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CONVENIENCE VS. CONSCIENCE

FOOD PACKAGING IN THE 21ST CENTURY

The Role of Intellectual Property in the Food Packaging Industry

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PROTECTING THE VALUE
OF TECHNICAL INNOVATION AND
BRAND ASPECTS OF PACKAGING
IS THE PROVINCE OF
PATENTS AND TRADEMARKS.

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“Food and convenience packaging are all made possible by innovations in the packaging industry.”

-Neil Kozarsky
CEO

Technical Help in Engineering and Marketing

OVERVIEW

Packaging plays a central role in ensuring that what we eat reaches our table in an edible state, that we know what it contains, that it bears branding to identify it is from a trusted source, and that we are assured it hasn't been tampered with during transit and distribution. To guarantee these things, sophisticated technology exists to preserve and track the food items and beverages we consume. Protecting the value of these technical innovations and brands is the province of patents, trademarks and other intellectual property (IP) rights, all of which underpin the business of getting food freshly and safely from the farm or factory into our homes.

But there's a conflict brewing that's raising questions in the minds of consumers. The "go green" movement that permeates so many other aspects of our lives is front and center in the food and beverage packaging industries. There

are many labels saying that packaging is green, but not much guidance on whether these labels actually certify a real improvement. There can be uncertainty about whether buying "green" is worth the extra cost to consumers that it may entail. Consumers need assurance that they are spending their money for real improvements that not only are green, but also preserve and protect food just as well or better than the old options.

This report showcases the state of the food and beverage packaging industry by looking across a number of information sources, including patents, trademarks, scientific literature, litigation data and more. It highlights the extent to which IP supports the business of companies involved in packaging of foods and beverages, as well as how IP supports the different aspects of what packaging does. It shows that convenience is not just an indulgence, but reduces food waste, aids in portion control and serves the elderly. Convenience is important, and the challenge is to serve convenience while offering consumers a believable way to make conscientious choices.

THE EVOLUTION OF FOOD PACKAGING

From the start, innovation has played a part in the preservation and safe delivery of food, beginning with the tin can, described in patent literature as long ago as the 1850s.¹ Through the early 20th century, development continued with inventions like aluminum foil, polyethylene and polyvinyl chloride (PVC), to modern day packaging materials such as ethylene-vinyl acetate (EVA) co-polymer plastics (for flexible packaging), polyethylene terephthalate (PET) as replacement for glass bottling and aluminum pop-top drink cans.

Innovation continues apace today. Neil Kozarsky, CEO of Technical Help in Engineering and Marketing (T.H.E.M.), identifies a number of significant recent innovations within the industry:

- High barrier plastic structures that coupled with processing and packaging extend shelf-life
- Re-closure technologies allowing convenience for customers
- Microwavable food and packaging to meet the needs of time-constrained consumers
- And in the area of design, the use of innovative packaging to “re-invent” tried and true brands via the creation of new-usage occasions

Mr. Kozarsky observes that “*food and convenience packaging, frequently referred to as ‘dashboard dining’ whereby meals are ‘made in minutes, served in seconds,’ are all made possible by innovations in the packaging industry.*”

In the view of Jane Bickerstaffe, Director of The Industry Council for Packaging and the Environment (INCPEN), key innovations in recent food packaging technology are:

- Modified atmosphere containers
- Aseptic containers

Ms. Bickerstaffe says that “*from an environmental perspective, [the key issue is] feeding a rapidly growing global population. This may be addressed by developing packaging with better barrier properties to allow longer shelf and storage life and presenting food in a wider number of portion sizes so people can buy just the right quantity and avoid waste at home.*”

Looking forward, Anne Lise Kjaer, futurist and CEO of kjaer global ltd says “*I do believe that packaging uniqueness, incorporating provenance and storytelling, is going to be a major factor in the success of brands in the future.*”

¹ For example, US Patent 12153 “Improvement in self-sealing preserve cans,” to Robert Arthur issued January 2, 1855.

ROLES OF PACKAGING

The traditional role of packaging is to ensure that food is preserved and protected during its journey so that it arrives safely and ready for consumption. The specific objectives that packaging supports are to:

- Contain, transport and preserve food quality, freshness and palatability
- Extend the product's shelf life
- Prevent tampering and improve the microbiological safety of the food
- Reduce losses in distribution
- Track the item from source to consumer, including monitoring transport conditions
- Inform consumers of the nutritional value, portion management and preparation of the food
- Promote the brand of the company
- Reduce environmental impact, food wastage and cost



CONSUMER SENTIMENT: Convenience vs. Conscience

As Frito Lay learned in August of 2010, when it pulled its biodegradable Sun Chips bags off the market after consumer complaints about the noise they made, the balance between environmental consciousness and consumer convenience is a delicate one. Clearly, both consumer products companies and dedicated packaging specialists are devoting an enormous amount of resources to “green” initiatives. But, how will customers react to the influx of environmentally-friendly bags, boxes and bottles?

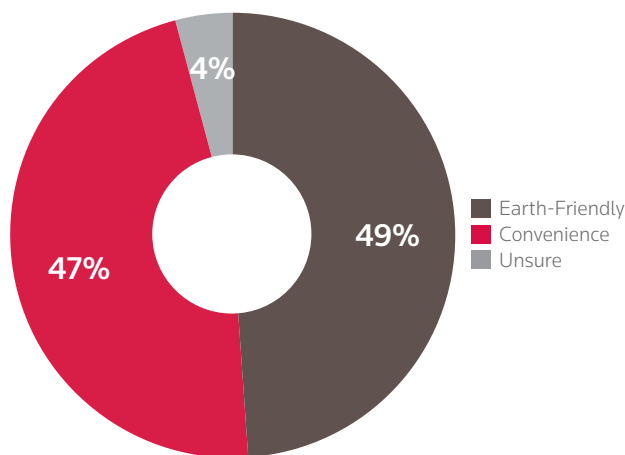
To get a better sense of what packaging attributes drive consumer purchase decisions, we conducted a telephone survey of 1,011 adults in March of 2011. We asked the following question: *Which is more important when you select the food and beverages you purchase: the convenience of having packaging that will make your life easier – whether in terms of going from store shelf to microwave, portion size or easy access to the goods*

inside; (or) the knowledge that the packaging is earth friendly and good for the environment, even though it may be less ‘convenient?’

