Antioxidants form olive waste

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Objective

To create a technology landscape report on **Antioxidants form Olive waste**

- Identify market players with prolific IP activity in the technology area
- Segment the players by the industry they belong to

Note: *This report is just a template and gives an indication of what the paid report contains.*

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Search methodology

Search strategy	1. Various keywords are retrieved for conducting the search related to antioxidants from olive waste from pubmed mesh, relevant patents, scientific articles and thesaurus. 2. The database used for patent search is Thomson innovation.
Keywords	Olive waste, By-products, Antioxidants etc.

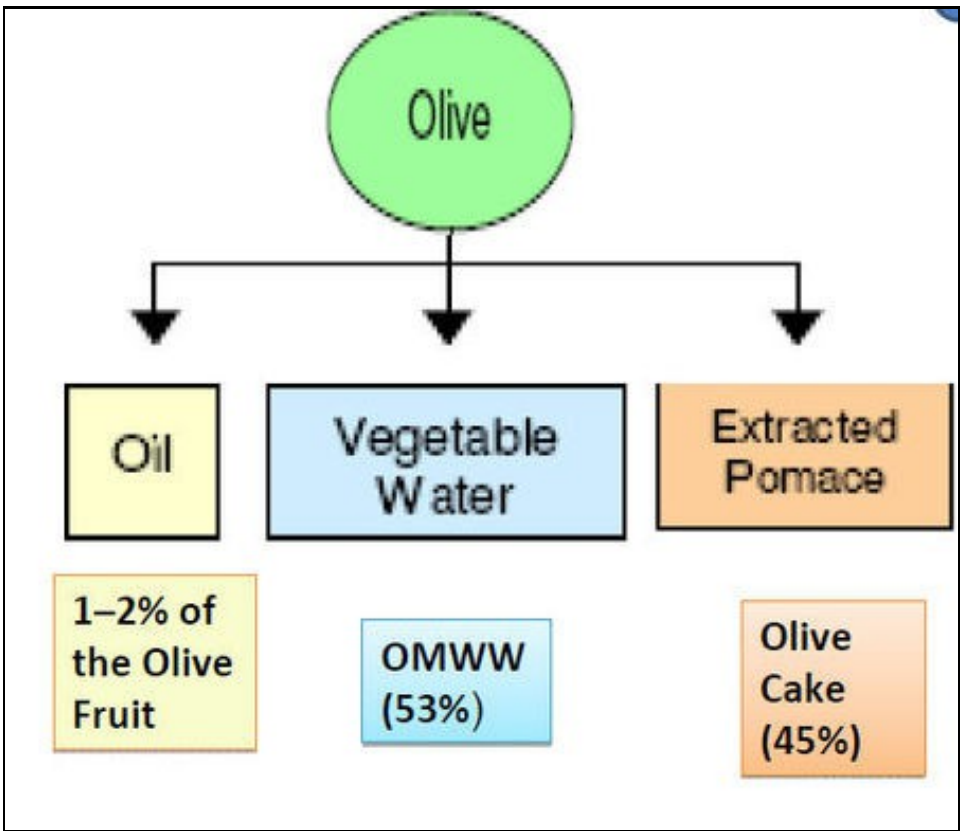
Background

Fruit and vegetable processing has increased considerably during the last 25 years and this generates substantial quantities of waste/by-products. These wastes are often disposed of as landfill, land-spreading, or as animal feed or fertilizers. But in last few years, efficient, inexpensive and environmentally sound utilization of these materials is becoming more important and hence new methods for waste handling and treatment have been introduced in the recovery, bioconversion, and utilization of valuable constituents from food wastes.Waldron



Olea europaea L. is a typical tree widely cultivated for oil production in the Mediterranean area, they are rarely consumed as a natural fruit due to their extreme bitterness hence they are widely used for the extraction of oil Bouaziz et al.This olive oil industry generates large amounts and varieties of wastes, which remain most of potentially interesting compounds.

- Olive oil production products Taka:
    - **Olive oil** (20%).
    - **Semi-solid waste** (30%)
    - **Aqueous liquor** (50%).



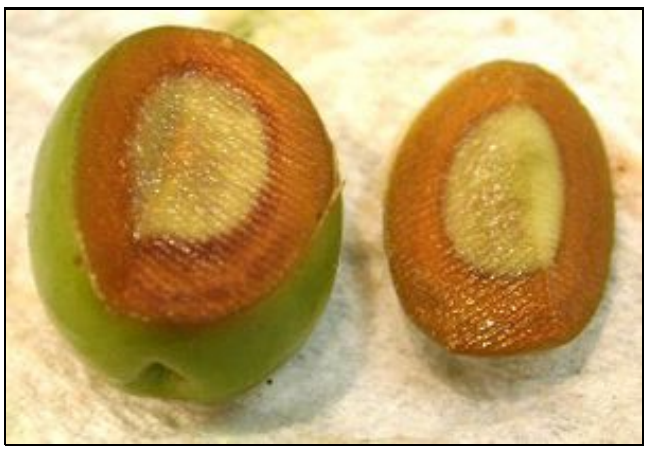
- **Solid waste** (olive oil **cake** (OOC) or ?**orujo**?) is a combination of **olive pulp** and **stones**.
- **Aqueous liquor** comes from the **vegetation water** and ?**alpechin**" or **olive-mill waste water** (OMWW).
- Two-phase processing technique in which no water is added, generates oil and a new by-product called ?**alperujo**, **alpeorujo** or twophase olive mill waste? which is a combination of liquid and solid waste. Bolanos et al

Antioxidants in olive waste

During the production of olive oil 80% of the olive fruit is discarded as waste, over 10 million tons per year of solid or semisolid wastes are produced worldwide in the olive industry, whose storage and/or recycling represent a serious environmental problem due to its high content in organic matter.However these wastes are rich in **polyphenols**, including **hydroxytyrosol** Schaffer et al. Olive fruits, olive leaves, olive oil and olive mill wastewater all of them have attracted considerable attention as valuable sources of biophenols Bouaziz et al.Biophenolic fraction of olive oil comprises only 1-2% of the total phenolic content of the olive fruits, while the remaining 53% and 45% being lost in oil mill waste (OMW) and olive cake.Consequently, with more than **30 phenolic** compounds, OMW is now regarded as a potent source of natural antioxidants. Taka

Oleuropein is the major secoiroid compound of unripe olive fruit and the glucoside of **hydroxytyrosol** is the predominant phenolic in ripe olives. Olive fruits also contain other secoiroids such as **verbascoside** and **ligustroside**. Other groups of phenolic compounds are derived from **cinnamic** (p-cumaric, ferulic and cafeic acid) and **benzoic** acids. Other phenols found in olive pulp are **catechol**, **methylcatechol**, **phenylalchols** (tyrosol, hydroxytyrosol), high concentrations of **flavonoids** and several **anthocyanin** pigments.The main phenolic compounds present in virgin olive oil are **tyrosol**, hydroxytyrosol, its secoiroids and conjugate forms (oleuropein, ligustroside, verbascoside) and **lignans** (pinoresinol and acetopinoresinol). During the olive oil mechanical process, the major proportion of the phenolic compounds are found in the aqueous phase, while only a minor percent (<1%) are located in the olive oil this explains why a large fraction of phenolics can be found in the **alpechin** and **alperujo**. Therefore, both residues seem to be an affordable and abundant source of natural antioxidants Bolanos et al.

