Food Packaging and Salmonella Prevention through Packaging

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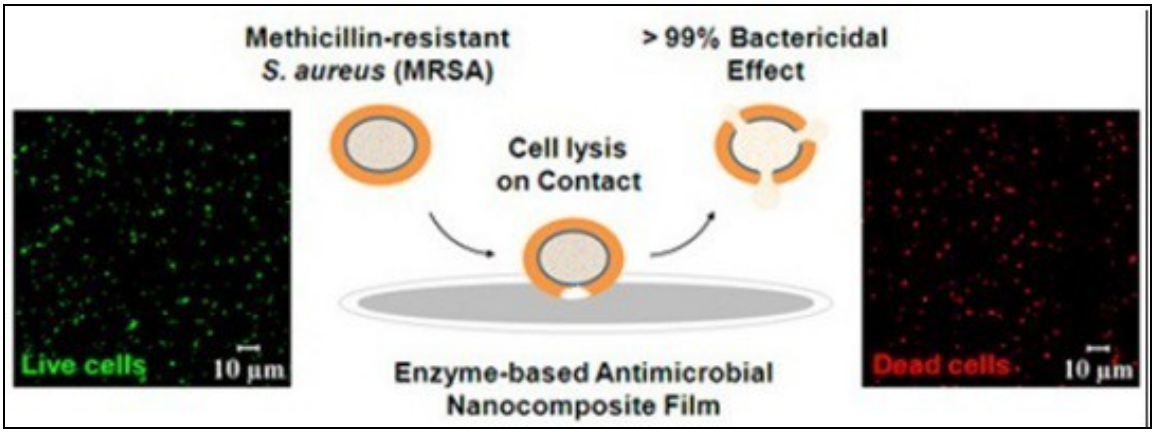
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Objective

The objective is to provide a landscape of the latest Food Packaging technologies that provide added consumer benefits. We will explore patent data bases to extract these technologies and highlight any claims mentioned that discuss new and beneficial consumer benefits. In addition, this final report will show where this technology is being developed, who is developing technologies in food packaging and white space potential.

Background

The major role of packaging is to protect the food product it contains against water, water vapor, air, oxygen, microorganisms, insects, other intruders, dirt, pilferage, etc. Besides protection, containment, communication, unitization, sanitation, dispensing, convenience, are some of the other package functions. One major benefit to the consumer from packaging is the safety of the product that it holds. Book on Development of Packaging for Food Products. Active packaging interacts with a product by releasing or absorbing substances to/from the packed food product and thereby extending shelf-life and improving food safety and quality. Some of the active packaging concepts include anti-microbial films, anti-oxidant films, and scavenging concepts such as oxygen scavenging, ethylene scavenging, moisture regulation etc. to preserve the freshness of the food product. Paperimpact. Researchers have also shown the migration of the antimicrobial compound such as ethyl lauryl arginate (LAE) to chicken breast to be within the regulated limits when using an active packaging. LAE has been shown to be effective against Listeria. FoodProduction Daily. Release of salicylic acid from polymer films can prevent the formation of Salmonella typhimurium biofilms. Review article of Rutgers University.



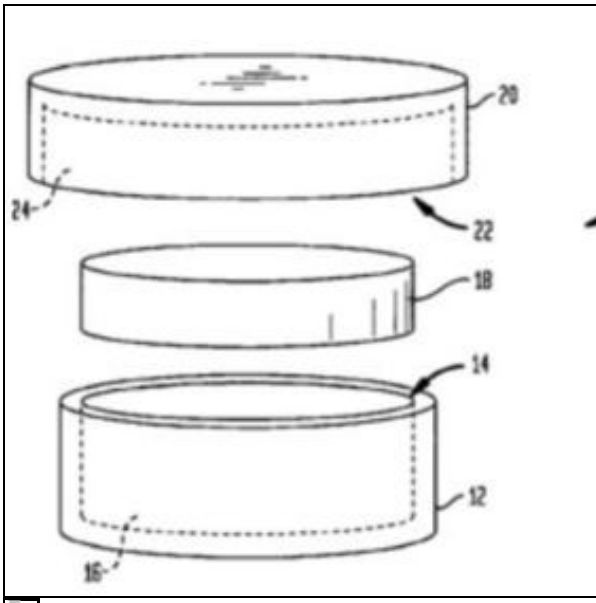
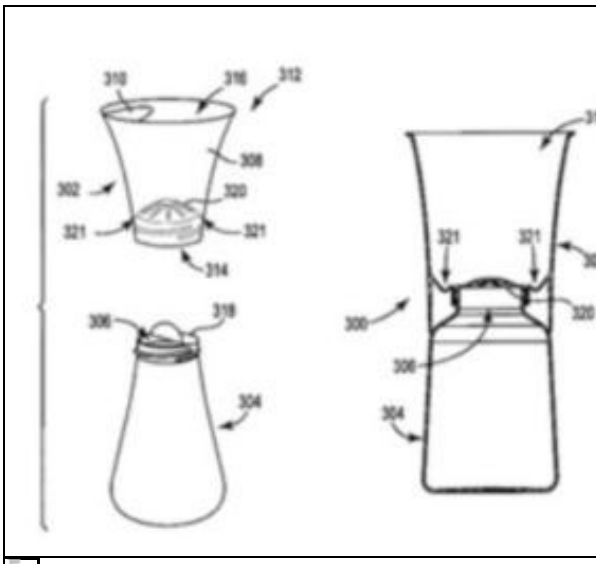
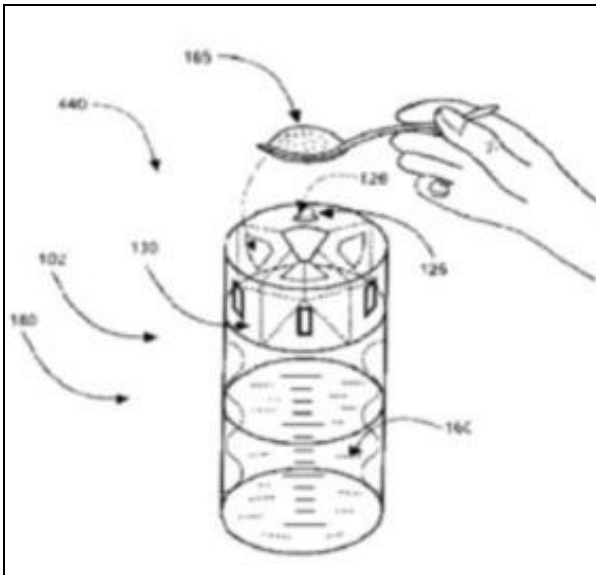
Food Packaging