As depicted in the charts below, respondents were split on the issue of convenience versus earth friendliness, with 47% opting for convenience and 49% opting for the “green” alternative. Digging deeper into the results, however, we find that women are 14% more likely than men to purchase food and beverages based on the knowledge that the packaging is green or environmentally friendly. By contrast, men are 11% more likely than women to make a purchase based on packaging convenience.

PHONE INTERVIEW: OVERALL RESULTS

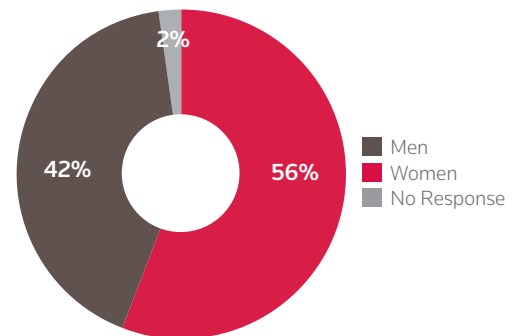
FIGURE 1a



These charts are based on Thomson Reuters commissioned survey of 1,011 adults, March 3 – 6, 2011.

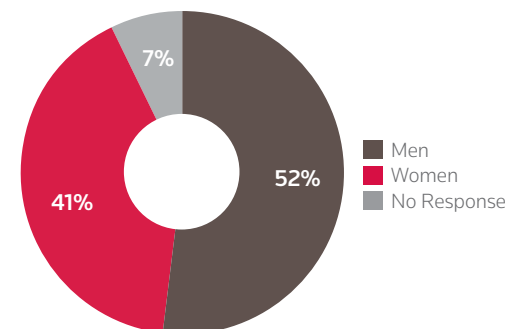
WOMEN/MEN: EARTH-FRIENDLY PREFERENCE

FIGURE 1b



WOMEN/MEN: CONVENIENCE PREFERENCE

FIGURE 1c



THE PACKAGING PLAYERS

There are three industries involved in packaging innovation that are the focus of this paper:

1. Companies that manufacture packaging materials: paper and coatings, plastics and films, sheet metal and stamping equipment
2. Companies that manufacture equipment for food and beverage processing, equipment for filling and sealing, and printing and control systems
3. Companies that make ingredients and produce food and beverages

Most of the players in packaging are suppliers that sell business-to-business (B2B), while food and beverage producers are the only manufacturers that sell business-to-consumer (B2C).

B2B companies own the lion's share of packaging patents, especially compared to consumer direct companies, as shown in Figure 2.

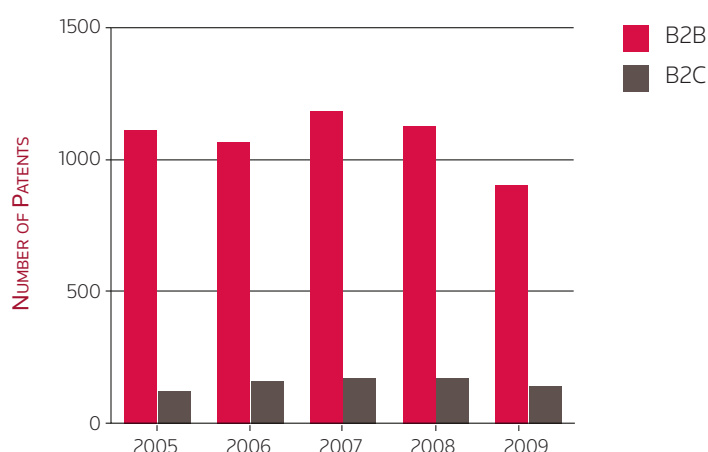
Aaron Brody, industry commentator and adjunct professor at the University of Georgia, agrees. With regard to the prevalence of patenting and industry behavior in defending innovation, Mr. Brody says patents are *"usually held by suppliers which often develop the innovations exclusively for the user - the packager."*

Breakthrough developments have historically come from:

- Large corporations (e.g., TetraPak, Cryovac)
- Government labs (e.g., U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) - the developer of MREs (meals-ready-to-eat) for the U.S. Army)
- Universities that are part of industry/university consortia on food-related developments (including microwavable packages, retort pouches, aseptic containers and high-pressure processing)