Polyphenols present in different parts of olive plant



Olive Bark	Olive Branches	Olive stones
Hydroxytyrosol	Hydroxytyrosol	Pinoresinol
Tyrosol	Tyrosol	Hydroxy pinoresinol
Oleuropein	Oleuropein	
Ligstroside	Verbascoside	
	Taxifolin	

Concept table

Title : **Antioxidants from olive waste**

S.No	English Keywords				German Keywords			French Keywords		
	Concept One	Concept Two	Concept Three	Concept Four	Concept Two	Concept Three	Concept Four	Concept Two	Concept Three	Concept Four
1	Olive	Waste	Antioxidant	Recovery	Abfall	Antioxidans	Erholung	déchets	antioxydant	Récupération
2	*Olea europaea L*	By-product	Phenols	Removal	Nebenprodukt	Phenole	Entfernung	Par-produit	phénols	suppression
3	*****	*****	*****	*****	****	******	****	***	******	********
4	********	***	********	***	*******	*********	******	****	****	**********

- *An indicative list of terms to show how a concept table is generated. View paid report for complete list.*
- *Concept Table was enriched by searches related to olive waste and antioxidants from pubmed mesh, relevant patents, scientific articles and various thesauri*

IPC class codes

Concept	Code	Definition
Waste	C02F	Treatmentof water, waste water, sewage, or sludge
	103/32	• Nature of the water, waste water, sewage or sludge to be treated ♦ From the food or foodstuff industry, e.g. brewery waste waters
Olive	A61K	Preparations for medical, dental, or toilet purposes
	36/63	• Medicinal preparations of undetermined constitution containing material from algae, lichens, fungi or plants, or derivatives thereof ♦ Oleaceae (olive family), e.g. Jasmine, lilac or ash tree
Antioxidant 	A61K	Preparations for medical, dental, or toilet purposes
	31/05	• Medicinal preparations containing organic active ingredients ♦ Phenols
Removal Process	C02F	Treatmentof water, waste water, sewage, or sludge
	1/04	• Treatment of water, waste water, or sewage ♦ By distillation or evaporation

US class codes

Concept	Codes	Definition
Waste	554	Organic compounds
	554/177	Recovering from industrial waste materials
Olive	424	Drug, bio-affecting and body treating compositions
	424/769	Containing or obtained from a tree having matured height of a least two meters
Antioxidant	424	Drug, bio-affecting and body treating compositions

	424/725	Plant material or plant extract of undetermined constitution as active ingredient
Removal Process	210	Liquid purification or separation
	210/600	processes

- *An indicative list of various class codes used for the IP search. View paid report for complete list.*

Search strategy

- **Search Engine:** Thomson Innovation
- **Database Coverage:** US, Europe, German, Japanese and Korean applications and granted patents
- **Scope:** Title, Abstract and Claims
- **Timeline** : 1900 to 2011
- **Date of search** : 20/09/2011

S.No	Concept	Query	No of Hits
1	Full keywords (**Olive + Waste + Antioxidants + Removal process**)	Olive***	#####
2	(**Olive + Waste + Antioxidants**) keywords AND (**Removal process**) class codes	Olive*** **AND** C02F000100***	###
3	(**Olive + Waste + Removal process**) keywords AND (**Antioxidants**) class codes	Olive*** **AND** A61K003105***	####
4	(**Olive + Removal process + Antioxidants**) keywords AND (**Waste**) class codes	Olive**** **AND** C11B001300****	##
5	(**Waste + Antioxidant + Removal process**) keywords AND (**Olive**) class codes	Waste*** **AND** A61K003663****	####
6	Combined query	2 OR 3 OR 4 OR 5	####
7	Not query	1 NOT 6	###(Non relevant patents)
8	(**Olive + Waste + Antioxidants**) keywords AND (**Applications**) class codes	Olive**** **AND** A61Q***	###
9	Combined query	6 OR 8	**#### (### unique hits)**

- Search using German keywords
- Search using French keywords
- Search with F-Terms
- Micropat Search

Final Query

- **Year : 1900 to 2011**

S.No	Scope	Query	No of Hits
1	Claims,Abstract and Title	(English) OR (Japanese) OR (French) OR (German)	**#### (#### unique hits)**

Interactive Taxonomy

```
.markmap-node {
    cursor: pointer;
}

.markmap-node-circle {
    fill: #fff;
    stroke-width: 1.5px;
}

.markmap-node-text {
    fill:  #000;
    font: 10px sans-serif;
}
```

```
    .markmap-link {
        fill: none;
    }

    pre, .mw-code{
      background-color: transparent;
    }
d3.xml("https://www.dolcera.com/wiki/images/Antioxidants_from_olive_waste.mm", function(error, data) {
        if (error) throw error;

        markmap("svg#mindmap_867d507c5adfdc3aa580ce92e6e712a7", data, {
            preset: "colorful",
            linkShape: "diagonal"
        }, "xml");
      });
```

Relevant Patents (sample set)

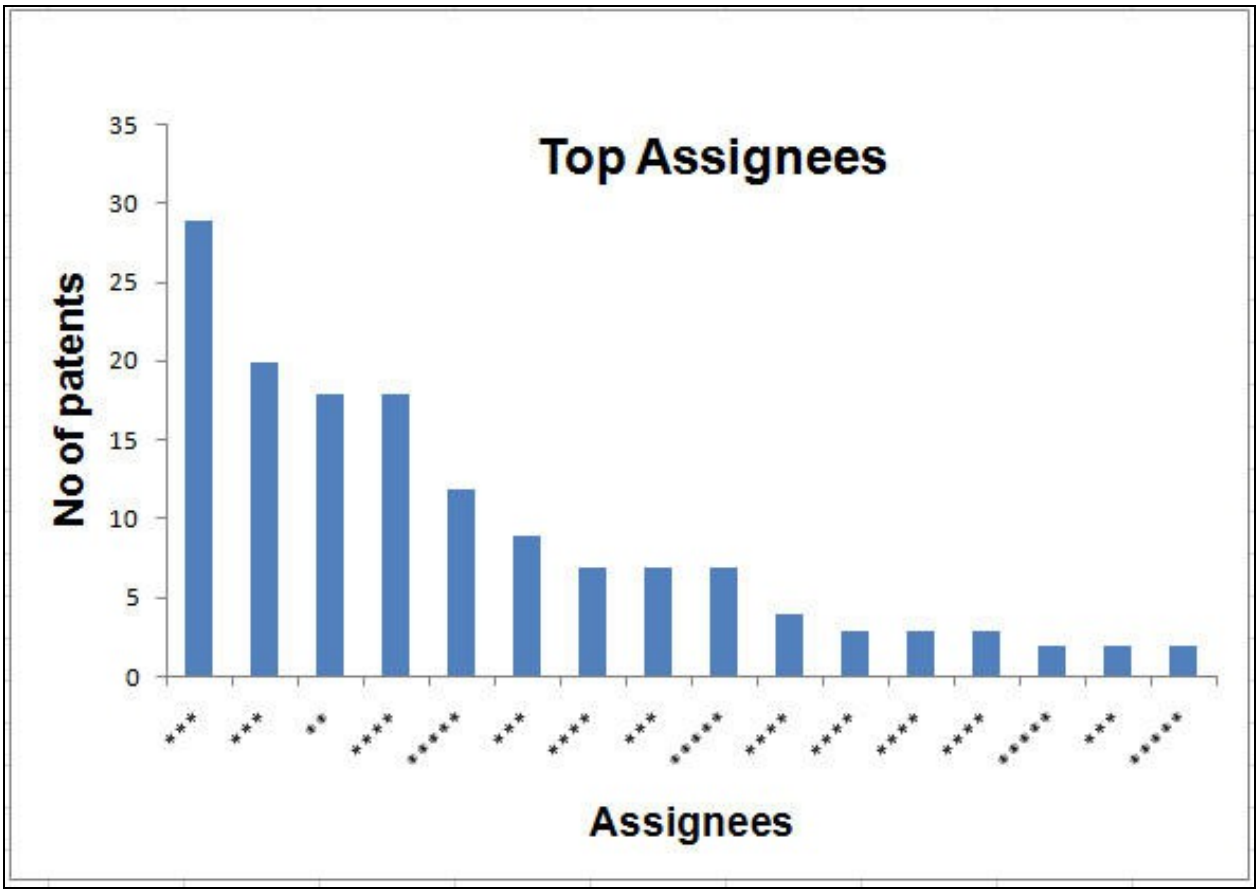
S.No	Patent/ Publication Number	Assignee/Applicant	Publication Year	Title	Focus	Summary
1	EP2338500	Phenofarm S.r.l., Romani, Annalisa, Pizzichini, Massimo	2011	Process for producing concentrated and refined actives from tissues and byproducts of *Olea europaea* with membrane technologies	Producing powders and concentrated solutions consisting active compounds.	Powder and concentrated solutions containing antioxidants (hydroxytyrosol, oleuropein etc) are extracted from olive tree residues by integrating various separtion techniques such as micro, nano filteration and reverse osmosis.
2	US20100240769	Phenoliv AB, Lund (SE)	2010	Olive waste recovery	Isolation of polyphenols and dietary fibers from olive mill waste	Ploy phenols (PP) and deitary fibers (DF) are extracted simultaneously from olive mill waste water using solvent extraction procedure, separation of PP from DF is effected through centrifugation and precipitation process.

