 Solubility: Soluble in water and hydroglycolic mixtures  
 Oleuropein: >5% (HPLC)  
 Total polyphenols: >15% (by Folin Ciocalteau method)  
 Other natural compounds: flavonoid glucosides, verbascoside, terpenes etc.  
 Antioxidant activity: IC<sub>50</sub> = 50-70 µg/ml (DPPH radical scavenging assay)  
 INCI name: *Olea europaea* leaf extract  
 CAS No: 8001-25-0 / 84012-27-1

**Contact:**  
 PharmaGnose  
 address: Papatthanassiou 24, 34100 Chalkida, Euboea, Greece  
 mail: info@pharmagnose.com  
 web: www.pharmagnose.com

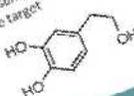
# The products

**Authorized claim concerning the olive oil consumption**

On the basis of the data presented, the Panel concludes that a cause and effect relationship has been established between the consumption of olive oil polyphenols (standardised by the content of hydroxytyrosol and its derivatives) and protection of LDL particles from oxidative damage.

The Panel considers that in order to bear the claim, **5 mg of hydroxytyrosol and its derivatives (e.g. oleuropein complex and tyrosol) in 20ml olive oil** should be consumed daily. These amounts, if provided by moderate amounts of olive oil, can be easily consumed in the context of a balanced diet. The concentrations in some olive oils may be too low to allow the consumption of this amount of polyphenols in the context of a balanced diet. The target population is the general population.

<http://www.efsa.europa.eu/efsajournal/pub/2024.htm>



## Oleuropein and Mediterranean diet

Oleuropein is a polyphenolic compound found in olive leaves and olive oil. It has been evidenced to promote coronary health and promote longevity. It is found in high concentrations in olive oil and is associated with a low intake of saturated fat and high in monounsaturated fat and dietary fiber. One of the main reasons for the health effects of olives and olive oil, which characterizes the Mediterranean diet, are the strong antioxidant, anti-inflammatory and cardioprotective properties are contained in olive oil polyphenols, such as hydroxytyrosol, tyrosol, verbascoside, oleocanthal and oleacin. The EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA Panel) has approved the relationship between the daily intake of 5 mg of olive oil polyphenols (standardized by the content of hydroxytyrosol and its derivatives) and the protection of LDL particles from oxidative stress\*.

## What is Oleamed?

Oleamed is a standardized, "green" olive extract from the fruit of a specific greek variety, Amfissis (*Olea europaea* var. *rotunda*). It is obtained through environmentally friendly extraction processes. It exhibits a characteristic composition, rich in hydroxytyrosol (which is approved by EFSA for heart and coronary health claims) and tyrosol among other phenolics which have been shown to possess antioxidant properties by protecting body cells and LDL from oxidative damages, according to EFSA. It also promotes skin health and retards skin aging through the scavenging of free radicals.

## Specifications

Oleamed is standardized in hydroxytyrosol and guarantees high total phenolic content demonstrating high antioxidant activity during DPPH radical scavenging activity tests.

- Hydroxytyrosol content : ≥7%
- Total polyphenols : ≥17%
- DPPH radical scavenging activity : IC<sub>50</sub> ≤100 µg/ml.

## Recommended dose

Oleamed is destined for food supplements and/or cosmetic formulations. It is a powdered olive fruit extract with maltodextrine and it can be comprised in various types of *per os* (capsules, softgels, sachets, drinks, tablets) and/or cosmetic formulations (creams, lotions, gels). It can be administered orally in a dose of 50-100 mg/day, or topically up to 2% in the final formulation.



### Botanical product information

**Product name:** Oleamed  
**Common or usual name of product:** Olive fruit extract  
**General product information:** Olive fruit extract standardized to more than 7% hydroxytyrosol

### Botanical manufacturing information

**Manufacturing site:** PharmaGnose, Greece  
**Mode of manufacturing:** Flow chart attached  
**Agricultural process:** Greek olives traditional cultivation

### General specifications

**Appearance:** beige powder  
**Solubility:** Soluble in water, ethanol and hydroalcoholic mixtures  
**Ash:** 3-6%  
**Hydroxytyrosol:** ≥8% (HPLC)  
**Total polyphenols:** ≥17% (Folin Ciocalteu)  
**Lipids:** 8-10%  
**Proteins:** 2-4%  
**Energy:** 300 kcal/100 g  
**Antioxidant activity:** IC<sub>50</sub> ≤100 µg/ml (DPPH radical scavenging assay)  
**Origin/Obtaining method:** Olive Fruit/Chromatographic Natural Extraction  
**Shelf life:** 24 months unopened stored in a cool and dry location  
**Others:** Oleamed must be used after opening. Once open, it is recommended to keep the product closed, store in a dry place and keep out of the damp. As Oleamed is an entirely natural extract, there may be a slight variation in colour from batch to batch. This circumstance in no way signifies any alteration in the quality of the product.