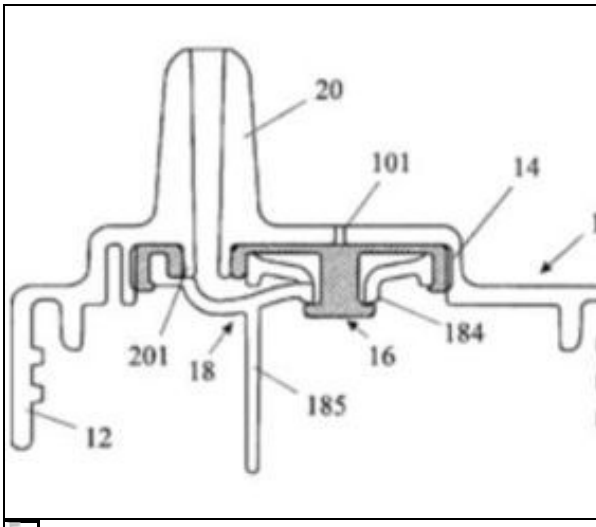
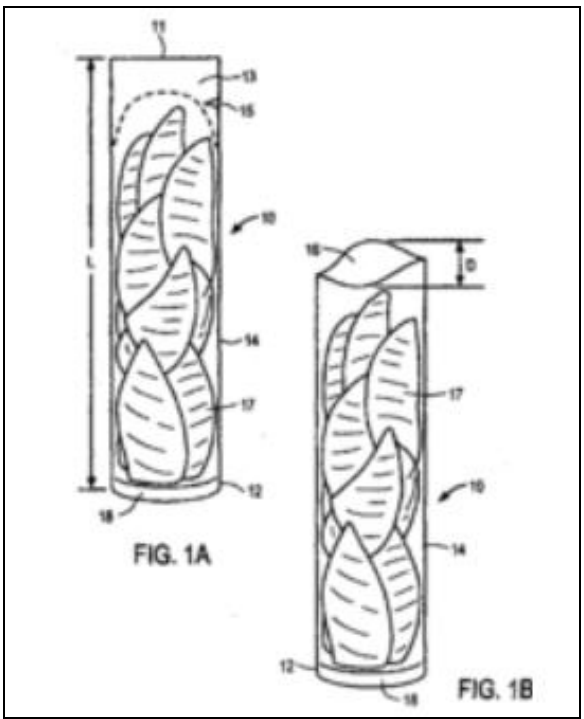
Old Sample patents