Sample patent analysis sheet

- Sample analysis sheet

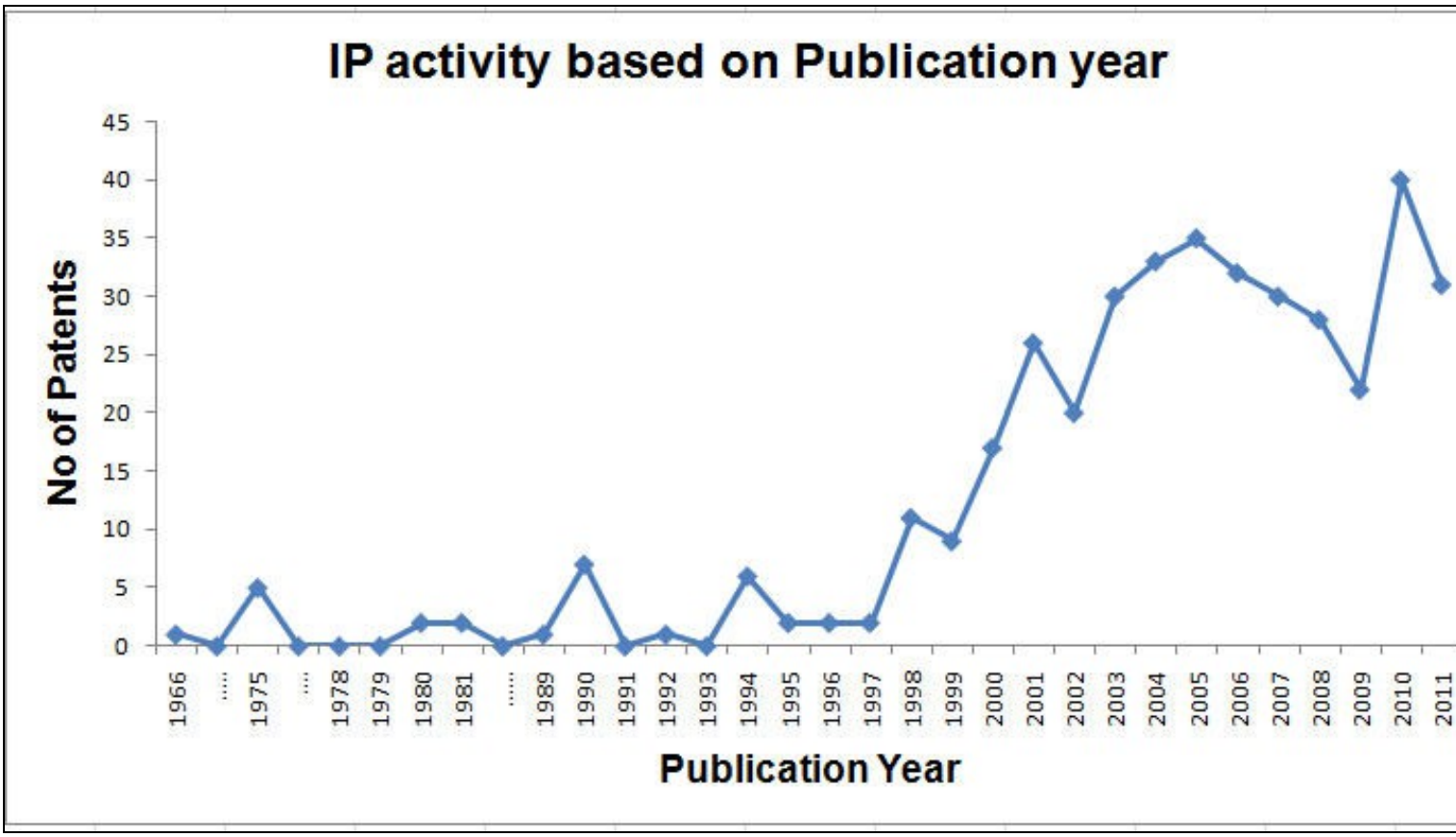
Assignee Analysis and IP Activity

- *Labels for all the charts below are available in the paid report.*
- **The following graphs explain the placement of the different assignees in this area.**

