Campylobacter control in meat

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Objective

To create a technology landscape report on ***Campylobacter*** **control in meat**

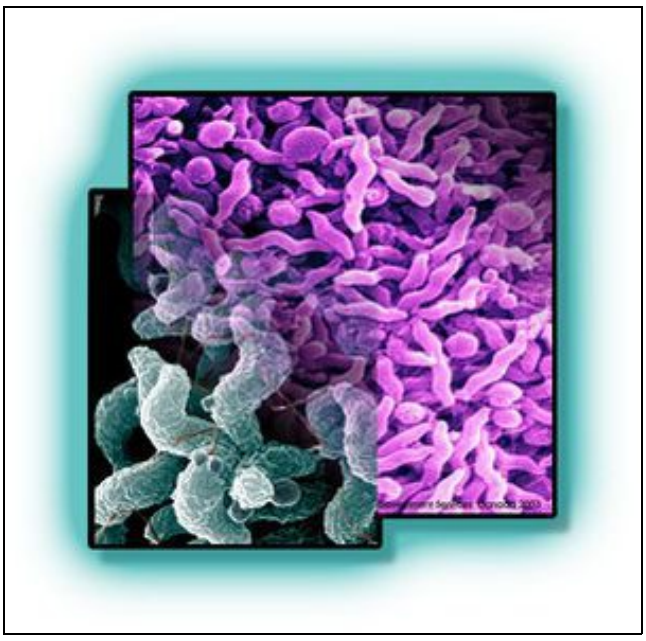
- Identify market players with prolific IP activity in the technology area
- Segment the players by the industry they belong to

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

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Background

Campylobacter bacteria are a major cause of foodborne diarrhoeal illness (Campylobacteriosis) in humans and are the most common bacteria that cause gastroenteritis worldwide. *Campylobacter* infections are generally mild, but can be fatal among very young children, elderly and immune-suppressed individuals [WHO] The *Campylobacter* spp. associated with gastrointestinal illness in humans include *C. jejuni, C. coli, C. lari, C. fetus* and *C. upsaliensis* [Food safety and Authority of Ireland]





Campylobacter **spp.**
The bacteria normally inhabit the intestinal tract of warm-blooded animals such as poultry, cattle, pigs, sheep, ostriches and shellfish; and in pets, including cats and dogs. Hence they are frequently detected in foods derived from these animals. Most often, carcasses or meat are contaminated by *Campylobacter* from faeces during slaughtering. The main route of transmission is generally believed to be foodborne, via undercooked meat and meat products, as well as raw or contaminated milk. Contaminated water or ice is also a source of infection [WHO] Poultry meat is known to be one of the most important sources of *Campylobacter* for humans. However, *Campylobacter* colonization in the gut is prevalent in all animals. *Campylobacter* is mainly a contamination of the surface of the carcass and bovine, ovine and porcine carcasses and can also test positive for *Campylobacter* immediately after slaughter. Storage (cooling down) of the carcasses under dry air conditions results in the death of *Campylobacter* and reduced *Campylobacter* counts after a prolonged time. At retail level, the *Campylobacter* contamination levels of non-poultry meat are clearly less than the levels in poultry. It is to be expected that red meat contributes to human campylobacteriosis to a much lesser degree than poultry [Wagenaar et al.]

The *Campylobacter* spp. are sensitive to freezing, heating (pasteurisation/cooking), drying, acidic conditions (pickling), disinfectants and irradiation. They survive poorly at room temperature (21°C) and in general survive better at cooling temperatures. They can grow on moist foods at temperatures between 37°C and 45°C, with an optimum temperature of 42°C. It has been estimated that consumption of a small number of organisms (500 or less) may be associated with illness. Therefore, the fact that the organism does not multiply very effectively in most foods does not prevent it from causing foodborne illness. The organisms normally die quickly in the presence of air and are very sensitive to oxygen breakdown products. Vacuum or gas packaging appears to have little effect on their survival [Food safety and Authority of Ireland]

Strategies aimed at reducing *Campylobacter* counts on carcasses and raw chicken meat products include

- Improved hygiene during processing
- Freezing of carcasses at processing plants
- Irradiation
- Chemical decontamination of carcasses by chlorine or trisodium phosphate
- Marination of the raw fresh chicken meat
- Spreading of a mixture of dry seasoning compounds on the surface of chicken meat products, etc. [González and Hänninen]

Concept table

S.No	English Keywords			French Keywords			German Keywords		
	Campylobacter	**Control**	**Meat**	***Campylobacter***	**Control**	**Meat**	***Campylobacter***	**Control**	**Meat**
1	*Campylobacter*, Campylobacteriosis	Control	Meat	*Campylobacter* , campylobactériose	Contrôle, Contrôle, contrôlée	Viande, Viandes	*Campylobacter*, Campylobacteriose	Kontrolle, Steuerung, Regelung, kontrolliert	Fleisch
2	**	***	***	**	***	***	**	***	***

- *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 gut biology and probiotics in food from pubmed mesh, relevant patents, scientific articles and various thesauri*

Class codes and Definitions

IPC / ECLA Class codes

CLASS CODE	DEFINITION
CLASS CODES RELATED TO MEAT PRESERVATION	
A23B0004*	**General methods for preserving meat, sausages, fish or fish products**
A23K000118	Animal feeding stuffs specially adapted for particular animals

US Class codes

CLASS CODE	DEFINITION
CLASS CODES RELATED TO MEAT PRESERVATION	
426	**FOOD OR EDIBLE MATERIAL: PROCESSES, COMPOSITIONS, AND PRODUCTS**
426332	**Inhibiting chemical or physical change of food by contact with a change inhibiting chemical agent other than an antioxygen agent** • Animal flesh

Relevant F-Terms

S.No	F-Theme	F-Terms	
	F-TERMS FOR MEAT PRESERVATION		
3	2B005	**Feed for specific animals**	
		MB00	SPECIAL ADDITIVES
		MB01	Antibiotic substances
		MB07	Medicines

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

Search strategy

Search Strategy with English keywords

Database: Thomson Innovation
Timeline: Query: 01/01/1991 - 18/10/2011

Patent Coverage: US, DWPI, FR, WO, EP, JP,CN, KR, DE, GB

S.No	Concept	Scope	Search string	Type of class codes	Class codes	Number of hits
1	(*Campylobacter**) keyword + (Meat preservation) class codes	Description	*Campylobacter** OR ****	Any IPC or ECLA	A23B0004* OR *****	###
2				US class	426332 OR ****	###
3	**1 OR 2**					###
4	(*Campylobacter* + Meat) keywords + Class codes of Preservation methods	Description for *Campylobacter* keyword	(*Campylobacter**) AND (Meat*1 OR *****)	Any IPC or ECLA	A01N**** OR *****	###
5		Title, Abstract, Claims for Meat keywords		US class	42*** OR ****	###
6	**4 OR 5**					####
7	(*Campylobacter* + control) keywords + (Meat processing) class codes	Description for *Campylobacter* keyword	(*Campylobacter**) AND (Control*4 OR ******)	Any IPC or ECLA	A22B***** OR ****	###
8		Title, Abstract, Claims for Control keywords		US class	42*** OR ***	##
9	**7 OR 8**					###
10	**Final English search Query**	**3 OR 6 OR 9**				**#### (No. of unique hits = ####)**

Search Strategy with French keywords

Database: Thomson Innovation
Timeline: Query: 01/01/1991 - 18/10/2011

Patent Coverage: FR, WO, EP

S.No	Concept	Scope	Search string	IPC or ECLA Class codes	Number of hits
1	(*Campylobacter*) keywords + (Meat preservation) class codes	Description	(*Campylobacter* OR *****)	A23B0004* OR ******	###
2	(*Campylobacter* + Meat) keywords + Class codes of Preservation methods	Description for *Campylobacter* keywords Title, Abstract, Claims for Meat keywords	(*Campylobacter* OR *****) AND (Viande*1 OR *****)	A01N***** OR *****	###
3	(*Campylobacter* + control) keywords + (Meat processing) class codes	Description for *Campylobacter* keywords Title, Abstract, Claims for Control keywords	(*Campylobacter* OR ****) AND (contrôle OR *****)	A22B000500 OR A22C* OR A23L0001314 OR A23L0001315 OR A23L0001317	###
4	**Final Query**	**1 OR 2 OR 3**			**### (No. of unique hits = ###)**