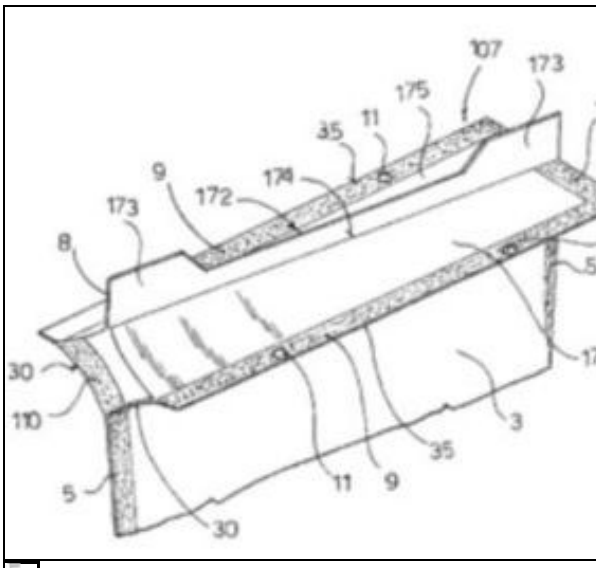
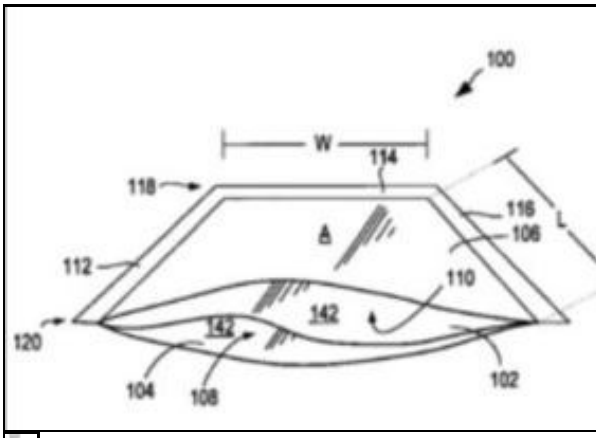
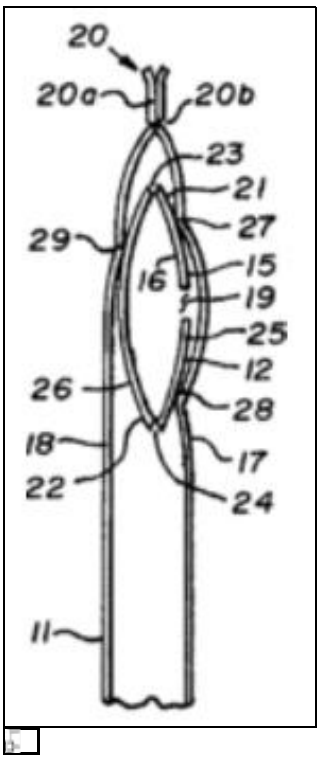
Revised Sample patents

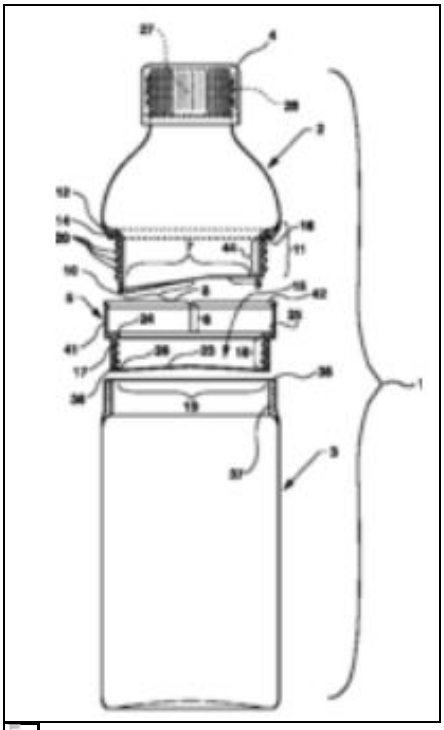
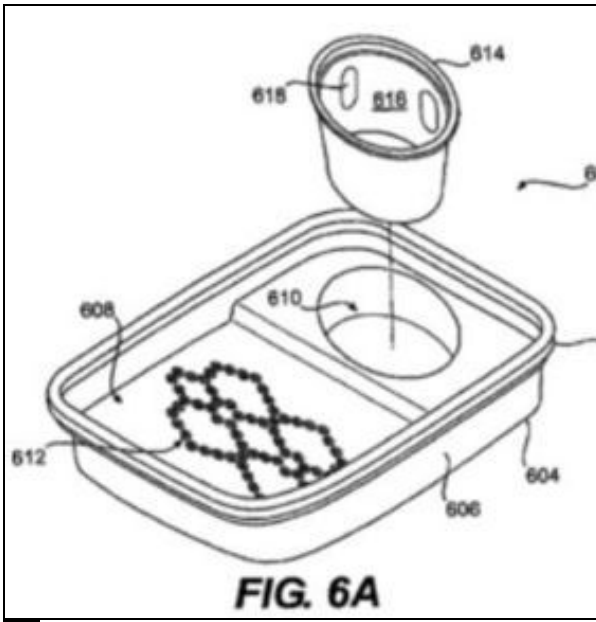
Revised Sample patents-Consumer Perspective

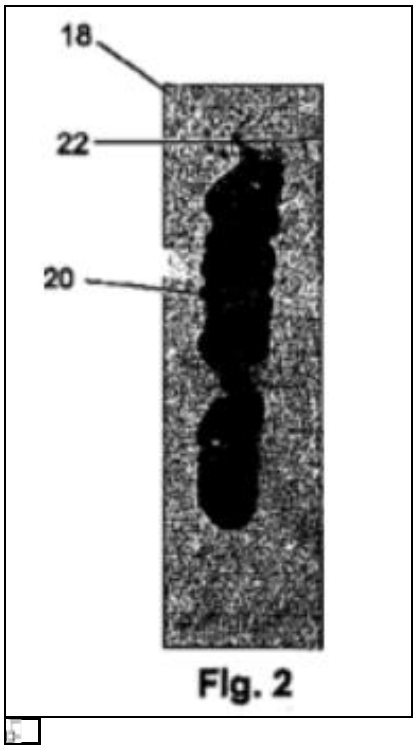
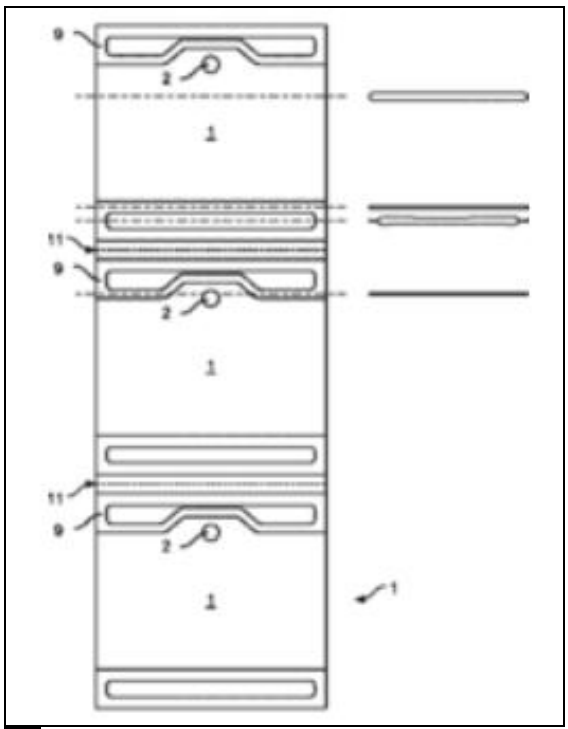
Patent/Publication No.	Publication Year	Assignee / Applicant	Title	Dolcera summary	Image