PACKAGING INVENTION PATENT OWNER TYPES

FIGURE 2



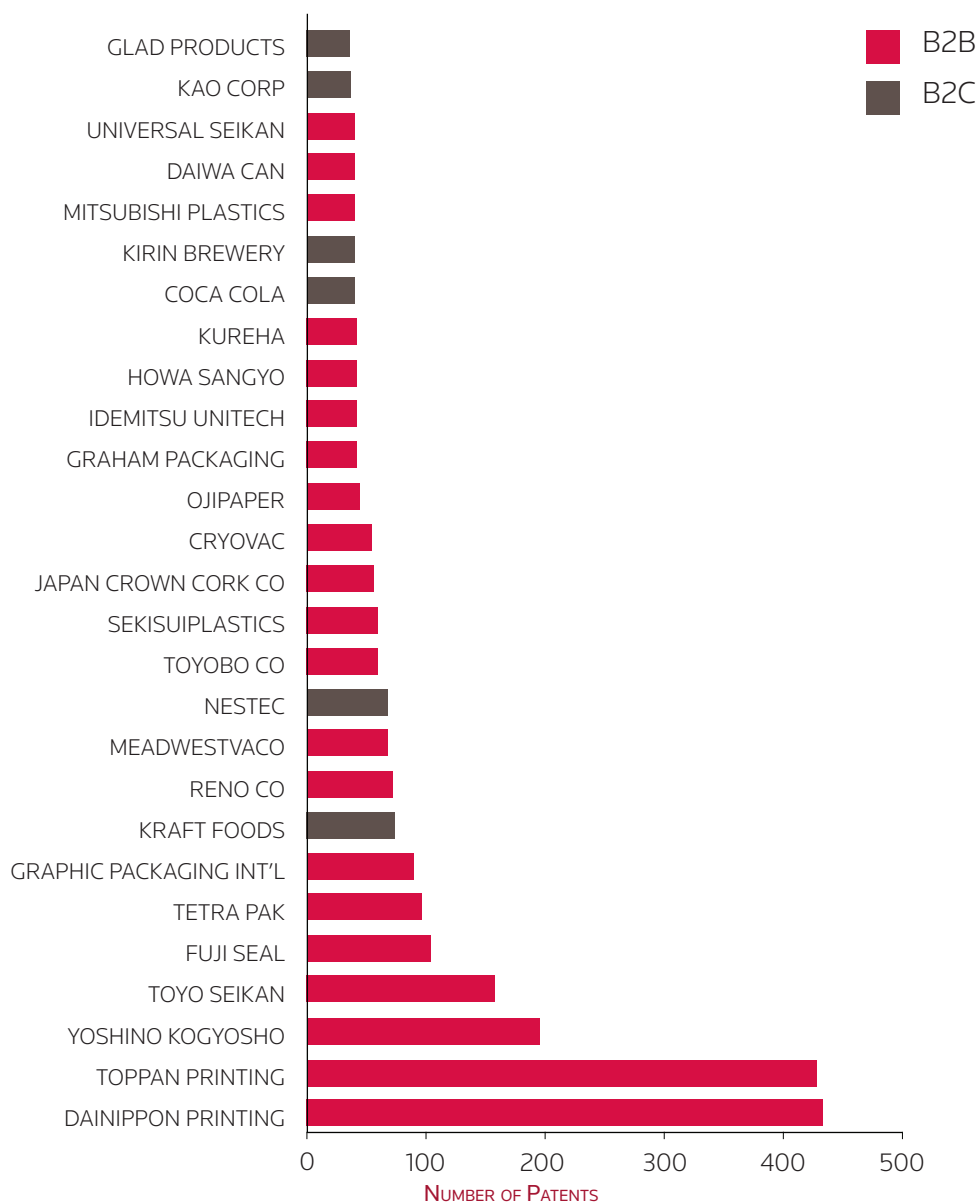
TOP INVENTION PATENT HOLDERS

Most of the top patenting companies are B2B organizations; only six of the 27 companies shown are B2C firms. This confirms that the majority of food packaging innovation is coming

from the packaging manufacturers, and not from consumer companies – a key point as we dive deeper into the state of packaging today.

TOP PATENT OWNERS IN PACKAGING INVENTIONS

FIGURE 4



PACKAGING LANDSCAPE: Design Patents

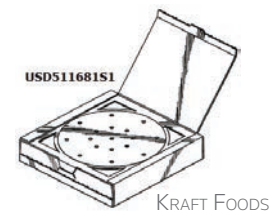
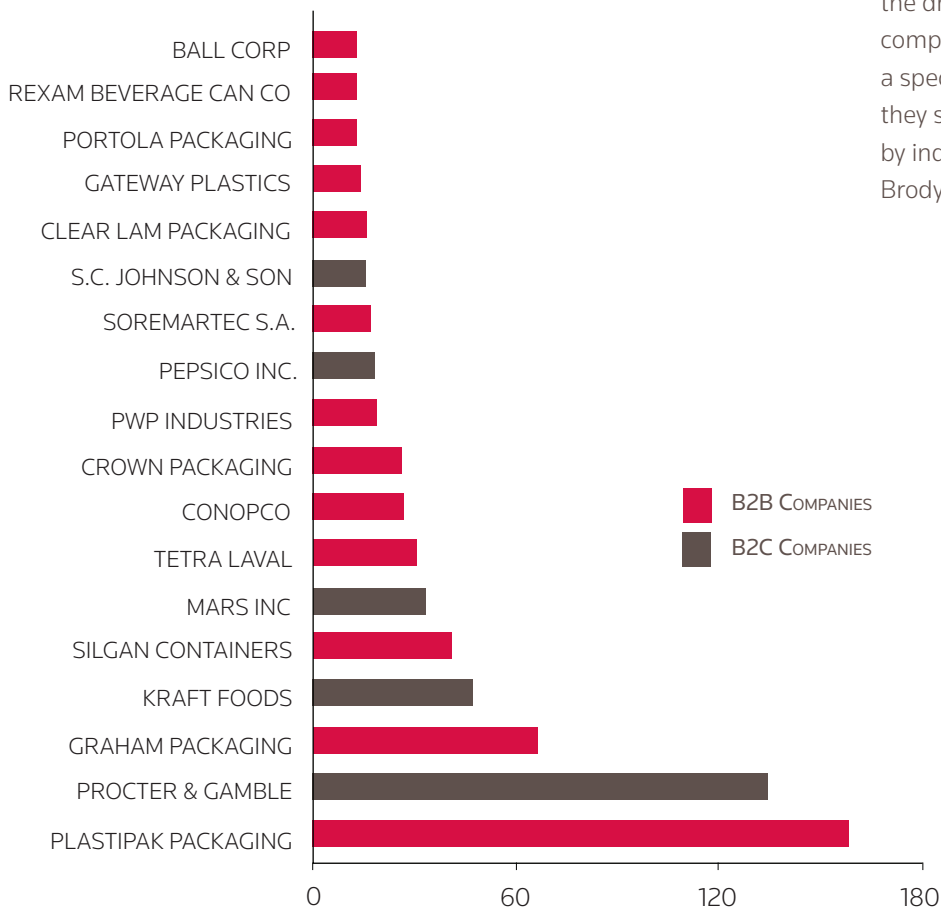
As one would expect, there are also a large number of design patents in the food packaging space: over 2,000 recent U.S. design patents were analyzed for this paper. Design patents are found in some, but not all, countries; they are most prominent in the United States. These patents protect the look of a package, but not any of the manufacturing methods or materials used to make it. They're ideal for protecting unique packaging.