Search Strategy with German keywords

Database: Thomson Innovation
Timeline: Query: 01/01/1991 - 18/10/2011

Patent Coverage: DE, WO, EP

S.No	Concept	Scope	Search string	IPC or ECLA Class codes	Number of hits
1	(*Campylobacter*) keyword + (Meat preservation) class codes	Description	(*Campylobacter* OR *****)	A23B0004* OR ****	###

2	(*Campylobacter* + Meat) keywords + Class codes of Preservation methods	Description for *Campylobacter* keywords Title, Abstract, Claims for Meat keywords	(*Campylobacter* OR ****) AND (Fleisch OR ****)	A01N***** OR ****	**###**
3	(*Campylobacter* + control) keywords + (Meat processing) class codes	Description for *Campylobacter* keywords Title, Abstract, Claims for Control keywords	(*Campylobacter* OR ****) AND (Kontrolle OR *****)	A22B**** OR *****	**##**
4	**Final Query**	**1 OR 2 OR 3**			**#### (No. of unique hits =####)**

Search Strategy with F-terms

Database: Thomson Innovation
Timeline: Query: 01/01/1991 - 18/10/2011

Patent Coverage: JP

S.No	Concept	Scope	Search string	F Terms	Number of hits
1	(*Campylobacter*) keyword + (Meat preservation) F-Terms	Description	*Campylobacter**	2B005**** OR ******	**##**
2	(*Campylobacter* + Meat) keywords + Class codes of Preservation methods	Description for *Campylobacter* keywords Title, Abstract, Claims for Meat keywords	(*Campylobacter**) AND (Meat*1 OR ****)	4H**** OR ****	**###**
3	(*Campylobacter* + control) keywords + (Meat processing) class codes	Description for *Campylobacter* keywords Title, Abstract, Claims for Control keywords	(*Campylobacter**) AND (Control*4 OR *****)	4B**** OR ****	**###**
4	**Final Query**	**1 OR 2 OR 3**			**### (No. of unique hits = ###)**

Final search Results

Query	Search strategy	Number of hits
Final Query	English OR French OR German OR Japanese	**#### (No. of unique hits = ####; Relavency = ***%)**

Relevant Patents

S. No	Patent/ Publication no.	Assignee/ Applicant	Year	Title	Focus	Dolcera Summary
1	US7767240B2	Albemarle Corporation	2010	Microbiological control in poultry processing	Microbiological control	The present invention deals with the preparation of halogen-based antimicrobial derivatives which are highly efficient, cost effective and can be widely used in the poultry processing industry. The microbicidal compound can be applied directly to the poultry carcass, or to the equipments, instruments, apparatus, chiller tanks, etc. used during the processing and is effective against *Campylobacter jejuni*, *Campylobacter coli*, *Campylobacter lari*, etc.
2	US20090239912A1	University of Arkansas	2009	Concentrated, non-foaming solution of quaternary ammonium compounds and methods of use	Microbiological control	A major challenge in the meat processing industry is to deliver a pathogen-free product to the consumers. The present invention deals with the preparation of compositions containing quaternary ammonium compounds (QAC) which prove effective against a broad spectrum of microorganisms including *Campylobacter* attached to the surface of meat products. The surface adhering microbes are killed, inactivated or their growth is retarded, making the meat products safe for consumption.
3	US5494660A	Emory University	1996	Method for inhibiting microbial binding to surfaces	Reducing adhesion of microorganisms to surfaces	The present invention deals with the preparation of a biologically active copolymer which is effective in reducing the adhesion of pathogenic microorganisms on the surface. The compound is either given in the form of feed to the poultry birds to reduce the gut population of pathogenic bacteria or applied to the surface of skin or meat

						from the poultry animals. It is effective against a number of food-borne pathogens including *Salmonella, Campylobacter*, etc.

Analysis sheet

Click here to download the sample patent analysis sheet

Interactive Taxonomy

Taxonomy was populated based on the detailed analysis of patents.

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

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

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

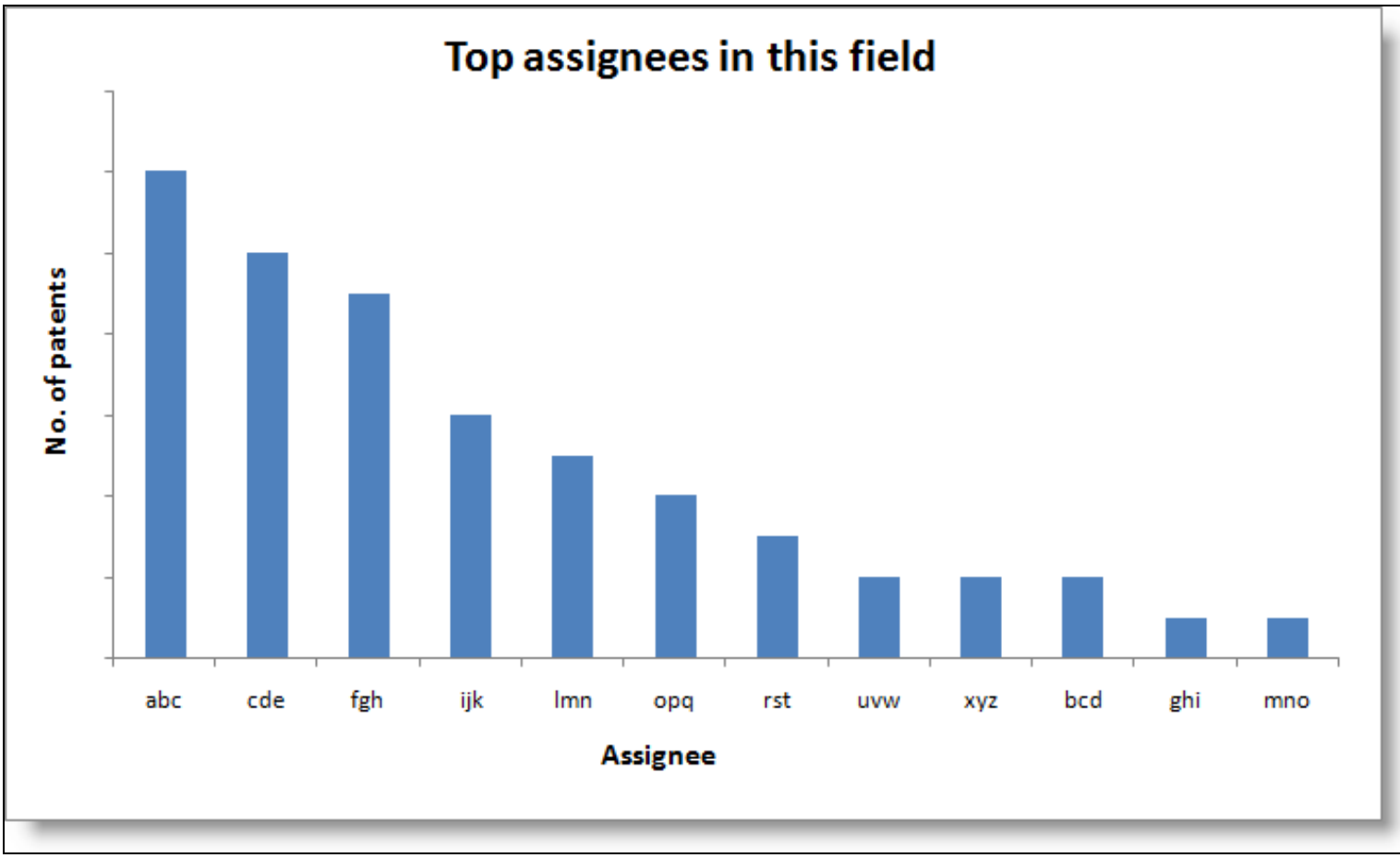
        .markmap-link {
            fill: none;
        }