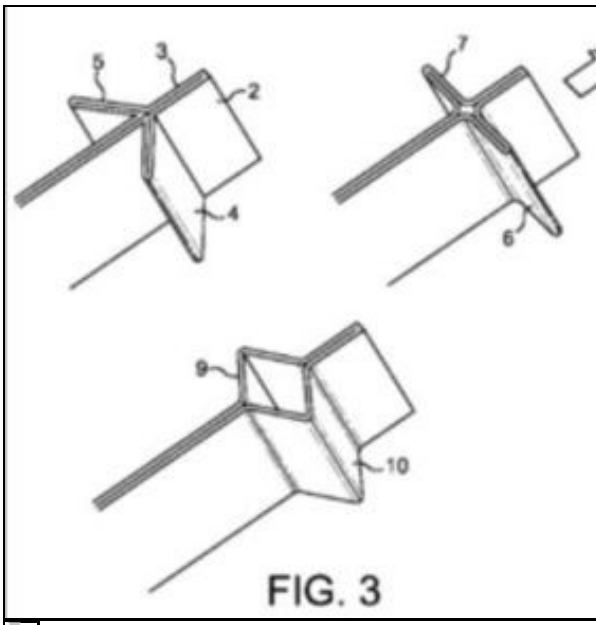
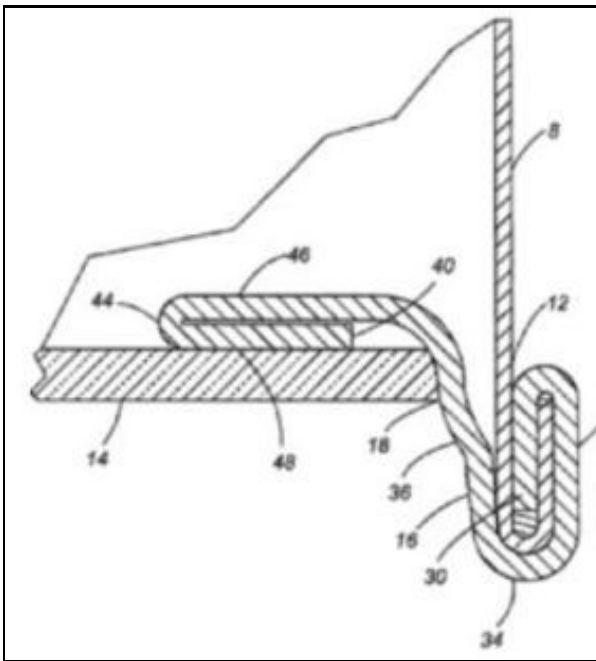
US8481134B2	2013	L?oreal. | atis, balanda | pradier, françois | kanji, mohamed | brereton, evelyn | gavin, linda	Biodegradable moisture-impermeable packages for consumer goods	Biodegradable and moisture impermeable	
US8485378B2	2013	General mills, inc. | zoss, robert a. | scholtes, bryan | genord, dan	Multi-container packages for dispensing liquid and dry food	Package for multi-component such as cereal and milk	
US8475856B2	2013	Sheehan, andrew | sheehan, andrew	OTG (on the go) specialty multi-beverage container systems	On the go specialty multicontainer for mixing and transporting a variety of powder-based beverages	