Here we see that the leading innovators in packaging design are the B2C companies, as compared to packaging utility innovation. The B2C companies are 22% more active than they were in the invention-patent area (34% vs. 12%), indicating that design control is an important part of their business strategies (Figure 5).

Design patents tend to be more focused on addressing a specific market need. Examples of this can be seen in the Campbell Soup Company ergonomically shaped can (making it easier to hold and open the soup), the Kraft foods aerated container (for convenient microwave cooking) and the Rexam Beverage wide-mouthed lid (for easier consumption of larger quantities of the drink inside). It also appears that when B2B companies file a design patent, it is often to meet a specification requested by one of the companies they supply – a concept which was also confirmed by industry expert Mr. Brody, CEO of Packaging/ Brody Inc.

TOP PACKAGING DESIGN PATENT ASSIGNEES

FIGURE 5



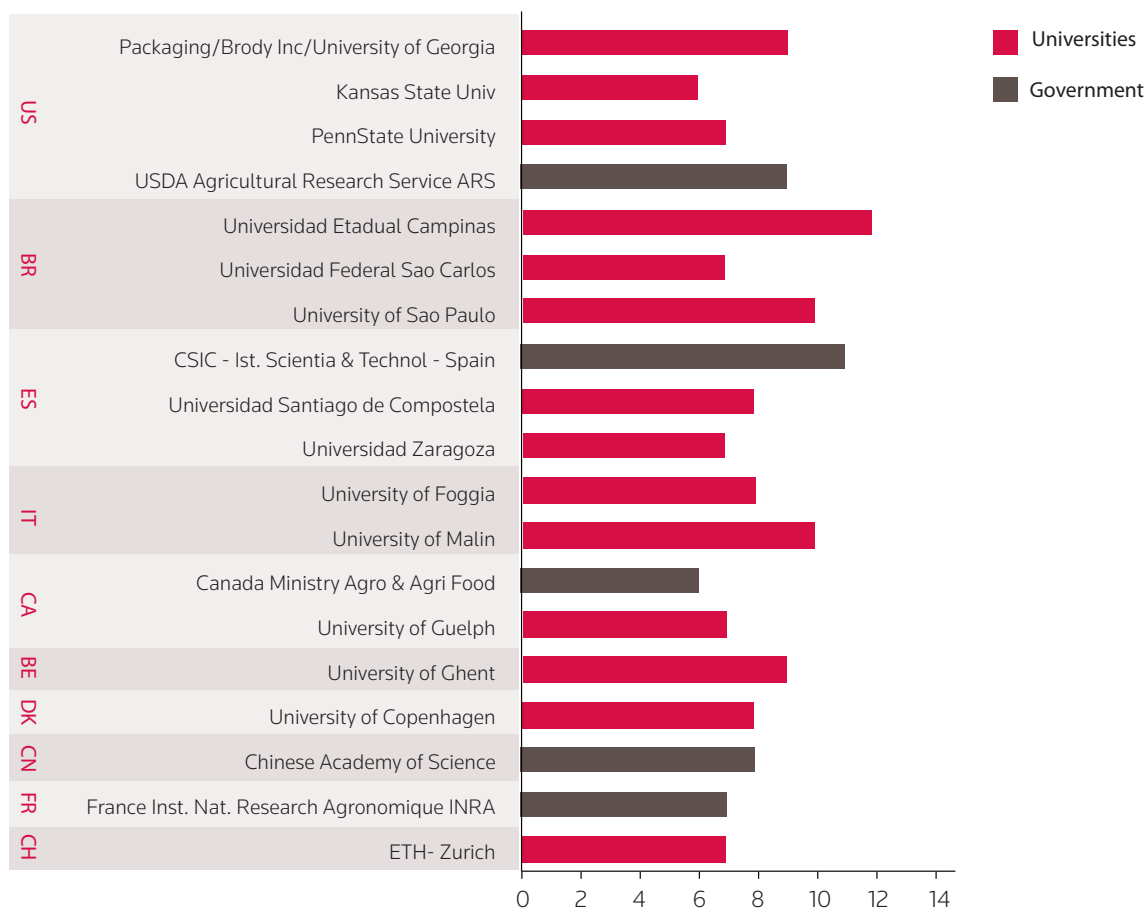
PACKAGING LANDSCAPE: Scientific Publications

In addition to food packaging innovation appearing in patent data, it is also found in scholarly research, which can provide an early look at the future of the field. Our research shows there is a prominence of U.S.-based information related to food packaging (Figure 7), as well as a number of articles from Brazil, Spain,

Italy, Belgium, Denmark, France, Switzerland, Canada and China. This is an indicator that these countries are involved in food packaging in some way. The articles are primarily published by academic (or government) researchers, sometimes with support and collaboration of commercial authors and entities.