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

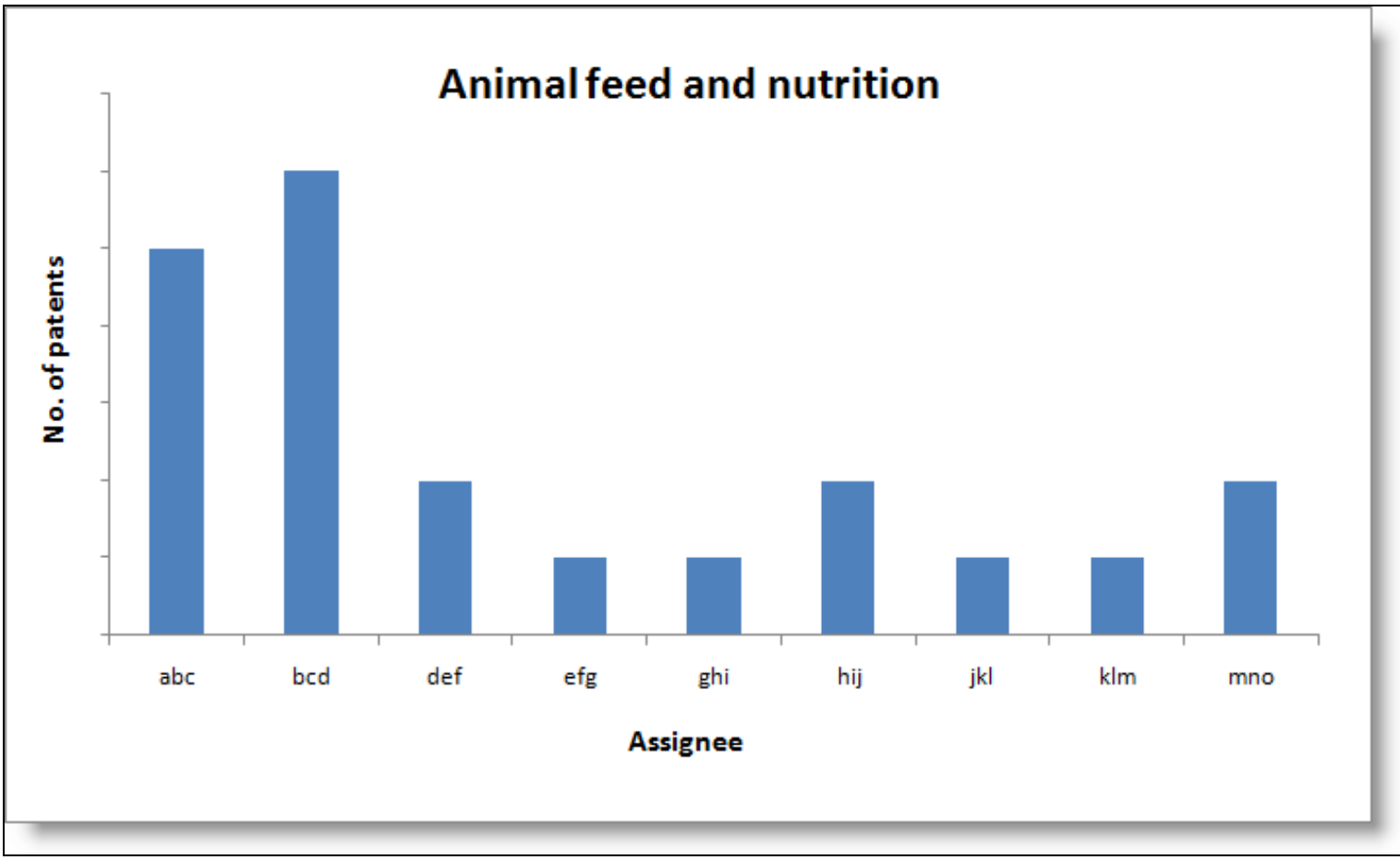
            markmap("svg#mindmap_e79938aa3a5642fc265d8dedc717a9a7", data, {
                preset: "colorful",
                linkShape: "diagonal"
            }, "xml");
          });
```

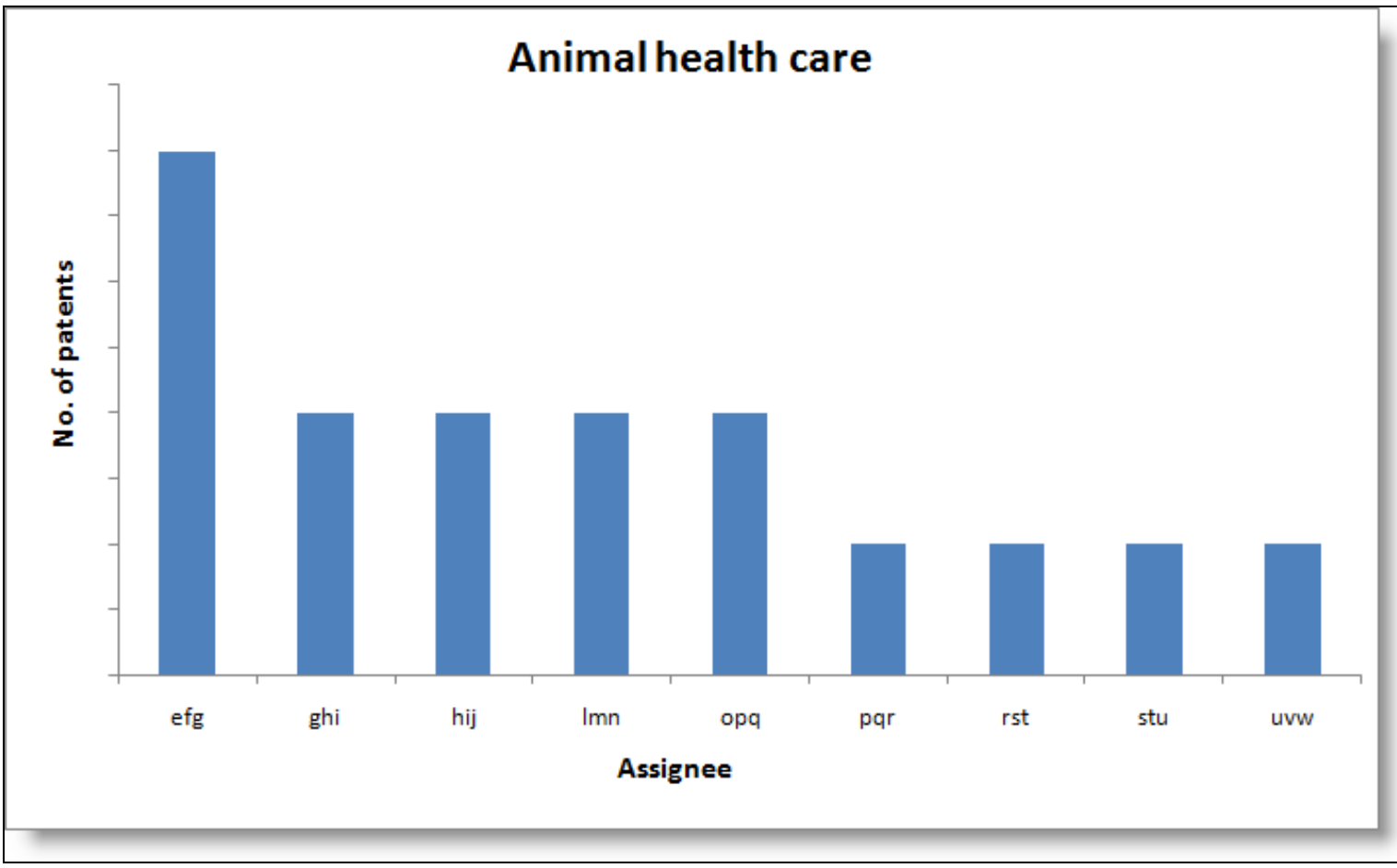
Assignee Analysis and IP activity

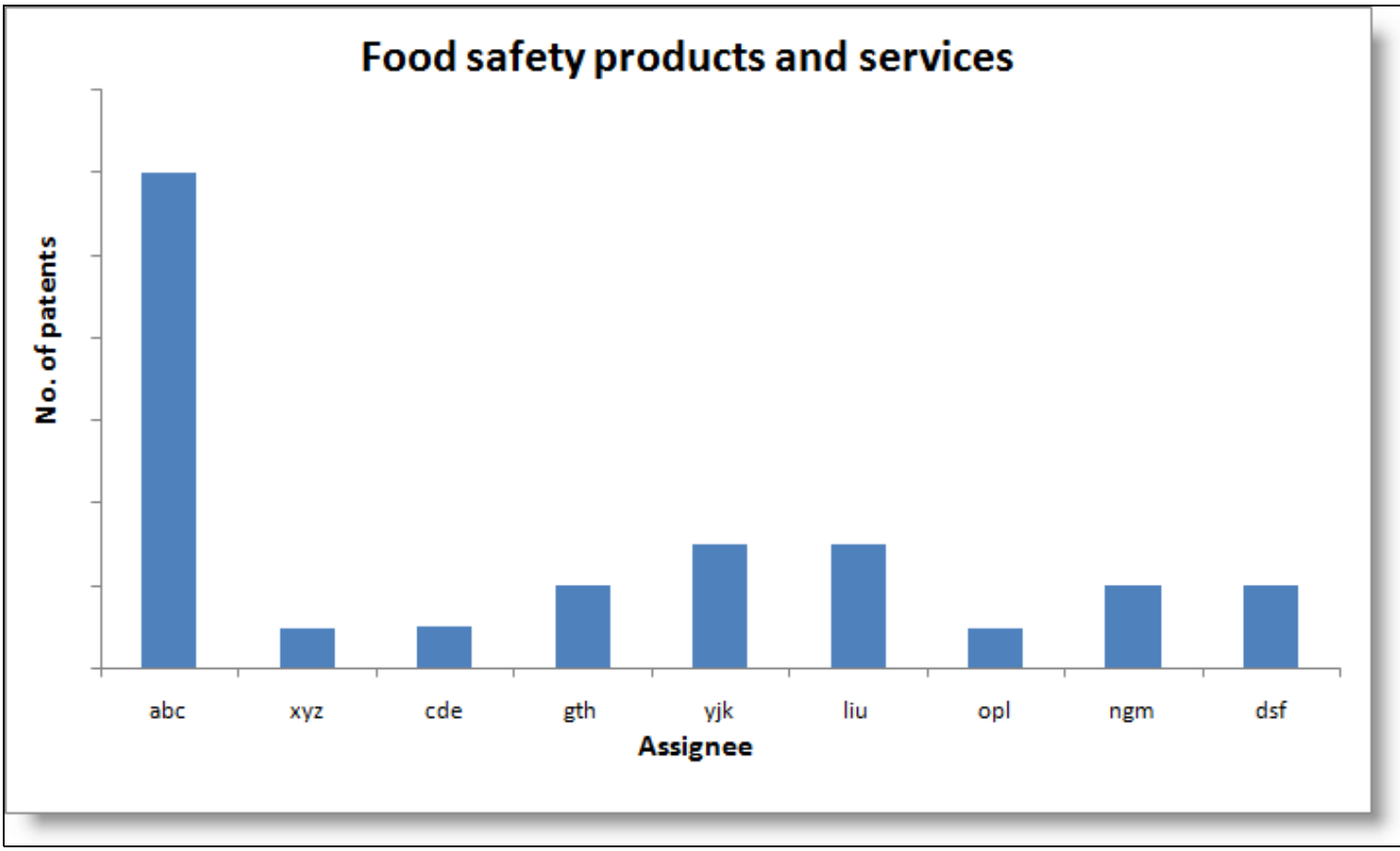
- *Labels for all the charts below are available in the paid report.*