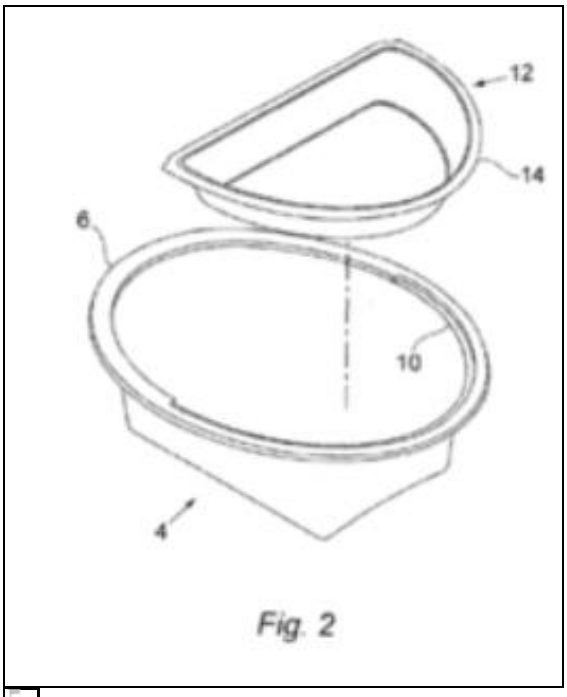
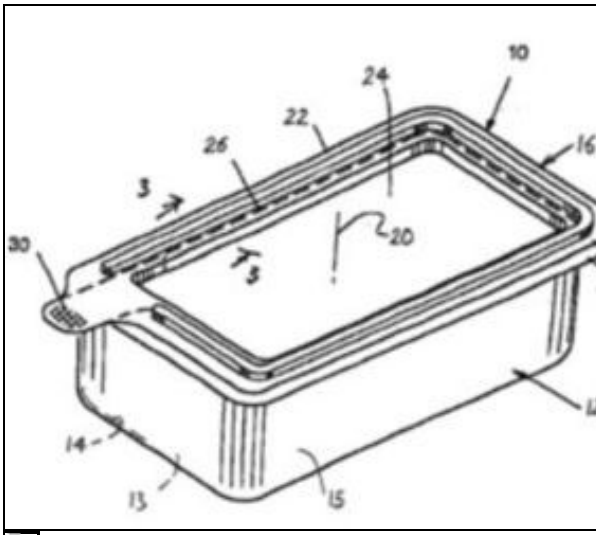
US8403164B2	2013	Samson, ilan	Cap for a spill-proof beverage container	Cap for a spill-proof cup with a reliable seal between the rigid and flexible members of the demand valve.	
US8377529B2	2013	Cryovac, inc. [bekele, solomon	Ultra high barrier aseptic film and package	A coextruded film with good oxygen barrier properties for pouches made in a VFFS aseptic system, that exhibits extended shelf life for the contained product by providing	N/A
WO2013085911A2	2013	Sepehr, cyrus, a.	Consumer oriented system for delivery of product including single serving package for preservative-free fruit pieces	Single serve packaging for preservative free fruit pieces	
US8231272B2	2012	Goglio s.p.a.	Stand-up, easy-open and easy-close package of flexible material, particularly for liquid, viscous, pasty, granular or powdered products	Flexible package for viscous, granular or powdered substances with peelable closure for easy open and close	

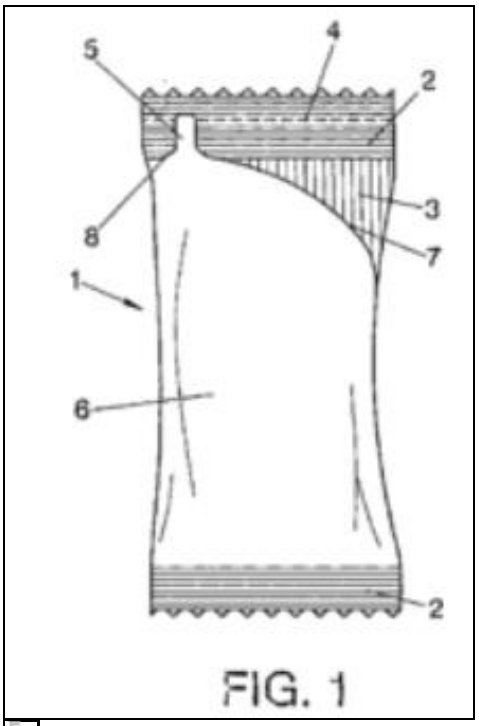
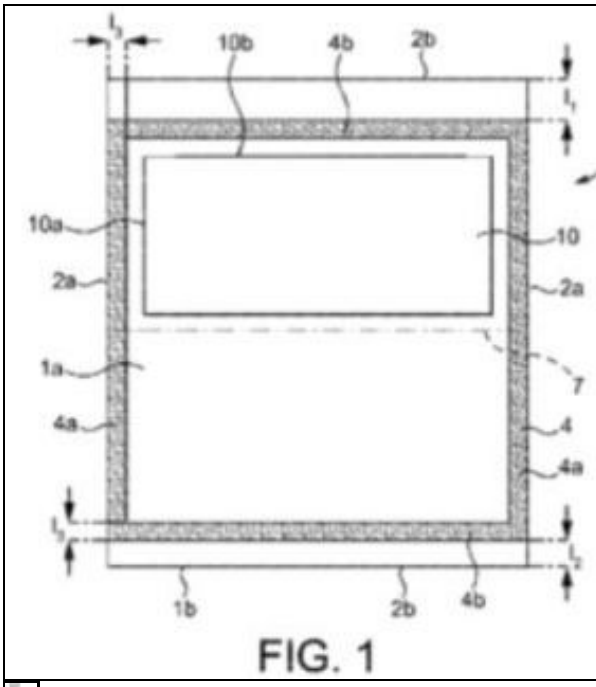
					