TOP PUBLISHERS OF SCIENTIFIC PACKAGING ARTICLES

FIGURE 7



To gain greater insight into the subjects of these publications, we analyzed them in a ThemeScape map (Figure 8). The overall theme in the scientific journal articles is the improvement of packaging by using materials and methods that create more environmentally sound, safer packaging that delivers a better food or beverage product. Although the general theme is aligned with some of the same themes prevalent in the patent research, only two of the areas correspond with the patent emphasis of the B2B packaging

companies. These shared areas (Figure 8, yellow labeling) are “storage improvement through control of atmosphere” and “films that form better barriers controlling exposure of the contents to moisture or oxidation.” As the map shows, the film theme includes the use of nanocomposites in barrier films. Nanotechnology presents the opportunity to potentially alter the structure of packaging materials on a molecular scale to give the materials desired properties.² The list of applications of nanocomposites in the food packaging industry is growing.³

SCIENTIFIC LITERATURE LANDSCAPE MAP OF PACKAGING ARTICLES

FIGURE 8



- 2 “Application of Nanotechnology in Food Packaging: An Overview,” Mandal, PK; Choi, K; Min, SG; Lee, CH, Korean Journal For Food Science of Animal Resources | 29 (4): 403-408, August 2009.
- 3 “Improvement in Food Packaging Industry with Biobased Nanocomposites”, Akbari, Z; Ghomashchi, T; Moghadam, S, International Journal of Food Engineering | 3 (4): - 2007.

The map in Figure 8 also reveals areas of emphasis in the literature (white highlighting) that were not prevalent themes in the patent research presented in the previous section. This literature map shows that there is a focus on the development of monitoring expertise and discovery of safe anti-microbial materials and methods that can be used in packaging. Our analysis reveals that the packaging companies are patenting less extensively in these areas, and they are relying on academia and government to lead the development of methods that the manufacturers can ultimately adopt. Voluntary remediation responses to safety and environmental issues are often seen in this industry, where company self-interest and consumer interest often coincide.

Taking the analysis of journal articles a step further, a review of an article's citations provides a unique window into important topics shaping the future of the industry. Articles that are frequently cited by others typically cover a topic of interest and may be fundamental technologies with high potential. Citations of food packaging journal articles identify the following three highly cited topics, which align with the areas identified in Figure 8:

- Use of nanocomposites in packaging surfaces
- Use of antimicrobials in active packaging to improve food safety
- Exposure to chemical compounds used in packaging

Commenting on nanotechnology, Neil Kozarsky, CEO, Technical Help in Engineering and Marketing (T.H.E.M.) states that *"metallization/deposition technology and nanotechnology"* will be leading future areas; and Jane Bickerstaffe highlights the environmental benefits of nanotechnology by saying *"packaging ... especially with nano-level clay coatings, will enable more lightweighting of materials with better barrier coatings."*

HIGHLY CITED SCIENTIFIC PACKAGING ARTICLES

FIGURE 9

Truncated Titles of Highly Cited Articles	Publication by:	Citation Frequency	Nano Tech	Anti-microb.	Exposure
Perceived risks and perceived benefits of different nanotechnology	EMPA / ETH Zurich	9			
Identification of potentially emerging food safety issues by analysis	U Wageningen & Res Ctr	10			
Effect of non-ionic surfactants on the exfoliation and properties of poly	ETH	34			
Applications and implications of nanotechnologies for the food sector	Univ York	21			
Concentrations of perfluorooctanesulfonamides in Canadian total diet	Hlth Canada	25			
Endocrine disruptors in bottled mineral water: total estrogenic burden	Univ Frankfurt	13			
Trace and ultratrace metals in bottled waters: Survey of sources worldwide	Univ Heidelberg	8			
Improving packaged food quality and safety. Part 2: Nanocomposites	CSIC / Nanobiomatters / U Sim	27			
Self-sterilized EVOH-TiO2 nanocomposites: Interface effects on biocidal	CSIC	7			
Silver nanoparticles dispersing in chitosan solution: Preparation by gamma-	Chulalongkorn Univ / Kaseart	7			
Graft copolymerization onto cellulose-based filter paper and its further	Govt Model Sci College India	7			
Antimicrobial plastic film: Physico-chemical characterization and nisin	Univ Lyon 1	7			
Current Applications and Future Trends of Lactic Acid Bacteria and their	Univ Santiago de Compostela	7			
Radiation treatment for sterilization of ppackaging materials	Warsaw Univ Technol / IAEA	6			
Quality and shelf life of orange juice aseptically packaged in PET bottles	Tech Univ Cartagena	6			
Low-pressure microwave plasma sterilization of polyethylene terephthalate	Fraunhofer Inst / Ruhr Univ	6			
Perspectives for chitosan based antimicrobial films in food applications	Motilal Nehru Inst Technol	28			
Solution approaches for the soft drink integrated production lot sizing and	Sao Paulo State Univ / U Fed	7			
Biodegradable starch/clay nanocomposites for food packaging applications	CNR / TNO	71			
Potential perspectives of bio-nanocomposites for food packaging applications	Univ Salerno	44			
Gas permeation properties of polyethylene-layered silicate nanocomposites	ETH	33			
Natural biopolymer-based nanocomposite films for packaging applications	Michigan State Univ / Mokpo	31			
Public acceptance of nanotechnology foods and food packaging: The influence	EMPA / ETH Zurich / U Zurich	19			
Antimicrobial polypeptide multilayer nanocoatings	Luisiana Tech Univ	15			
Optimization of biodegradable nanocomposites based on aPLA/PLC	CSIC / U Simon Bolivar	13			
High-performance dual-action polymer-TiO2 nanocomposite films via melt	Helmholtz Zentrum Infektion.	13			
New nanohybrids of poly(epsilon-caprolactone) and a modified Mg/Al	Univ Basilicata Ltd / Univ Sal.	11			
Comparative performance and barrier properties of biodegradable	Nanobiomatters Ltd / U Jaime	10			
Potential use of biopolymer-based nanocomposite films in food packaging	Mokpo Natl Univ	10			
Development of new polyolefin films with nanoclays for application in food	Univ santiago de Compostela	10			
Nano and food packaging technologies converge	Packaging/Brody, Inc.	9			
Fabrication, functionalization, and application of electrospun biopolymer	Univ Mass / Univ Milan	8			
The Potential Use of Polymer-Clay Nanocomposites in Food Packaging	Mondash Univ / Univ Auckland	7			
Barrier and mechanical properties of starch-clay nanocomposite films	Kansas State Univ	6			
Novel PET nanocomposites of interest in food packaging applications	Univ Jaume I / CSIC	6			