- The following graphs explain the placement of the key players in this technology area.

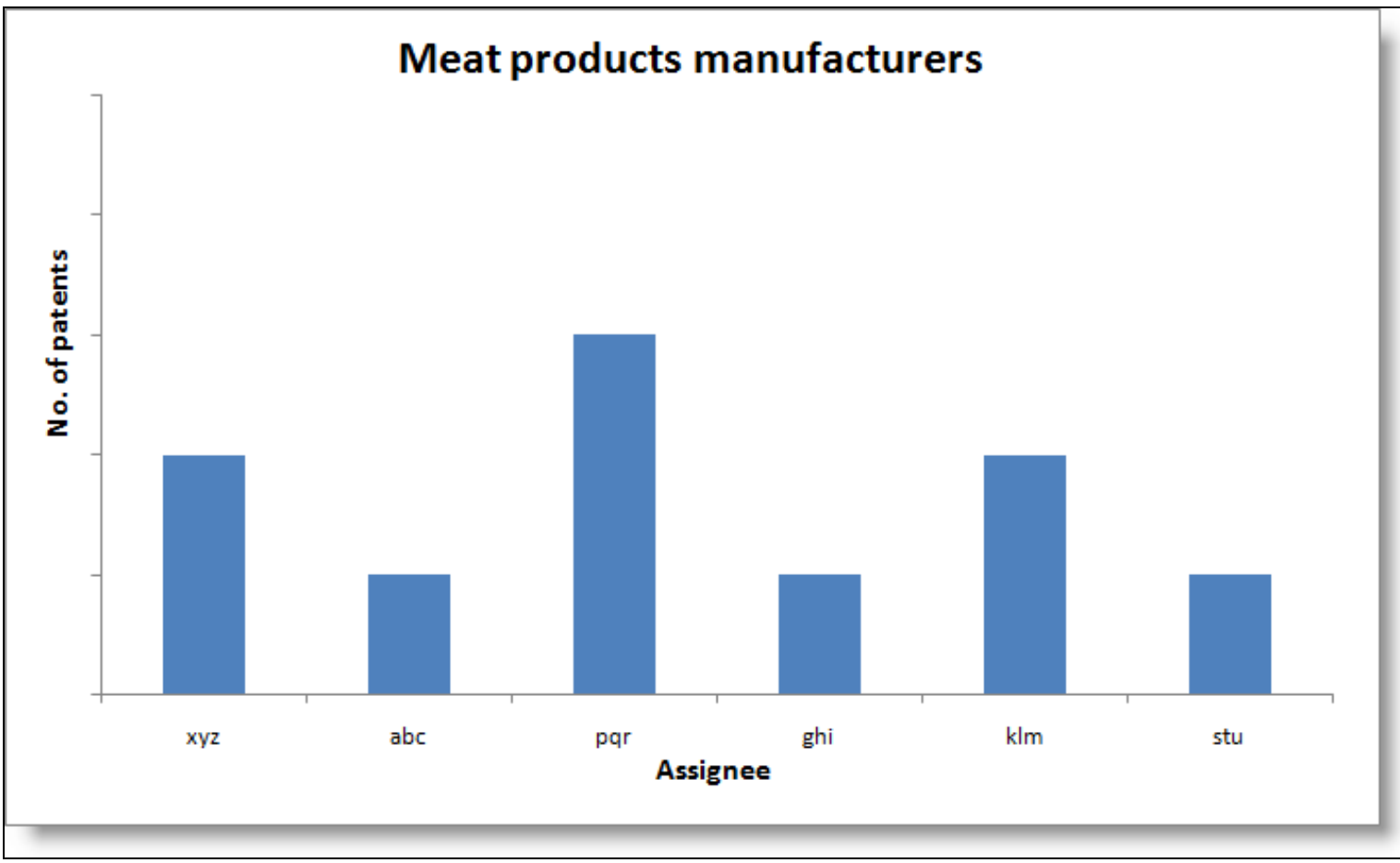


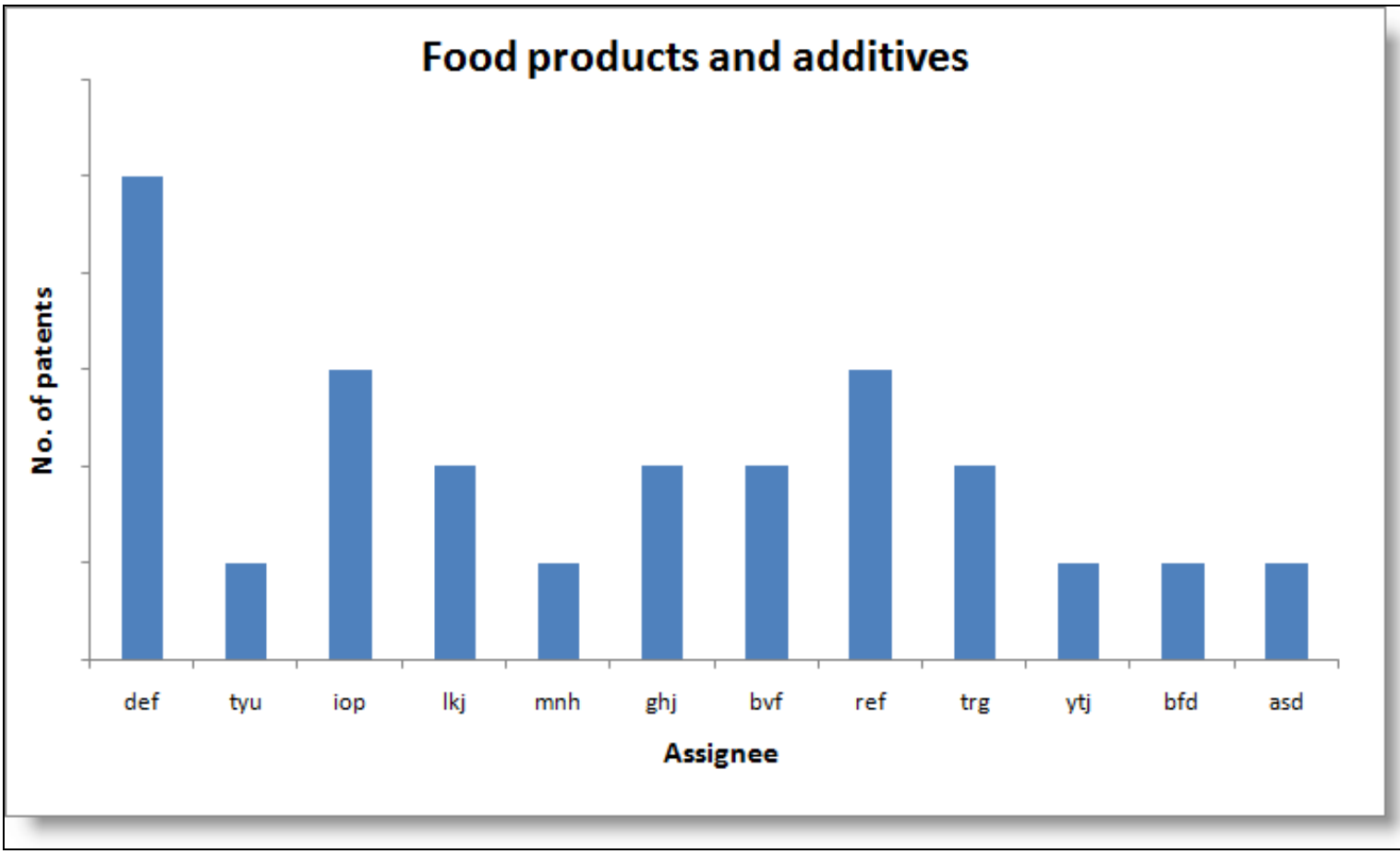
- Furthermore, the assignees have been categorized based on their commercial technology applications. The following graphs represent the Assignees in major technology areas


Animal feed and nutrition
No. of patents
abc
bcd
def
efg
ghi
hij
jkl
klm
mno
Assignee

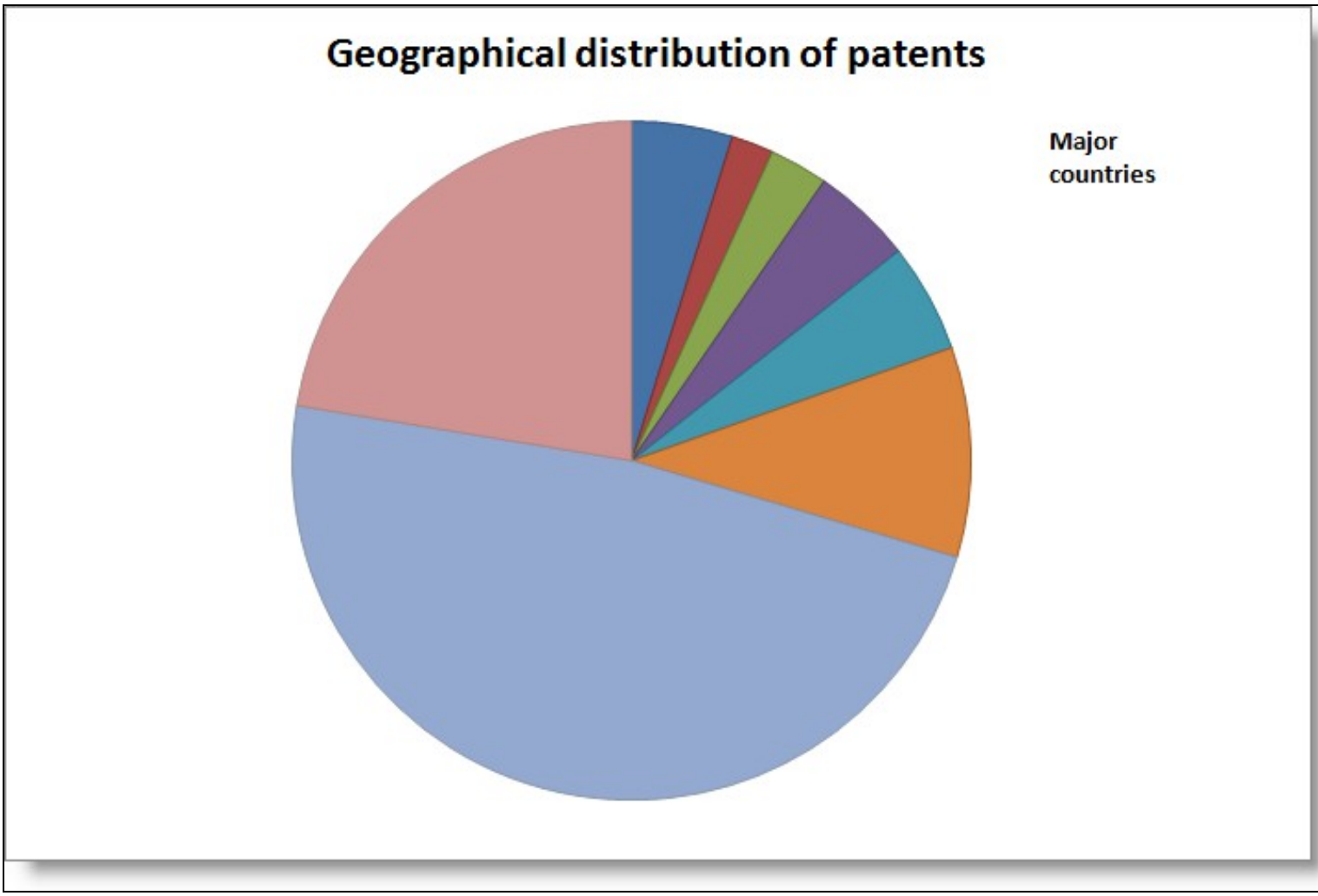

Animal health care
No. of patents
efg
ghi
hij