US8198571B2	2012	Graphic packaging international, inc.	Multi-compartment microwave heating package	A microwave package for heating, browning, and/or crisping a food	
US8167487B2	2012	Milprint, inc.	Secure access easy opening tamper evident feature for sealable bags	Bags with a tamper evident feature having an easy rupturable opening	

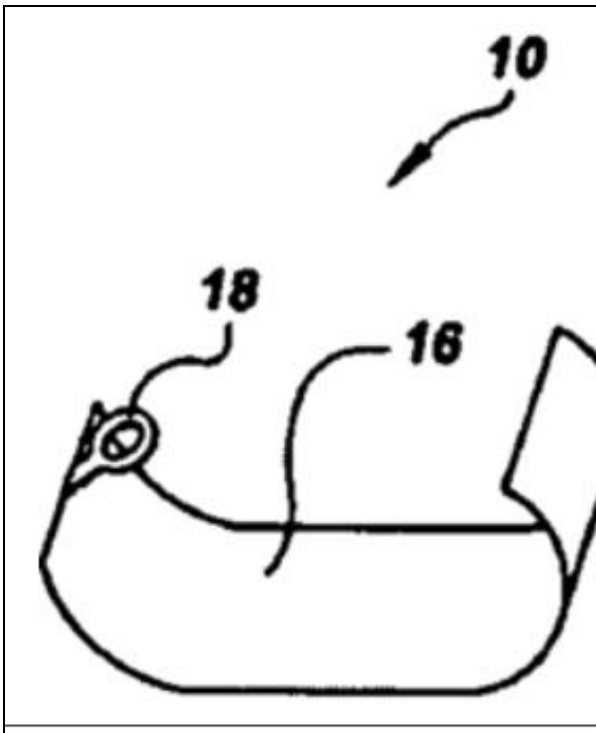
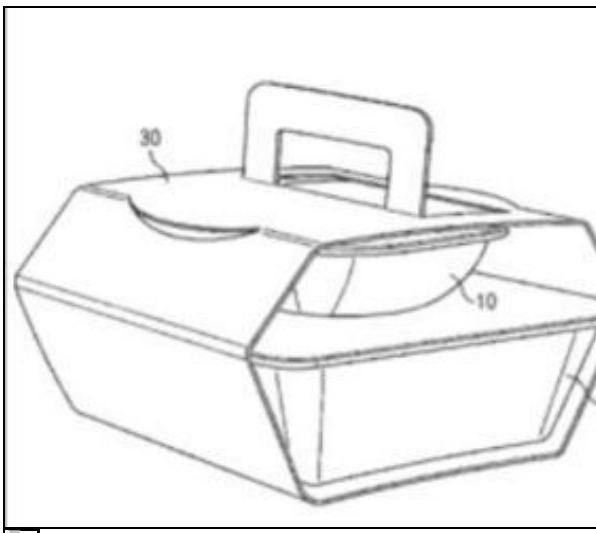
US8151985B2	2012	None	Containers for storing at least two substances for subsequent mixing	Disposable recyclable container for keeping two substances separate until mixed. The container can be enclosed in a tamper-evident film that includes a perforated pull strip	
EP2284099B1	2012	Graphic packaging international, inc.	Microwave packaging for multi-component meals	Packaging constructs in the form of trays, and other package forms for heating, browning, and/or crisping at least one food item in a microwave oven	 FIG. 6A
EP2208604B1	2012	Amcor flexibles kreuzlingen ltd.	Packaging pouch with food flow properties	Packaging pouch made of a flexible mono or multilayer film for packaging viscous jelly and/or gravy matrix food in a thermo cycle such as retort, pasteurisation, hot filling or aseptic conditions	

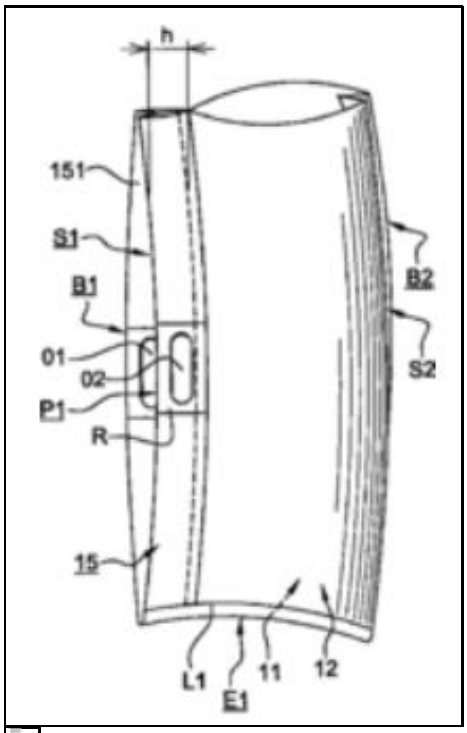
					 Fig. 2
US20120168025A1	2012	Nestec s.a.	Disposable very lightweight package	A biodegradable flexible pouch-like disposable package with a hermetic seal	
EP2459463A1	2012	Nestec s.a.	Easy opening packaging for liquid or gel products	A flexible package for a food product such as gel having a closure which is suitable for one hand operation	

					
US8080770B2	2011	Ball corporation	Microwavable metallic container	A metallic microwavable container which is hermetically sealed and capable of storing foodstuffs for long periods of time	
US7981408B2	2011	Boston brands, inc.	Method of preserving food using antimicrobial packaging	Antimicrobial film for food packaging	N/A
EP1888430B1	2011	Graphic packaging international, inc.	Microwavable food package having an easy-open feature	Package construct for cooking or heating a food item in a microwave oven.	N/A
GB2476365A	2011	Avondale foods, limited	Food packaging for two different food products to be stored separately	A Microwaveable food packaging containing a first outer bowl for a first food and a separable insert tray for a second food where the insert tray fits within the first bowl.	