A CLOSER LOOK...

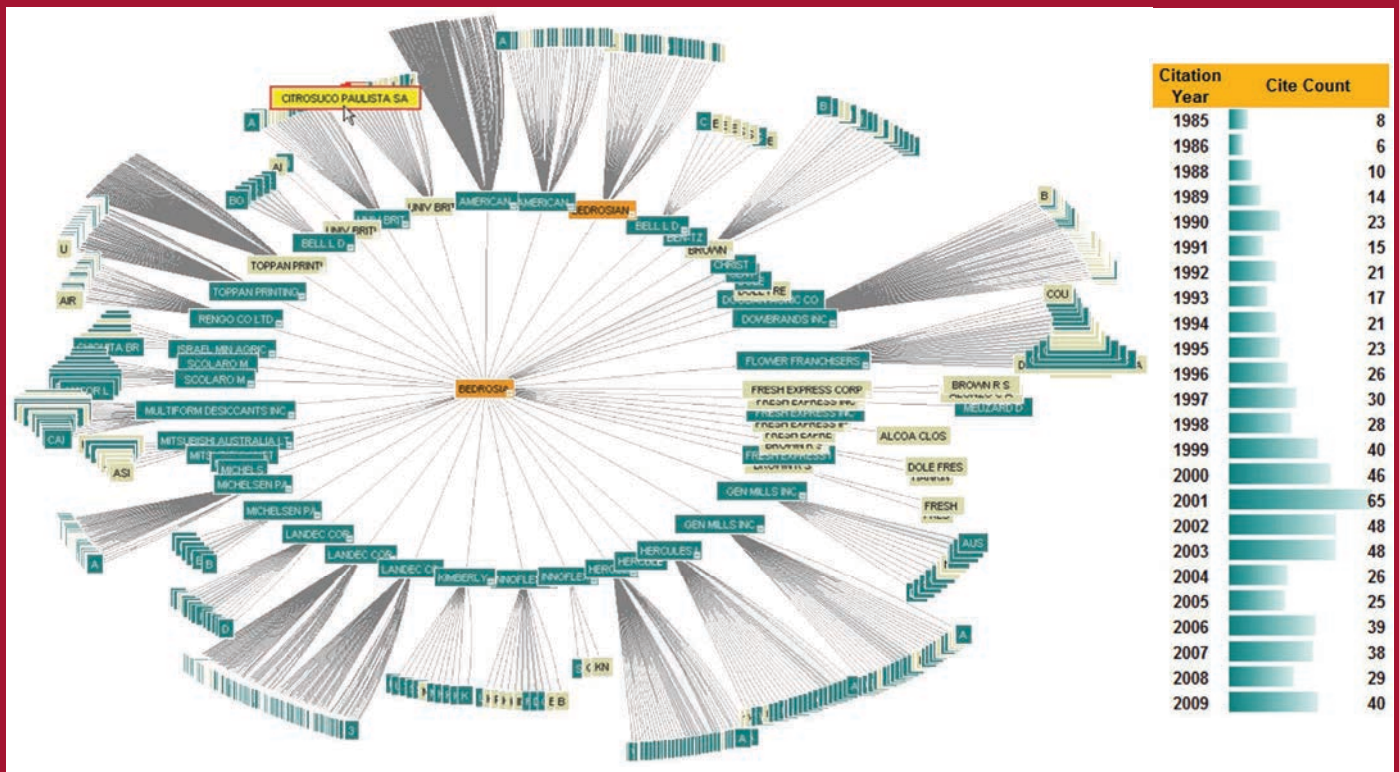


BARRIER FILMS AND MODIFIED ATMOSPHERE PACKAGING (MAP)

Barrier film technology, originally developed to preserve the freshness of produce, has influenced numerous packaging technologies over the past few decades, as can be seen in the citation map and citation counts of Figure 10. A founder technology in this field is represented by the gold box in the center of the map. Since inception, the original patent from Bedrosian has been referenced as a key technology in many later (“downstream”) inventions, as shown by the other colored boxes surrounding it. And, a look at the yearly citation counts reveals that this early patent on barrier films continues to be a key technology influencing innovation all the way through 2009, for a decade and a half.

CITATION MAP SHOWING THE SIGNIFICANCE OF BARRIER FILM TECHNOLOGY IN FOOD PACKAGING

FIGURE 10



Modified atmosphere packaging employs selective barriers. Because vegetables and fruits are living and breathing entities, they need to be enclosed in packaging that is semi-permeable or has microperforations that delay premature decomposition. Other preservation techniques include managing the oxygen that causes unwanted browning, dealing with natural ethylene production that accelerates ripening, and, in general, controlling the atmosphere inside the package. Today there are technologies that extend produce life by controlling atmosphere in ways that are exactly tailored for the specific type of produce and the time it is expected to be in transit. These approaches allow produce to be shipped for greater distances, and also prevent wastage. It is somewhat paradoxical that the packing both reduces and adds to the carbon footprint of produce, the net result of which has probably not been fully determined.