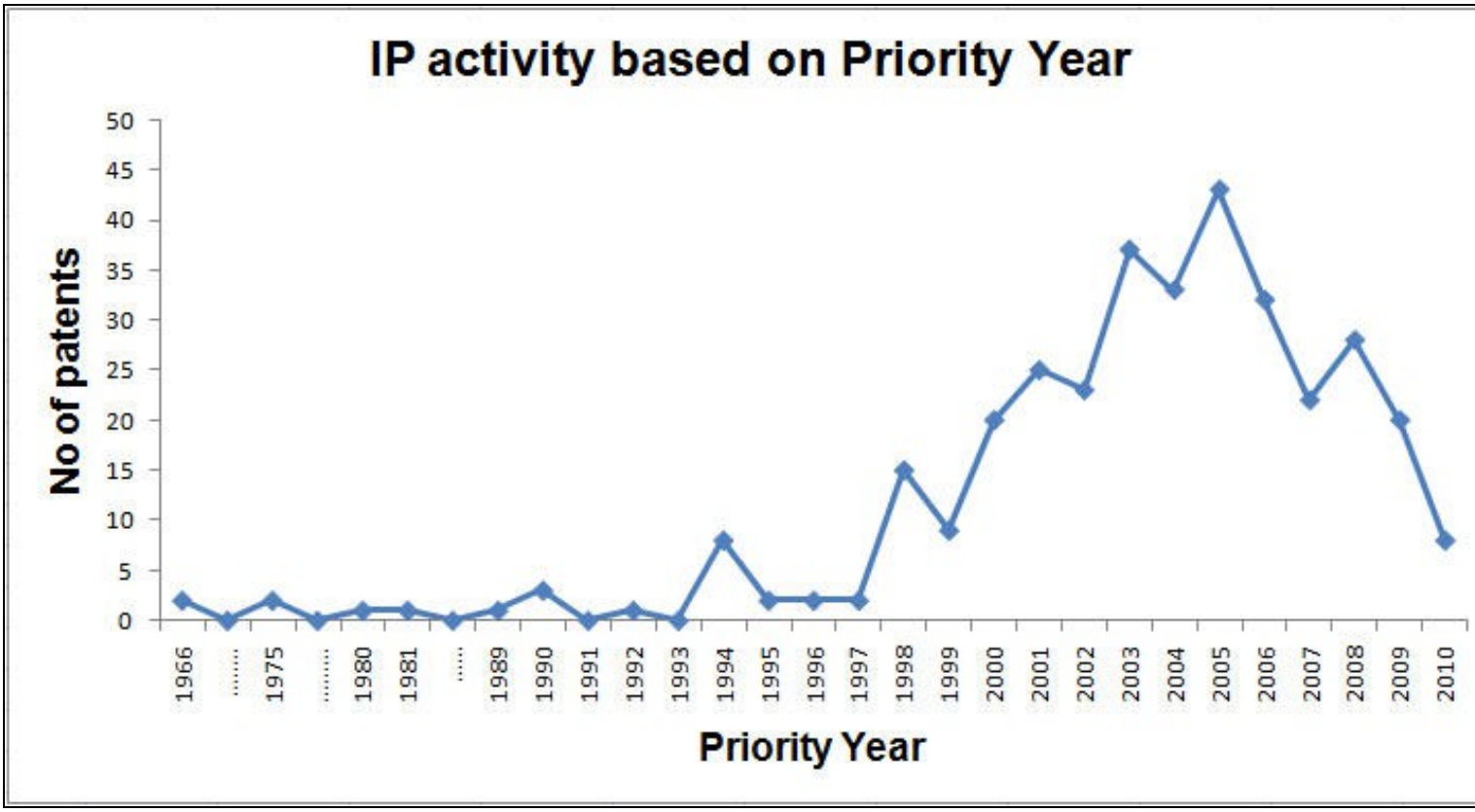


Top 20 Assignees in this area

- **The graphs given below explain the IP activity in this area over the years**.