### Contact:

PharmaGnose  
 address: Papiathanassiou 24, 34100 Chalkida, Euboea, Greece  
 mail: info@pharmagnose.com  
 web: www.pharmagnose.com



# The products

**PharmaGnose**

# Phenolio

**Phenolio** is an ultra-concentrated extract of Extra Virgin Olive Oil condensed in all its famous bioactive biophenols and other bioactive olive secondary metabolites, such as triterpenic acids. **Phenolio** is isolated from selected Greek extra virgin olive oil of the highest quality and exclusively with environmentally friendly techniques. It has been proven to offer protection from oxidative stress and inflammation.

Its phytochemical content is well characterized through modern analytical techniques. More specifically, **Phenolio** is rich in the very well known olive molecules hydroxytyrosol, tyrosol, oleacein, oleocanthal, luteolin, maslinic and oleanolic acid. It contains also the less known active ingredients such as elenolic acid, oleuropein and ligstroside aglycons derivatives.

**WHAT IS PHENOLIO?**

**Phenolio** is a standardized Extra Virgin Olive Oil extract. It contains famous bialdehydic oleuropein aglycons, Oleacein and Oleocanthal. It is obtained through natural chromatographic enrichment (green process).

**Oleocanthal:** Exists in high contents in most Greek oils. It possesses a strong anti-inflammatory activity, comparable with that of known anti-inflammatory drugs, according to recent scientific publications (Nature).

**Oleacein:** The bi-hydroxylated oleocanthal analogue. Also exists in high quantities in Greek olive oils. It is a strong antioxidant and anti-inflammatory agent.

**OTHER COMPOUNDS**

- Flavonoids, and especially luteolin are efficient free radical scavengers.
- Olive triterpenic acids, mainly maslinic and oleanolic acids have also been shown to possess good antioxidant and anti-inflammatory properties. They have been found as strong anti-virus agents.
- Tyrosol and Hydroxytyrosol are the most known olive molecules. Hydroxytyrosol is the only olive-derived molecule that got an official EFSA claim as preventive from LDL-oxidation.

**RECOMMENDED DOSE**

**Phenolio** is destined for food supplements and/or cosmetic formulations. It is a powdered extract and can be comprised in various types of per os (capsules, softgels, sachets, drinks, tablets) and cosmetic formulations (emulsions, gels etc.). It can be administered orally in a dose of 200-500 mg/day depending on the indication or topically, up to 2% in the final formulation.

**BOTANICAL PRODUCT INFORMATION**

Product name: Phenolio  
 Common or usual name of product: Extra virgin olive oil extract  
 General product information: Extra virgin olive oil extract standardized to oleacein & oleocanthal.

**BOTANICAL MANUFACTURING INFORMATION**

Manufacturing site: PharmaGnose, Greece  
 Mode of manufacturing: Flow chart attached  
 Agricultural process: Greek olives traditional cultivation

**BIOACTIVE COMPOSITION:**

- **Oleocanthal:** Exists in high contents in most Greek oils. It possesses a strong anti-inflammatory activity, comparable with that of known anti-inflammatory drugs, according to recent scientific publications (Nature).
- **Oleacein:** The bi-hydroxylated oleocanthal analogue. Also exists in high quantities in Greek olive oils. It is a strong antioxidant and anti-inflammatory agent.
- **Flavonoids**, and especially **luteolin** are efficient free radical scavengers.
- **Olive triterpenic acids**, mainly **maslinic** and **oleanolic acids** have also been shown to possess good antioxidant and anti-inflammatory properties. They have been found as strong anti-virus agents.
- **Tyrosol and Hydroxytyrosol** are the most known olive molecules. Hydroxytyrosol is the only olive-derived molecule that got an official EFSA claim as preventive from LDL-oxidation.

**FLOWCHART PROCESS**

- extra virgin olive oil
- polyphenols adsorption in resin column
- recovery of the olive oil phenolic compounds
- vacuum evaporator spray-drying
- analysis and biological evaluation

**Contact:**

PharmaGnose  
 address: Papatthanassiou 24, 34100 Chalkida, Euboea, Greece  
 mail: info@pharmagnose.com  
 web: www.pharmagnose.com

---

---

---

**Thank you very much for your  
attention!**