A sampling of journal articles shows that research has been conducted to measure the suppression of respiration rates of fresh produce, which significantly extends storage life with better appearance, and safety.⁴ For example, the combined effect of phosphate and MAP (80%CO₂, 10%O₂, 10%N₂) has been studied in fresh fish⁵ and processed fish⁶ where high CO₂-concentration was able to guarantee the microbial acceptability of fish burgers until the 28th day of storage at 4 degrees Celcius. And, the effect of modified atmosphere packaging has also been studied in meat;⁷ cheese (75% CO₂ and 25% N₂);⁸ prepared ready-to-eat food (60% CO₂/40% N₂);⁹ and fruit (LDPE film with perforations).¹⁰

4 "Extending Storage Life of Fresh Ginseng by Modified Atmosphere Packaging," Hu, WZ; Xu, P; Uchino, T, *Journal of the Science of Food and Agriculture*, 85 (14): 2475-2481, November 2005.

5 "Combination Effect of Phosphate and Modified Atmosphere on Quality and Shelf-Life Extension of Refrigerated Seabass Slices," Masniyom, P; Benjakul, S; Visessanguan, W, *LWT-Food Science and Technology*, 38 (7): 745-756, 2005.

6 "Combined Effect of MAP and Active Compounds on Fresh Blue Fish Burger," Del Nobile, MA; Corbo, MR; Speranza, B; Sinigaglia, M; Conte, A; Caroprese, M, *International Journal of Food Microbiology*, 135 (3): 281-287, November 15 2009.

7 "Effect of Packaging and Aging Time on Shelf-Life of Beef Meat," Ballico, S; Failla, S; Iacurto, M; Conto, M; Signorelli, F; Ficco, A, *Italian Journal of Animal Science* | 6: 397-399, Suppl. 1 2007.

8 "Effect of Modified Atmospheres on Microbiological and Sensorial Properties of Apulian Fresh Cheeses," Gammariello, D; Conte, A; Attanasio, M; Del Nobile, MA, *African Journal of Microbiology Research*, 3 (7): 370-378, July 2009.

9 "Effectiveness of Modified Atmosphere Packaging in Preserving a Prepared Ready-to-eat Food," Lee, KE; Kim, HJ; An, DS; Lyu, ES; Lee, DS, *Packaging Technology And Science*, 21 (7): 417-423, November 2008.

10 "Storage of 'Laetitia' Plums Under Modified Atmosphere," Steffens, CA; do Amarante, CVT; Alves, ED; Tanaka, H; Brackmann, A; Both, V, *Ciencia Rural*, 39 (9): 2439-2444, 2009.