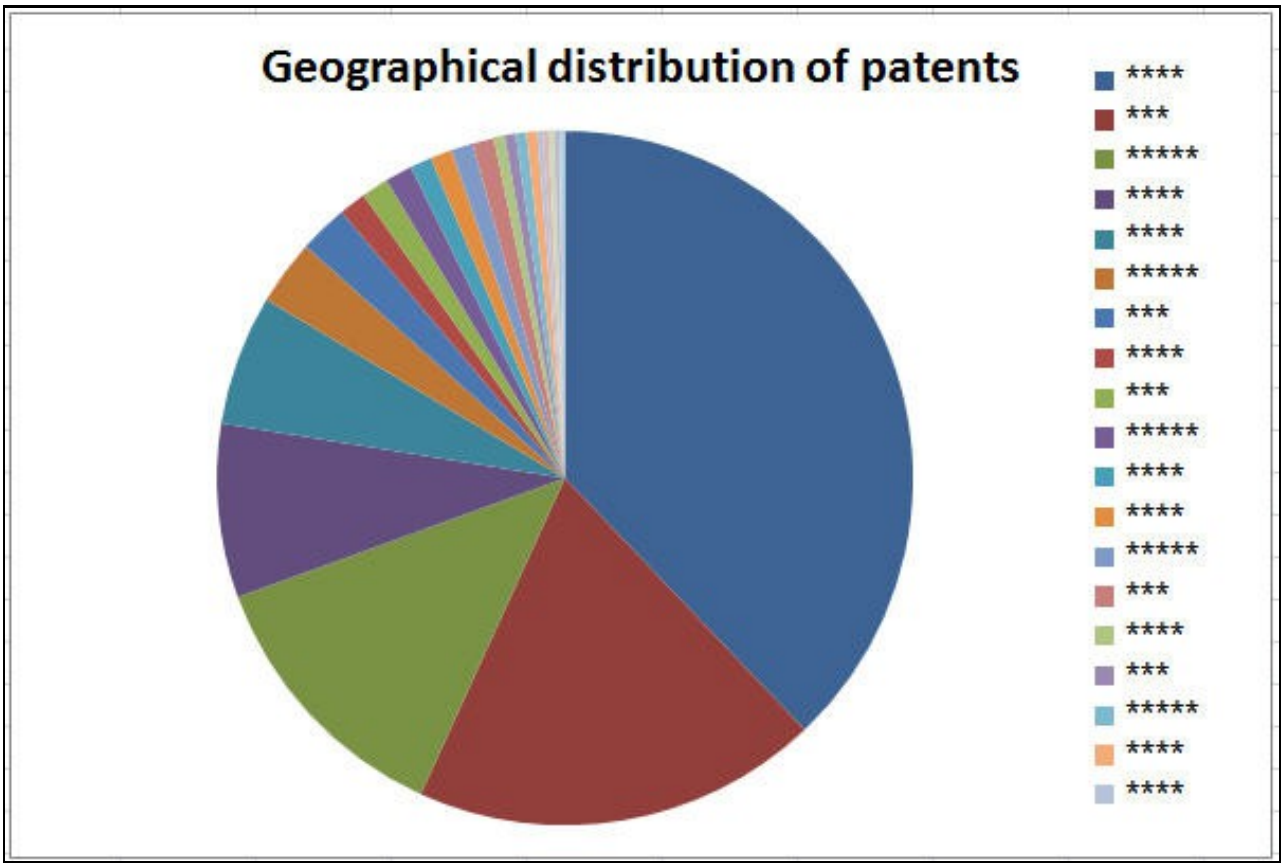


IP activity based on Publication Year



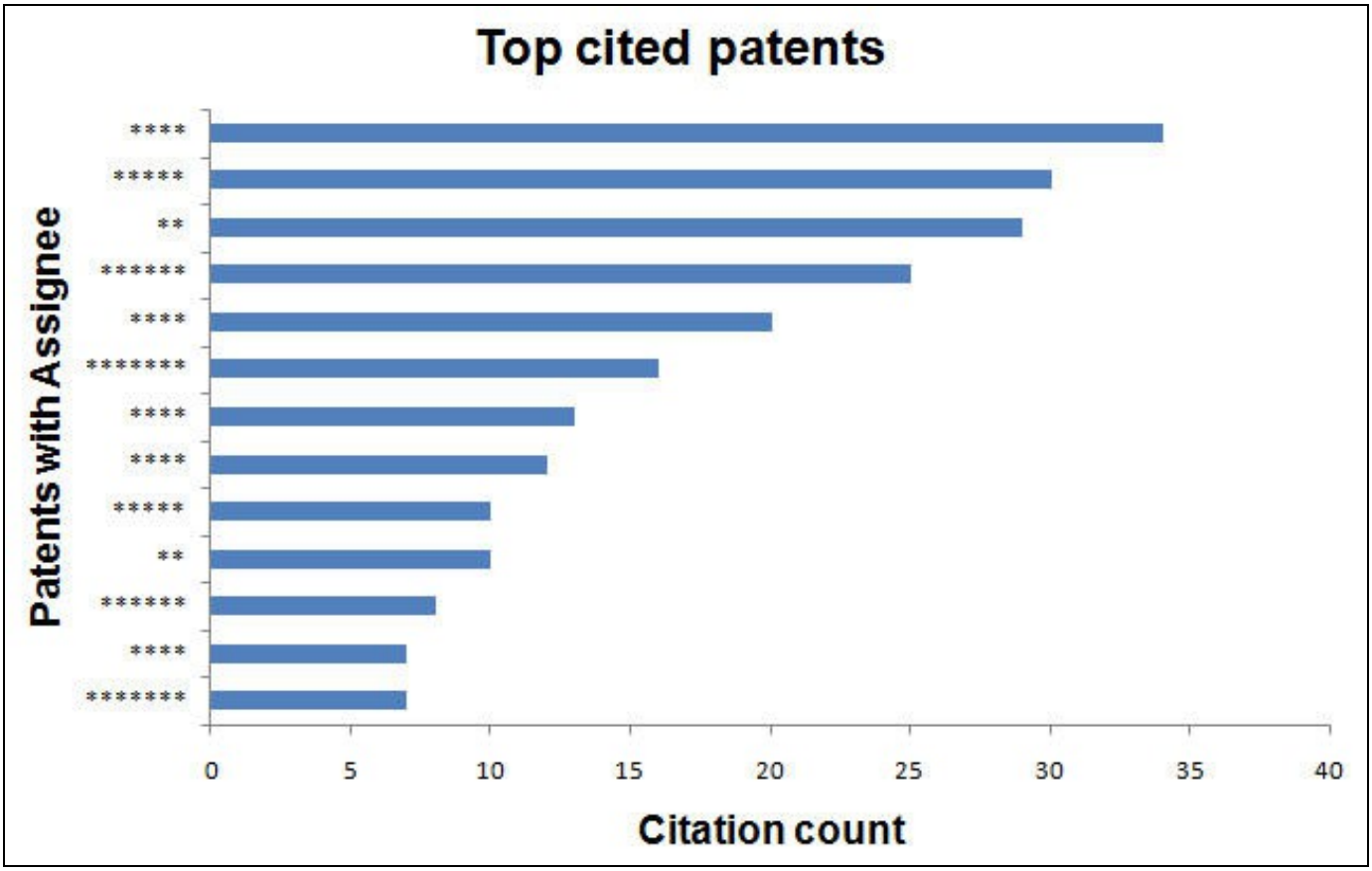
IP activity based on Priority Year

- **Geographical distribution of Patents**



Geographical distribution of Patents

- **Top Cited patents**
    - ◊ Patents with the maximum number of forward citations were determined and the graph shows the top 13 patents with corresponding assignees.



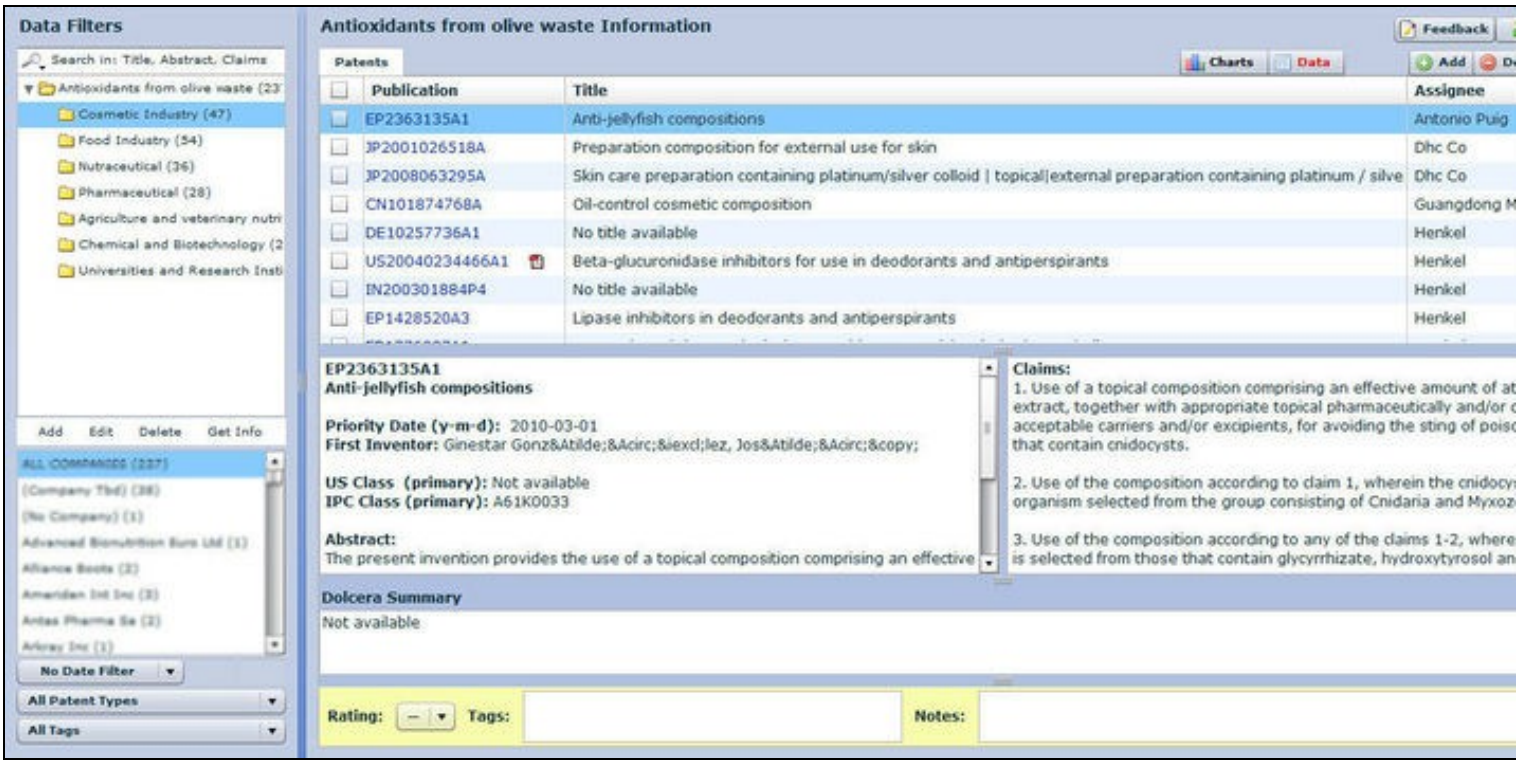
Top cited patents

Dashboard

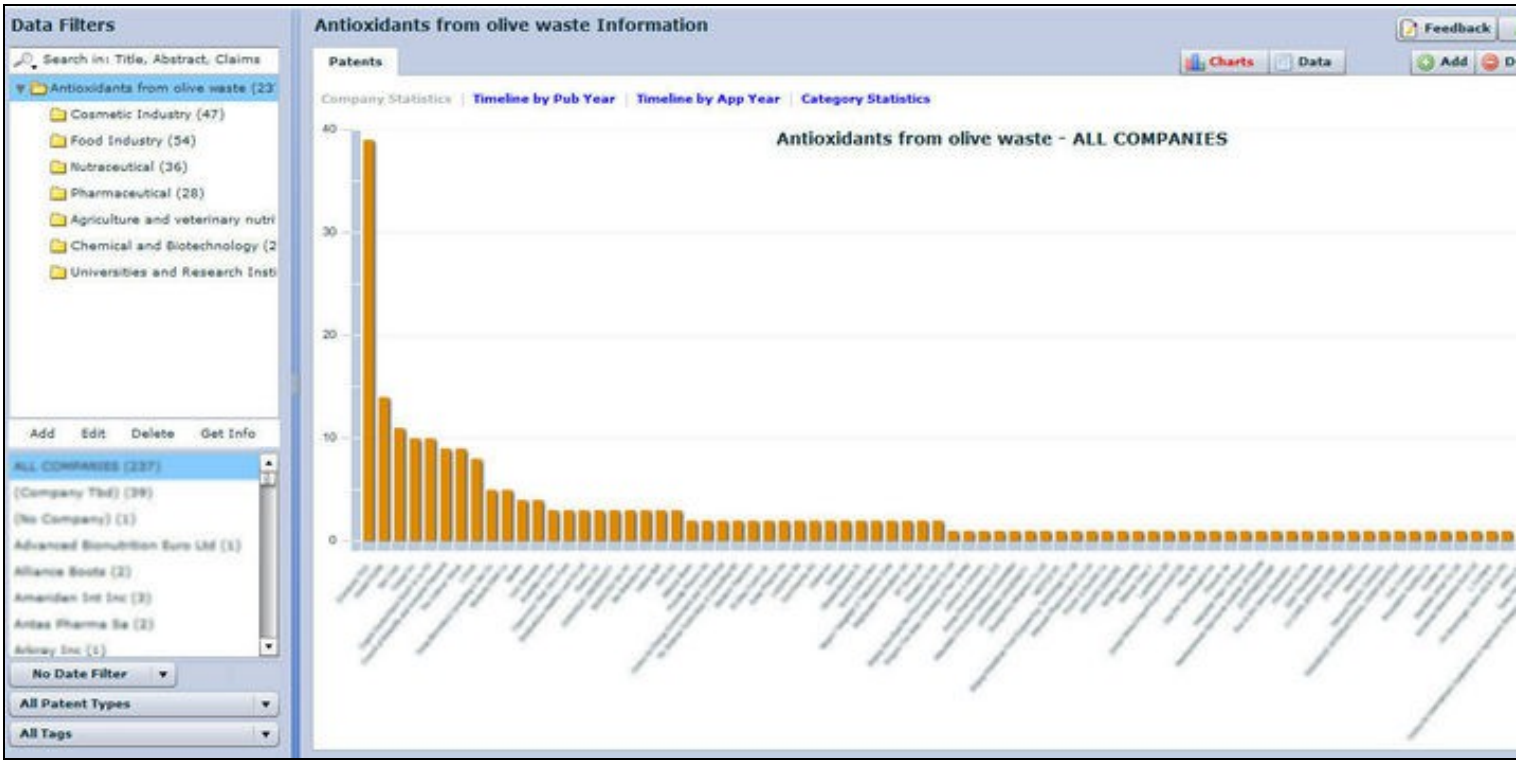
- The assignees have been categorized into following areas:

1. Food Companies
2. Cosmetic Companies
3. Nutraceutical companies
4. Pharmaceutical Companies
5. Agriculture and veterinary nutrition Companies
6. Chemical and Biotechnology companies
7. Universities and Research Institutes

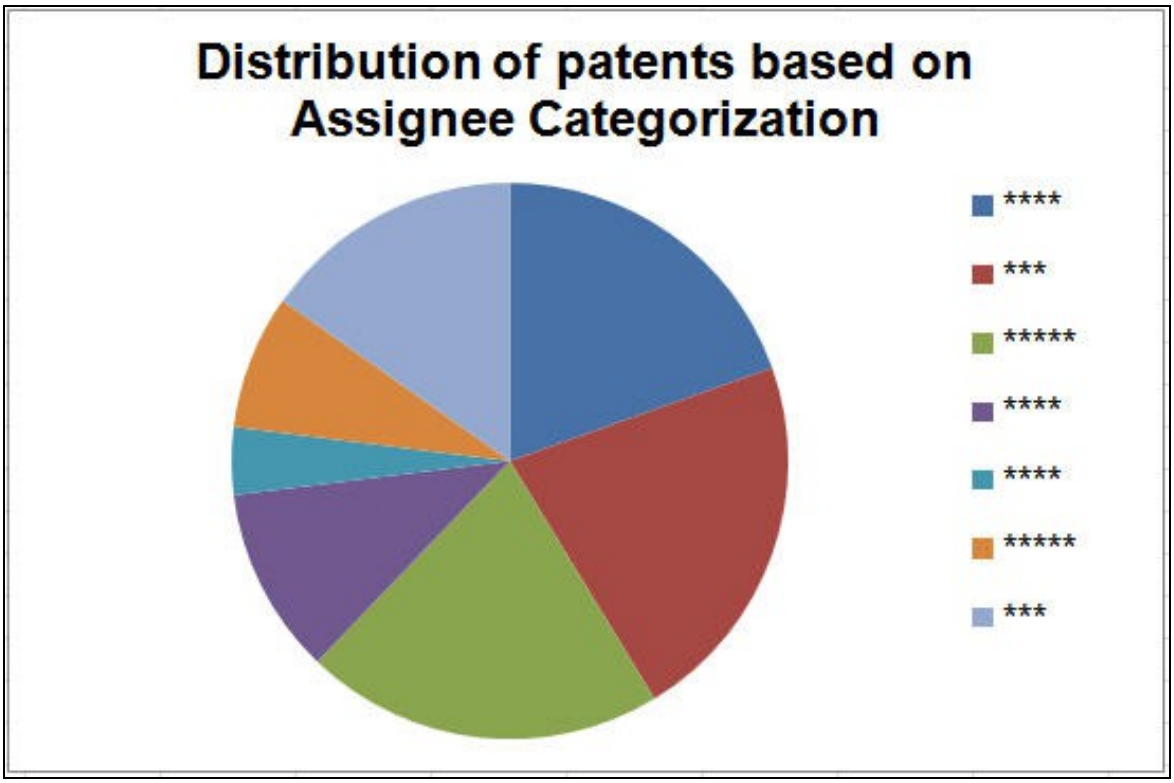
A data preview of the dashboard is shown below:



A chart preview of the dashboard is shown below:

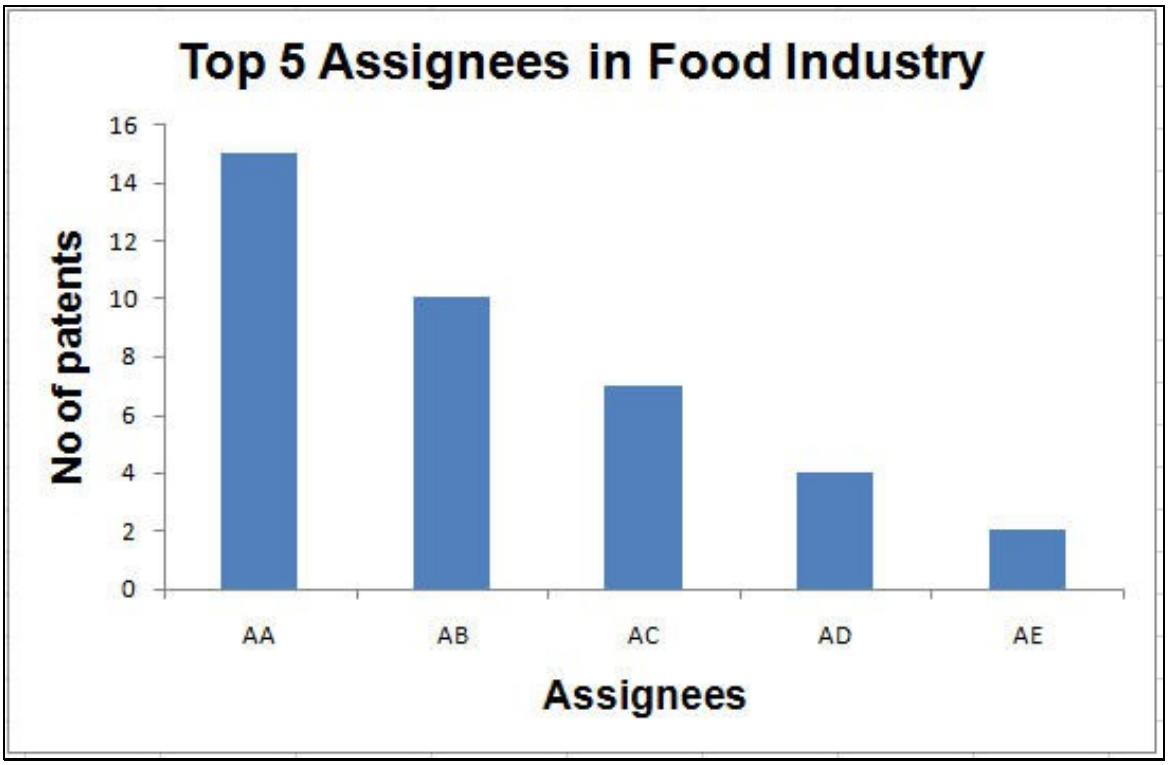


Distribution of patents between assignees

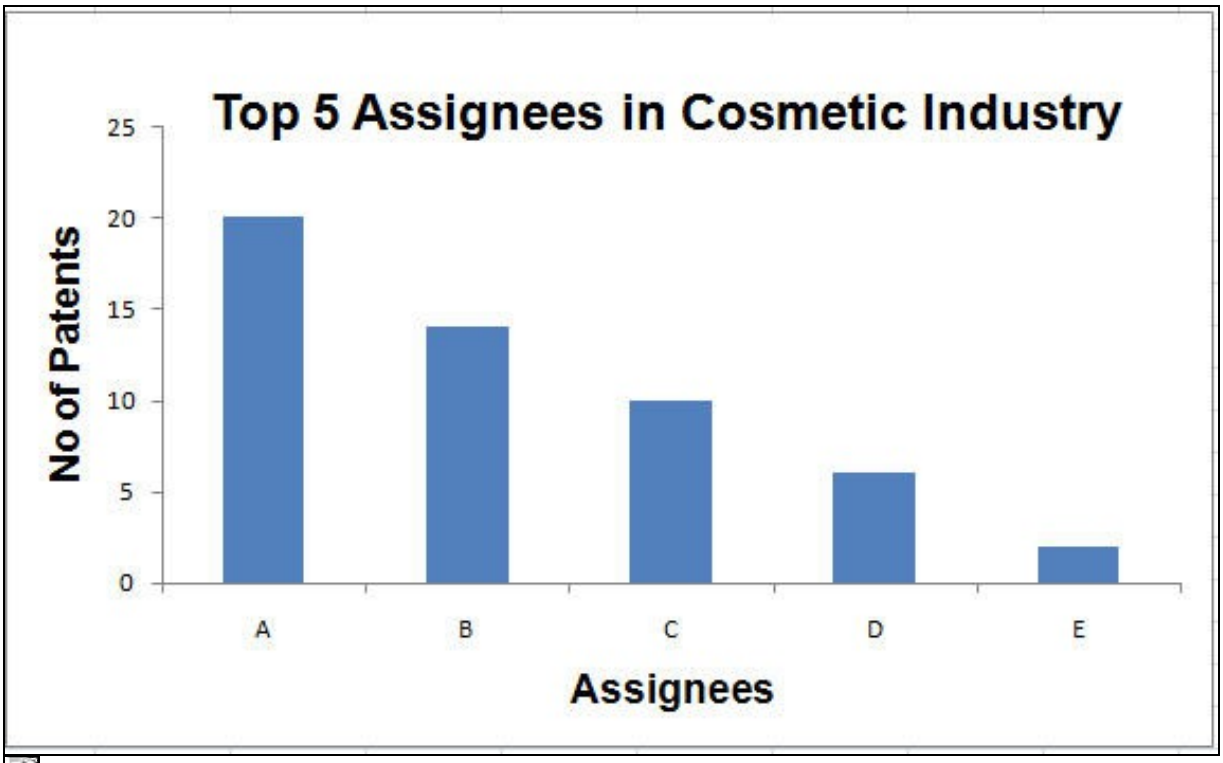


Distribution of patents based on Assignee categorization

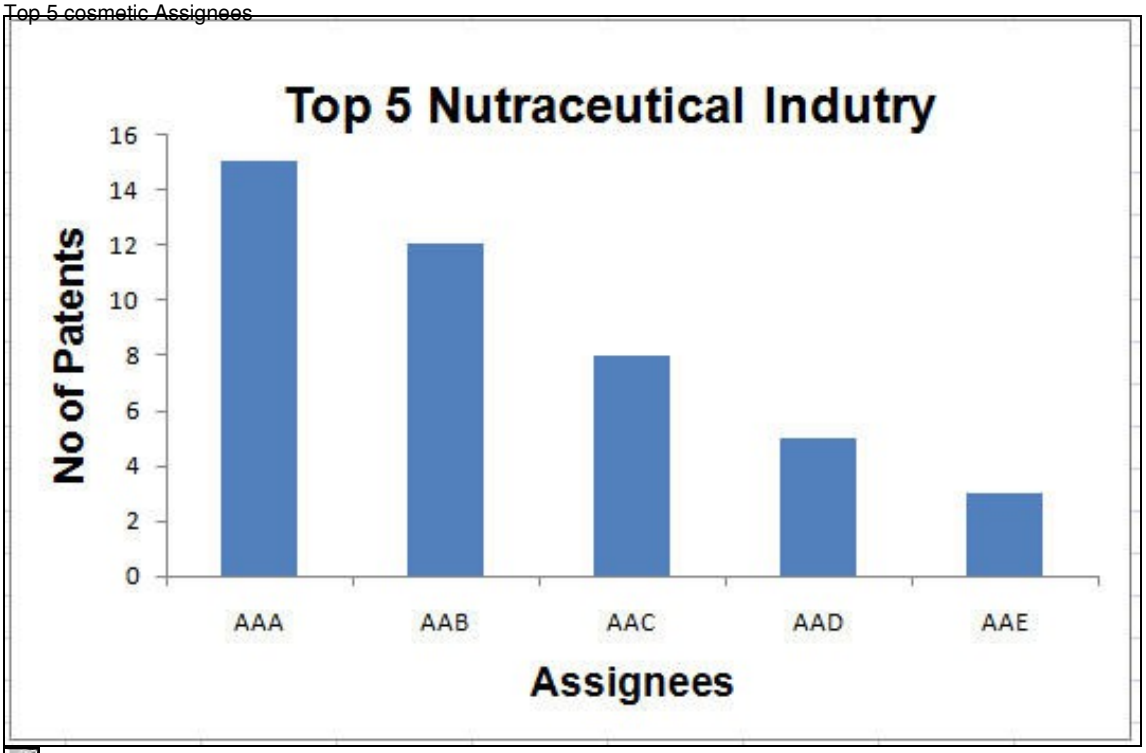
- **Top 5 players in Food, Cosmetic and Nutraceutical Sectors**:



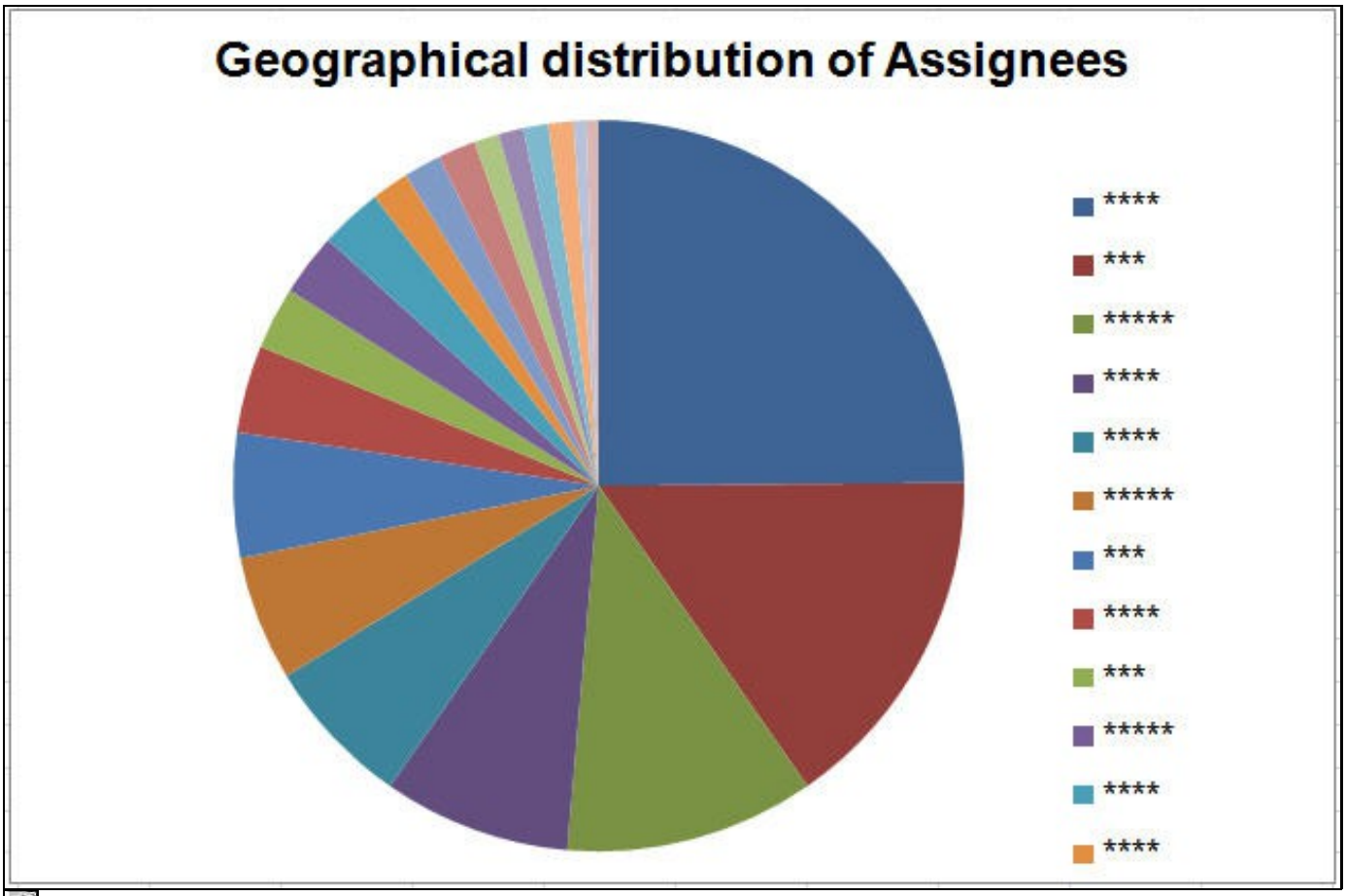
Top 5 food Assignees



Top 5 cosmetic Assignees



Top 5 nutraceutical Assignees



Geaographical Distribution of Assignees

Patent Product Mapping

- *Some products with respect to this technology area were identified and mapped to the patents from their respective assignees.*

S.NO	Patent No	Title	Assignee	Products	Product Image
1	AU2007203440	Method of obtaining a hydroxytyrosol-rich composition from vegetation water	Creagri Inc	HIDROX	
8	JP2001026518	Preparation Composition for external use for skin	DHC CO	Olive Leaf Milk	

- Please click here for detailed Patent-Product highlight

Articles Search

Search Strategy

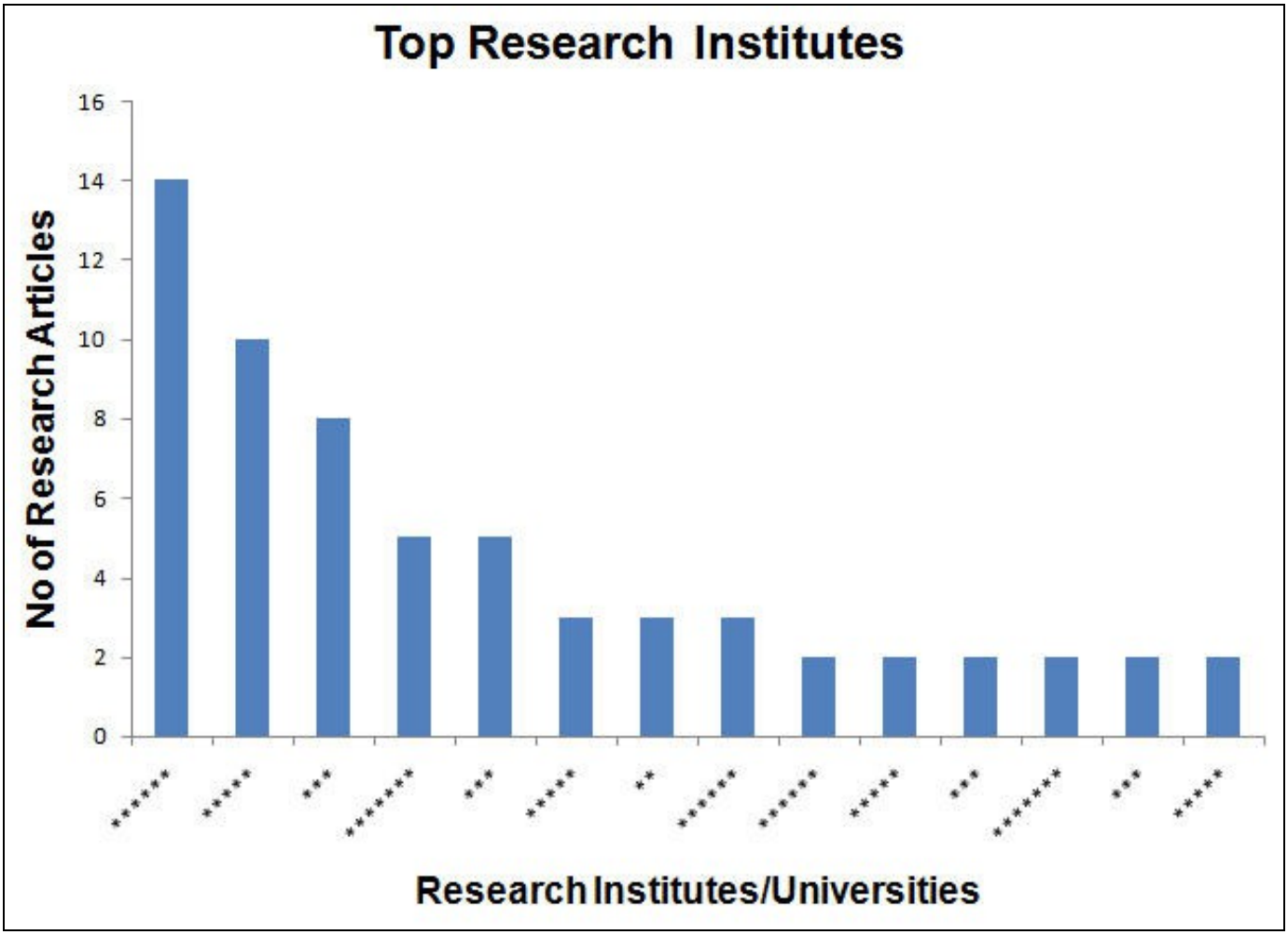
- **Database** : Scirus
- **Timeline** : 1990 - 2011
- **Subject Areas** : Agricultural and Biological Sciences, Chemistry and Chemical Engineering, Engineering, Energy and Technology,Environmental Sciences,Life Sciences, Medicine, Pharmacology.

S.No	Concept	Search string	No of Hits
1	(**Olive** + **Waste** + **Antioxidants**) Keywords	("Olive*" OR "Olea europaea"*****) And ("waste*" OR "by product*"********) And ("antioxidant*"******)	**###** (##% Relevancy)

Relevant articles

Click here to download the relevant articles sheet

- **The following graphs explain the placement of different Research Institutes and Universities in this area.**



Top Research Institutes and Universities in this area

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