lmn
opq
pqr
rst
stu
uvw
Assignee


Food safety products and services
No. of patents
abc
xyz
cde
gth
yjk
liu
opl
ngm
dsf
Assignee

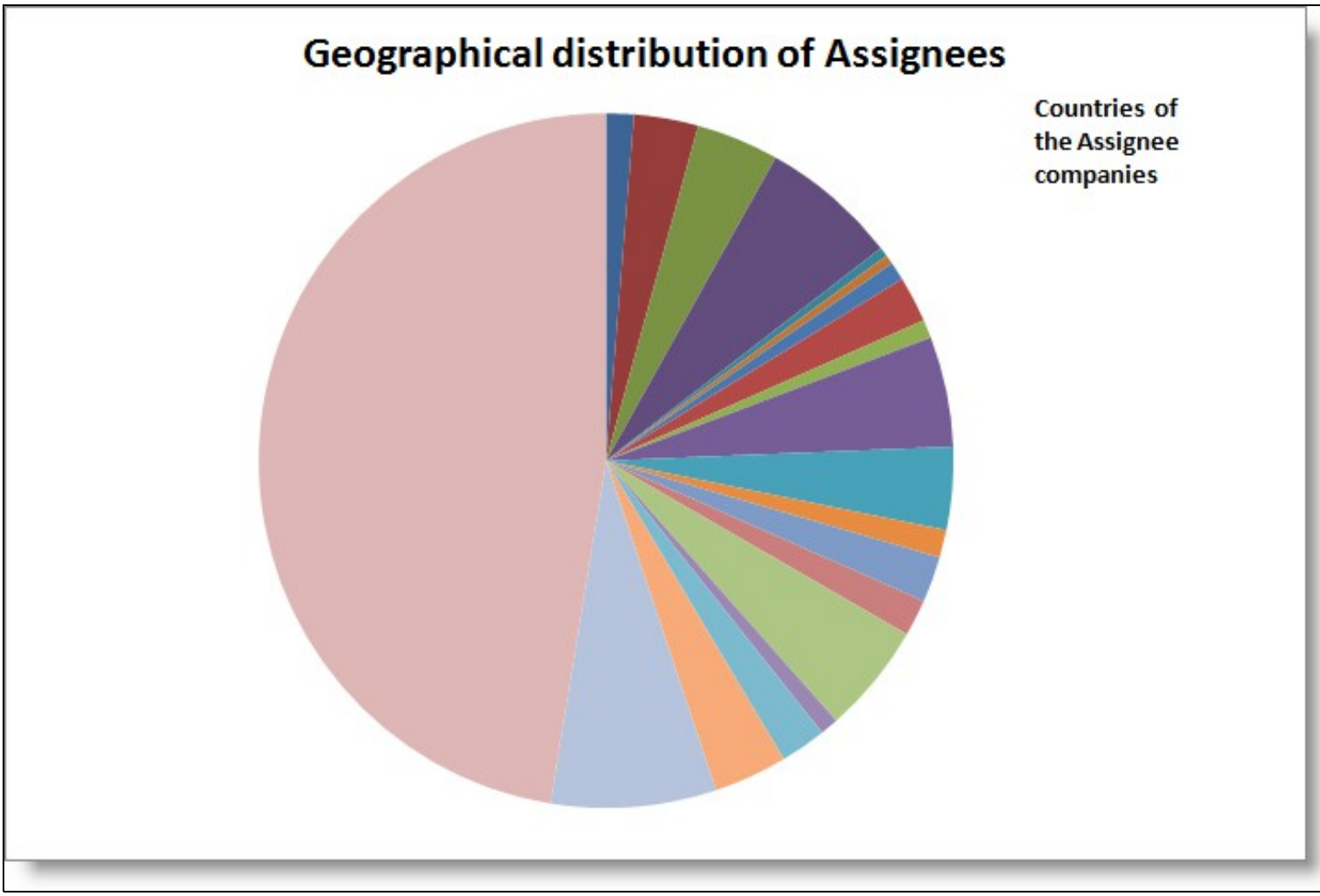

Meat products manufacturers
No. of patents
xyz
abc
pqr
ghi
klm
stu
Assignee



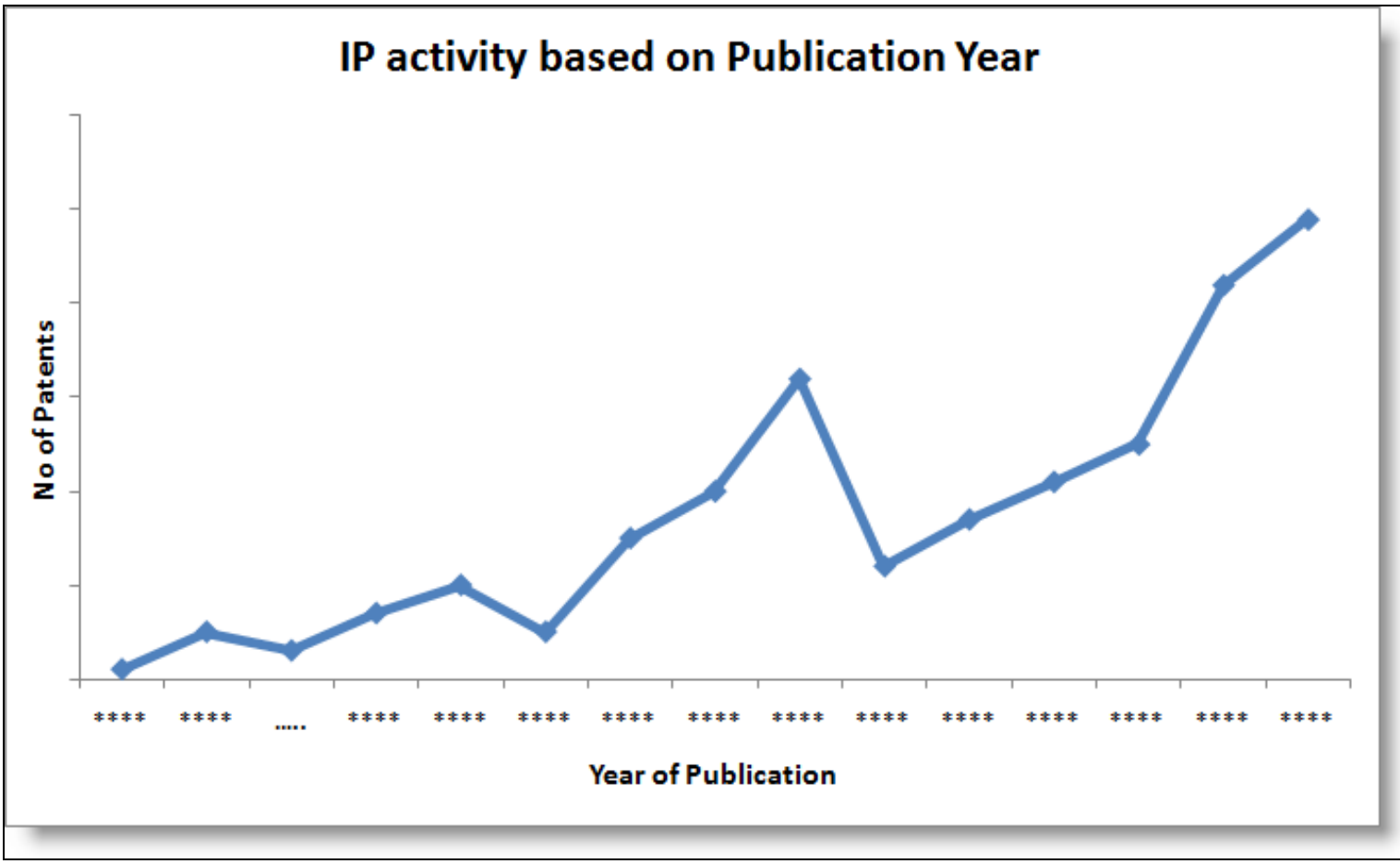
- **Geographical distribution of Patents**

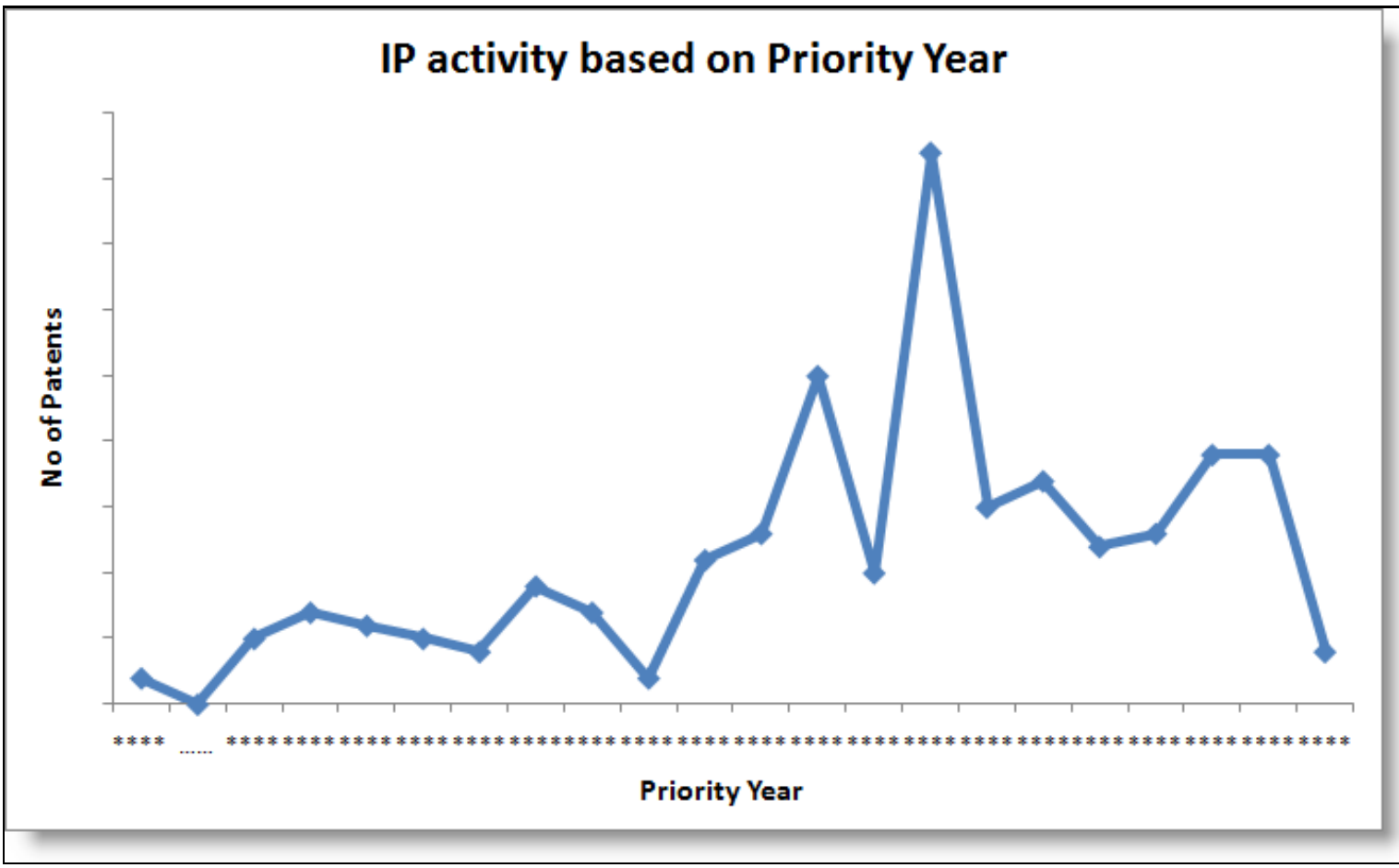


- **Geographical distribution of Patents**



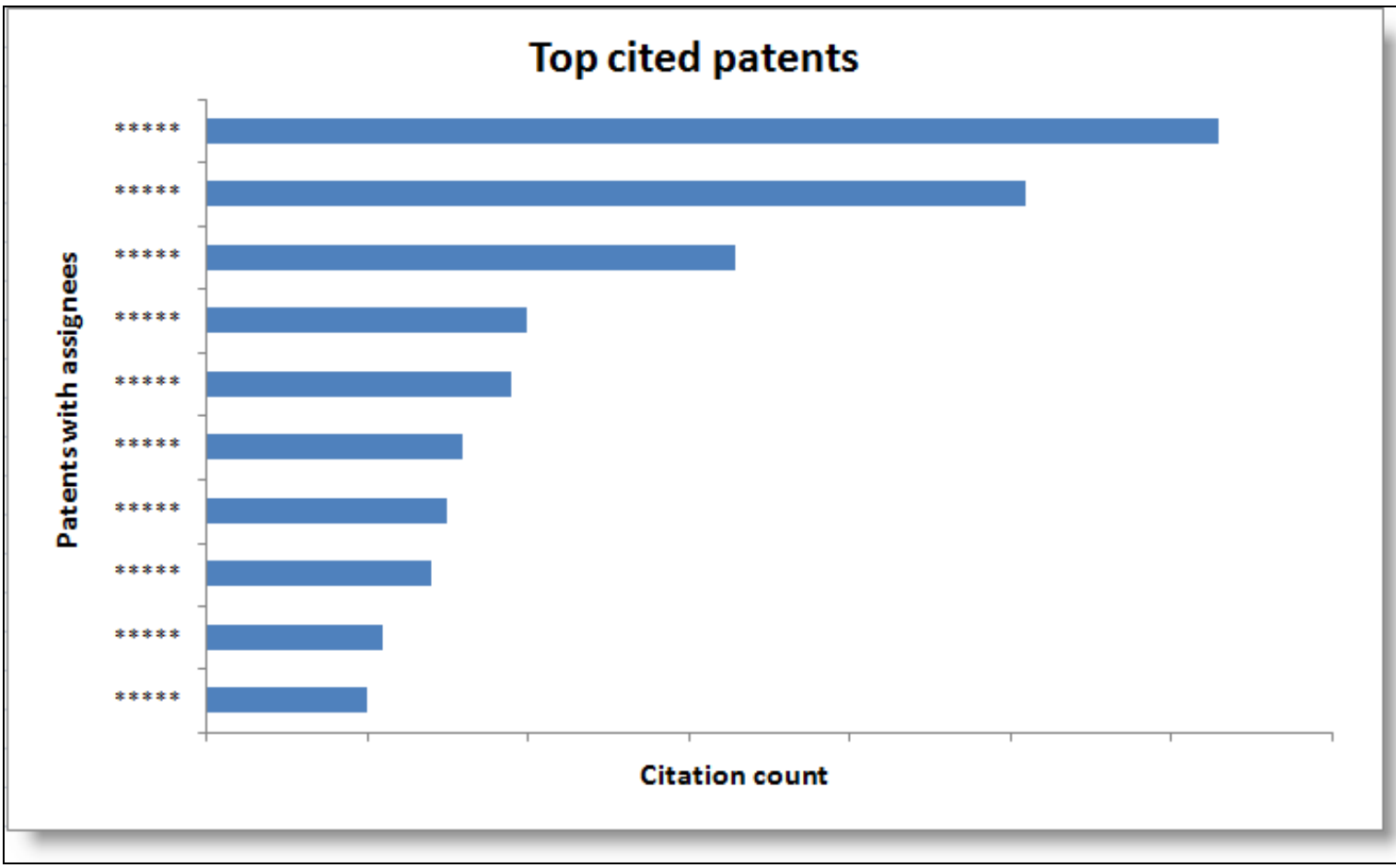