					 Fig. 2
US20100108680A1	2010	None	Enhanced tamper evident container with tear-apart parts	Easily openable tamper evident container where a large sustained pull force has to be applied to separate a lid from a peripheral cover portion that is fixed to a peripheral base portion of the base	
EP1777173B1	2010	Mora negrin, pedro ramon	Easily opened flexible vacuum packaging for single portions of pasty fluids	Easy-open flexible vacuum container for single doses of viscous fluids	

					 FIG. 1
EP2141085A1	2010	Nestec s.a.	Easy opening packaging for food products	Easy open flexible packaging for energy bars providing a bigger surface for consumer information	 FIG. 1
US20090285941A1	2009	None	Combination package of liquid and solid foodstuff	A multi-compartment package for convenience and portability to a favorite snack such as cookies and milk	

					
US20090214723A1	2009	None	Two component package for simultaneous heating	A package for simultaneous heating of a crispy food product and a non-crispy food product in microwave.	
US20090032487A1	2009	Stephen s. Rekstad	Spill resistant caps and container systems	A spill resistant cap for a standard commercially available beverage bottle containing water, milk, juice, soda or other beverage.	

					
US7494279B2	2009	Mars incorporated	Ergonomic bag assembly for foods	An ergonomic bag assembly for granular foods contains two bags mutually joined by a gripping element comprising a handle	

Search Methodology

Relevant Class Codes and Definitions

IPC/ECLA

Class	Definition
A23L	Foods, foodstuffs, or non-alcoholic beverages
A23L0001*	Foods or foodstuffs; their preparation or treatment
B32B*	Layered products, i.e. Products built-up of strata of flat or non-flat, e.g. Cellular or honeycomb, form

B65B*	Machines, apparatus or devices for, or methods of, packaging articles or materials; unpacking
B65D*	Containers for storage or transport of articles or materials, e.g. Bags, barrels, bottles, boxes, cans, cartons, crates, drums, jars, tanks, hoppers, forwarding containers; accessories, closures, or fittings therefor; packaging elements; packages
C09J*	Adhesives; non-mechanical aspects of adhesive processes in general; adhesive processes not provided for elsewhere; use of materials as adhesives
D21H*	Pulp compositions; preparation
G01N*	Investigating or analysing materials by determining their chemical or physical properties

US Class

Class	Definition
428*	Stock material or miscellaneous articles

Patent search

Revised Patent Search

- Search Engine:Thomson Innovation
- Time line: 1836-01-01 to 2013-07-22
- Databases: US Grant, WO App, FR App, US App, GB App, DE Util, EP Grant, DE Grant, EP App, DE App, JP Util, CN Util, JP Grant, CN App, JP App, Other

S. No.	Scope	Concept	Query	No. of hits
1	Any IPC or CPC or US class	Food class	AIC=(A23L0001*) OR UC=(426*) AND	550686
	Title	Packaging KW	(TI=((*Packag* or *container* or *receptacl* or bag* or sack* or pouch*2 or sachet* or *carton* or barrel* or bottle* or closure* or cap or caps or lid* or *seal or reseal* or *clos* or reclos* or zipper* or slide* or dispens*))) AND (DP>=(18360101) AND DP<=(20130722));	
2	Any IPC or CPC or US class	Packaging class	(AIC=(B65D* or B65B* or B32B* or D21H* or G01N* or C09J*) OR UCC=(428*))	866669
	Title	Packaging KW	(TI=((*Pack* or *container* or *receptacl* or bag* or sack* or pouch*2 or sachet* or *carton* or tray* or tub* or barrel* or bottle* or closure* or cap or caps or lid* or *seal or reseal* or *clos* or reclos* or tamper or zipper* or slide* or dispens*))) AND (DP>=(18360101) AND DP<=(20130722));	
3	CTAB	Food KW	CTB=(*food* or *beverage* or snack* or past* or meal*1 or entree*1 or *soup*) AND DP>=(18360101) AND DP<=(20130722);	1970718
4	Combined query		2 and 3	95607
5	Combined query		1 or 4	640980(14971)
6	CTAB	KW of customer interest	CTB=((barrier near2 propert*3) or (shelf adj2 life) or (Unique near2 (shape*1 or design*1)) or aseptic*4 or retort*4 or microwave*4 or light-weight*3 or (environmentally adj2 friendly) or biodegrad*4 or recycl*4 or ((dual or duplex) adj2 (dispens* or chamber* or discharg*4)) or (single adj2 serve) or ((individual or single) adj2 (serving or portion*1)) or unitized or (eas*3 near3 (carry*4 or tear*4 or peel*4 or grip*4 or tilt*4 or open*3 or handl*3 or pour* or dispens* or transport*4)) or convenien*4 or (consumer near3 (appeal*3 or acceptance or safety or orient*2 or favour*4)) or (one adj2 hand adj2 (open*3 or operat*4)) or "OTG" or "on the go" or ergonomic or (tamper adj2 (proof or resist*4 or prevent*4)) or (child adj2 proof) or (single adj1 handed) or dripless or ((leak*3 or spill*3 or mess or drip*3 or splash*4) adj2 (prevent*3 or resistan*2 or proof)) or nonspill*3 or (non adj2 spill*3) or ((enhanc*3 or colorful or colourful) near2 graphics)) AND DP>=(18360101) AND DP<=(20130722);	1277116
7	Combined query		5 and 6	34465(17463)
8	Time restriction for 5 years		DP>=(20080722) AND DP<=(20130722);	9329(6056)
9	Time restriction for 4 years		DP>=(20090722) AND DP<=(20130722)	7774(5298)