- The graphs given below explain the IP activity in this technology area over the years.


IP activity based on Publication Year
No of Patents
Year of Publication


IP activity based on Priority Year
No of Patents
Priority Year

Top cited patents

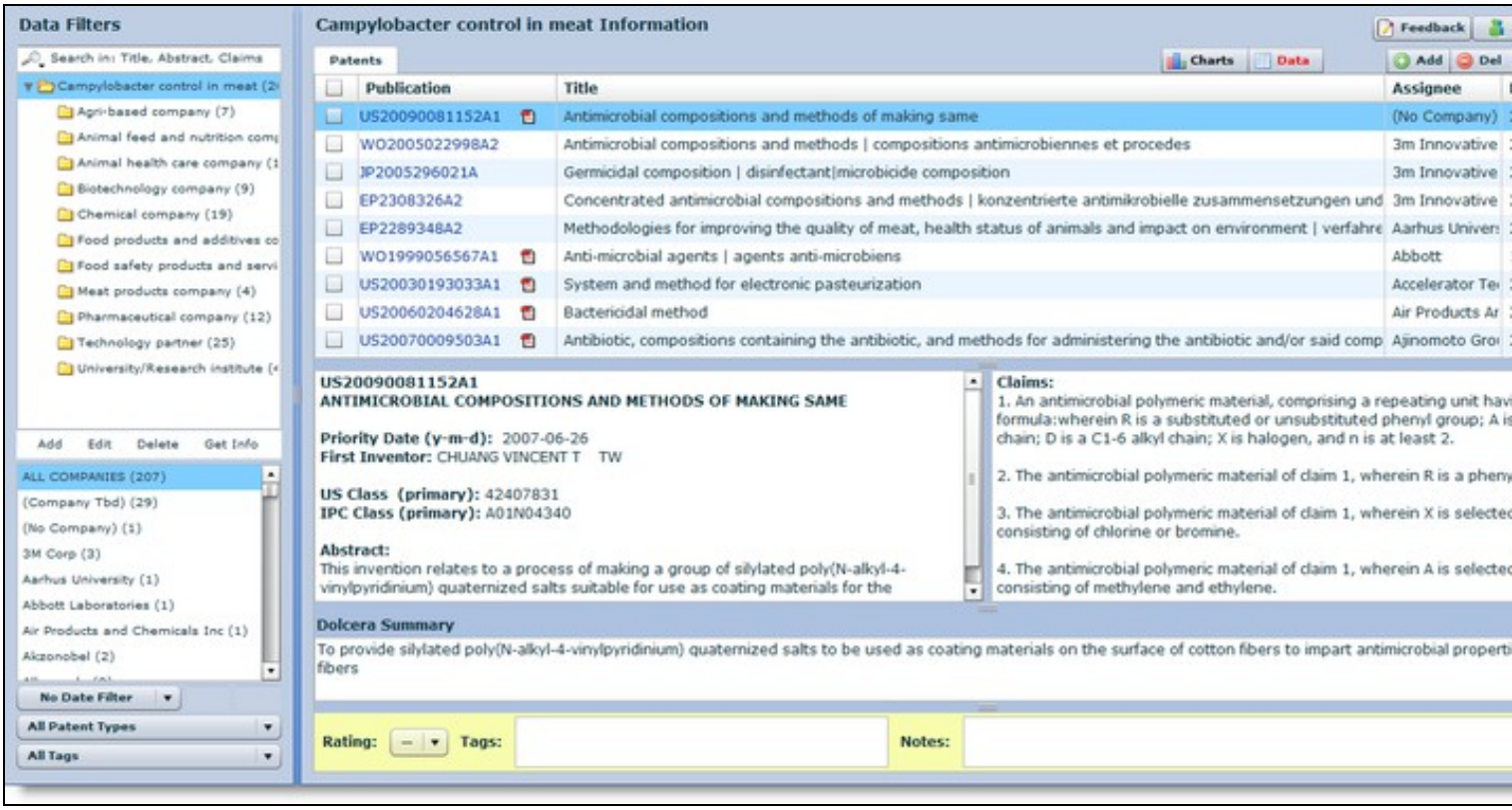
Patents with the maximum number of forward citations were determined and the graph shows the top 10 patents with corresponding assignees.



Dolcera Dashboard

A comprehensible result in the form of Dolcera dashboard has been given. Dashboard links