10	Time restriction for 3 years	DP>=(20100722) AND DP<=(20130722)	5625(3872)
11	Time restriction for 2 years	DP>=(20110722) AND DP<=(20130722)	3047(2088)
12	Time restriction for 1 year	DP>=(20120722) AND DP<=(20130722)	1336(1081)

Taxonomy of Food Packaging

Interactive Taxonomy

Revised Interactive Taxonomy

```
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            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/Revised_Food_Packaging_Colgate.mm", function(error, data) {
            if (error) throw error;

            markmap("svg#mindmap_0e3a9eea39f8a9a1d3238d00a0dc0420", data, {
                preset: "colorful",
                linkShape: "diagonal"
            }, "xml");
          });
```

Sample Analysis Sheet

◊ Click here to download **Sample patent analysis sheet**

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Dashboard link

Please click for the dashboard link

NOTE: You need to install Internet Explorer 8.0 and Adobe Flash Player to view the Dashboard.

Please download **Internet Explorer 8.0** and **Adobe Flash player**

Note:

- *Use the mouse(click and drag/scroll up or down/click on nodes) to explore nodes in the detailed taxonomy*
- *Click on the red arrow adjacent to the node name to view the content for that particular node in the dashboard*

Antimicrobial films

Sample Patents

S. No.	Patent/Publication No.	Publication Year	Assignee / Applicant	Title
1	US8318282B2	2012	3m innovative properties company	Microstructured antimicrobial film
2	US20120087968A1	2012	Cryovac inc.	Antimicrobial Packaging Material and Methods of Making and Using the Same
3	US8017667B2	2011	Victoria university | technion research and development foundation ltd.	Antimicrobial packaging material
4	US7915325B2	2011	Kuhne anlagenbau gmbh	Antimicrobial food packaging
5	US7705078B2	2010	Dupont teijin films u.s. Limited partnership	Antimicrobial polymeric film

6	GB2450475A	2008	Nottingham trent university	Antimicrobial polymer nanocomposite
7	GB2449876A	2008	Post harvest solutions, limited	Active packaging materials incorporating micro-porous solids and essential oils

Search Methodology

Relevant Class Codes and Definitions

IPC/ECLA

Class	Definition
A23L	Foods, foodstuffs, or non-alcoholic beverages
A23L0001*	Foods or foodstuffs; their preparation or treatment
A01N*	Preservation of bodies of humans or animals or plants or parts thereof; biocides, e.g. As disinfectants, as pesticides, as herbicides
B32B*	Layered products, i.e. Products built-up of strata of flat or non-flat, e.g. Cellular or honeycomb, form

Patent search

- Search Engine:Thomson Innovation
- Time line: 18.June.2008 to 18.June.2013
- Databases: US Grant, WO App, FR App, US App, GB App, DE Util, EP Grant, DE Grant, EP App, DE App, JP Util, CN Util, JP Grant, CN App, JP App, Other

S.no.	Concept	Scope	Search query	No. of hits
1	Preservation or layered products class	Any IPC or CPC	A01N* or B32B*	615(358)
	Antimicrobial film kw	Title	(antimicrobial or antibacterial or (anti adj2 (bacterial or microbial)) or smart) AND (packag* or film* or sheet* or laminat* or polymer* or *composite*)	
2	Food Kw	Full text	Food*	707301
3	Combined query		1 and 2	269(148)
4	Food Class	Any IPC or CPC	A23L0001*	8(7)
	Antimicrobial film kw	Title	(antimicrobial or antibacterial or (anti adj2 (bacterial or microbial)) or smart) AND (packag* or film* or sheet* or laminat* or polymer* or *composite*)	
5	Combined query		3 or 4	273(152)
6	Control patents		US8318282B2 US8017667B2 US7705078B2 US7915325B2 US20120087968A1 GB2450475A GB2449876A	7
7	Combined query		5 and 6	7

Taxonomy of Antimicrobial films

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/Antimicrobial_films-Colgate.mm", function(error, data) {
```

```
  if (error) throw error;

  markmap("svg#mindmap_890805e4424c6b77393e4aa1142a8ea8", data, {
      preset: "colorful",
      linkShape: "diagonal"
  }, "xml");
});
```

Sample Analysis with Problem Solution Approach

Revised Sample Analysis Sheet

◊ Click here to download **Revised Sample patent analysis sheet**

Dashboard link

Please click for the dashboard link

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