the Companies in each category to their patents, hence making an interactive platform for analysis.

A data preview of the dashboard is shown below:



A chart preview of the dashboard is shown below:



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 number	Title	Assignee	Products	Snapshot

1	EP0999851B1	Use of an enzyme for the manufacture of an agent for controlling bacterial infection	Danisco	Avizyme®	
2				Porzyme®	

- Please click here for detailed Patent-Product highlight

Articles search

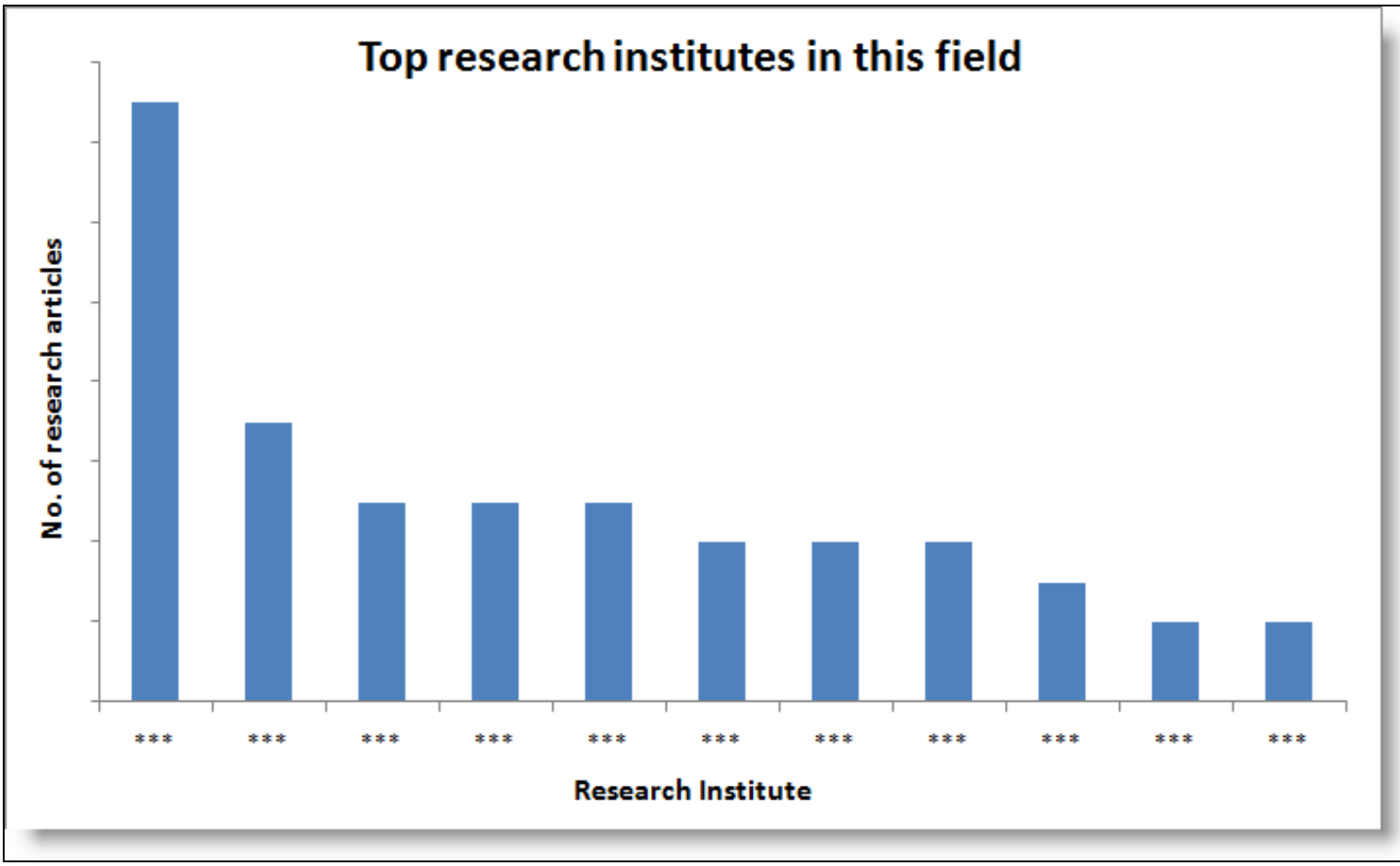
Search strategy

- **Database**: Scirus
- **Timeline**:1991-2012
- **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	**(*Campylobacter* + Control + meat)** keywords	(*Campylobacter**) AND (control* OR reduc* OR ****) AND (meat OR mutton OR ****)	**#### (Relevancy = ##%)**

- Please click here to download the Relevant articles sheet

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



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