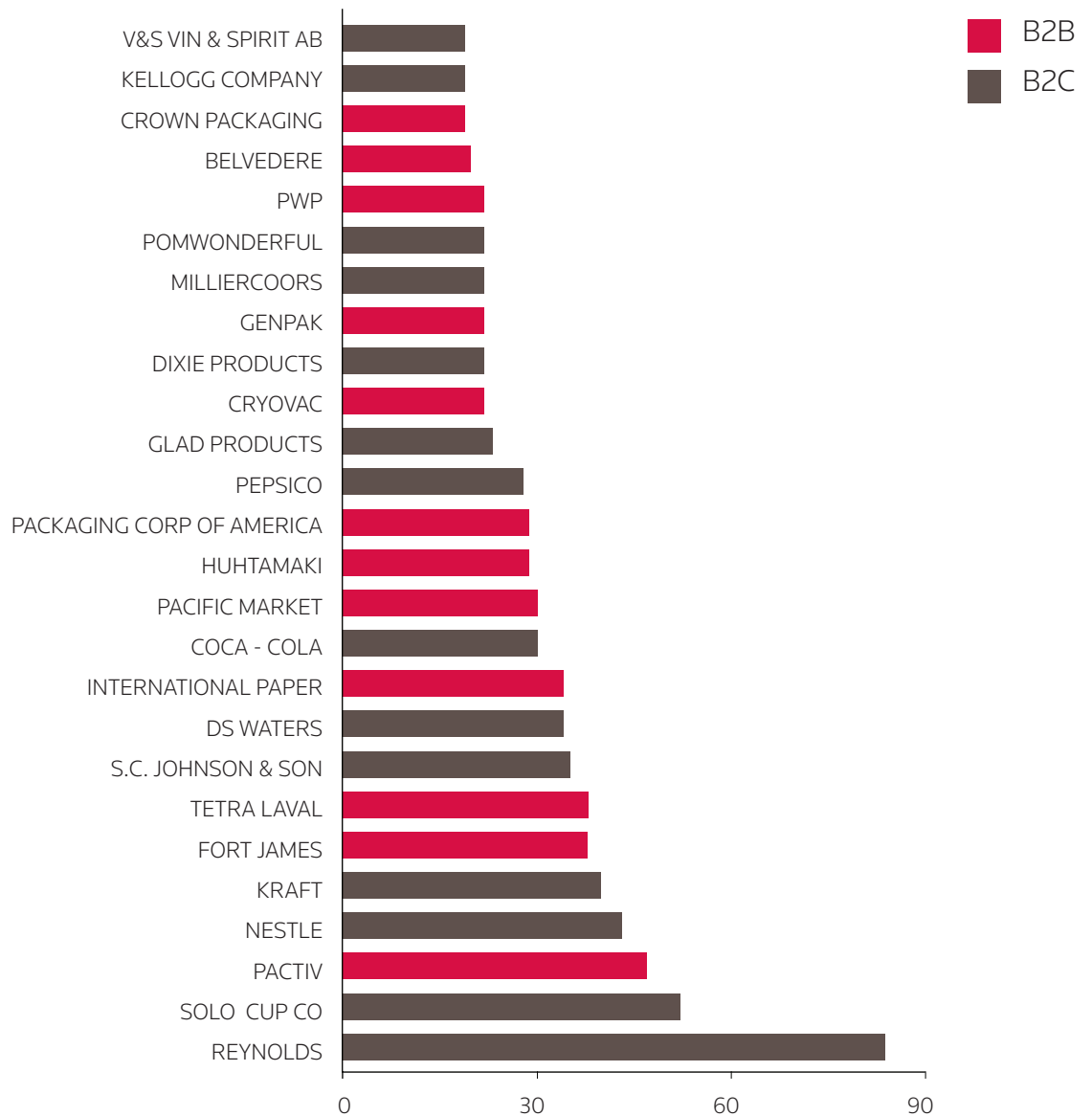
PACKAGING LANDSCAPE: Trademarks

Trademarks are the foundation for branding. The importance of a product's brand in the food and beverage industry cannot be underestimated. The brand is a way for companies to communicate value to customers, and is crucial to maintaining

market share in a very competitive environment. In our global sample of packaging-related trademarks, B2C companies exceed B2B companies in their ownership of marks, as shown in Figure 11.

TOP OWNERS OF PACKAGING TRADEMARKS

FIGURE 11



Trademark data includes a description of the Goods and Services that will bear the protected mark. The ThemeScape map in Figure 12 shows the types of goods and services protected by the marks that were analyzed. The dotted line drawn on the map demarcates the marks having more to do with food from those that are more directed toward packaging. Each colored dot highlights a mark that has a packaging term in its description.

Packaging marks tend to communicate information about the packaging that may influence the consumer.

Some examples of such marks include:

- No Waste, More Taste™ - Boone Brewing Company, LLC
- Make Taste, Not Waste™ - PI-Design AG
- Zero Waste. More Taste.™ - Primo Water Corporation

There are many other examples that could be listed, related to food packaging and beyond. The key point is that the mark must reflect the distinctive character of the good or service and not be too generic or passively descriptive.

TRADEMARK LANDSCAPE OF PACKAGING “GOODS & SERVICES”

FIGURE 12



LITIGATION INVOLVING INTELLECTUAL PROPERTY RIGHTS

U.S. litigation volume is higher than in any other country and, in the field of food and beverage packaging, is tipped more toward the assertion of trademark rights than patent rights. The value of a brand is paramount in this field. Although the Coca-Cola bottle undoubtedly has functional aspects, the iconic contour shape of the bottle is a fundamental part of the estimated \$70 billion value of the Coca-Cola brand.

The litigation count in Figure 13 is for the period 2005-2010. A 20-year review shows that the rate of filing in the 2000s was roughly twice that in the 1980s.

LITIGATION PRACTICE AREAS IN PACKAGING PATENTS AND TRADEMARKS

FIGURE 13

Patent Litigation Practice Areas - Food Industry Select	Occurrences
Intellectual Property - Patents > Federal NOS: Property Rights: Patents	293
Intellectual Property - Patents > Drawings and Specifications	43
Intellectual Property - Patents > Claims	42
Intellectual Property - Patents > Letters Patents	34
Intellectual Property - Generally > Infringement > Patents	28
Intellectual Property - Generally > Licenses > Patents	27
Trademark Litigation Practice Area - Food Industry Select	Occurrences
Intellectual Property - Trademarks > Federal NOS: Property Rights: Trademarks	837
Intellectual Property - Generally > Infringement > Trademark...	106
Intellectual Property - Trademarks > Confusion	95
Intellectual Property - Trademarks > Advertising	21
Intellectual Property - Trademarks > Actions and Proceedings	19
Intellectual Property - Trademarks > Marks and Names Protectable	17
Intellectual Property - Generally > Trade Dress	16
Intellectual Property - Trademarks > Registration	16

Some recent notable examples of litigation illustrate how important brands are to a company's business and the extent to which they will go to protect it:

Kraft Foods vs Interamerican Foods¹¹

Kraft Foods Inc., the largest U.S. foodmaker, has sued Interamerican Foods Corp. for their sale of chocolate chip cookies whose packaging allegedly infringes the packaging of Chips Ahoy! cookies produced by Kraft's Nabisco unit. The allegedly infringing package is said to use "virtually the same blue color" as the Chips Ahoy! package, and to reproduce many of the design features of the Nabisco product.

Hershey vs Williams-Sonoma¹²

According to Hershey (Hershey Co. v. Williams-Sonoma Inc.), Williams-Sonoma Inc. started to market a brownie pan made in a style that "embodies and mimics" the Hershey bar design. The suit says that the Hershey bar design is more than just a rectangle. It is "a chocolate bar that consists of, inter alia, a rectangle containing 12 equally sized rectangular panels arranged in a 4x3 format, with each panel having its own raised borders." Hershey claims that the Williams-Sonoma brownie pan "unlawfully trades on the goodwill and reputation Hershey has established through its use and promotion of that product configuration trademark."

¹¹ "Kraft Sues Over Cookie Packaging," Daily Herald (Arlington Heights, IL), April 16, 2010.

¹² "Hershey Seeks Injunction to Block Chocolate Bar-Shaped Brownie Pan," Legal Intelligencer, Volume 241; Issue 95, May 18, 2010.

THE GREEN MOVEMENT AND PACKAGING

There is a movement toward green or eco-friendly labeling, and a proliferation of symbols that seem to certify that packaging is “green,” but little consumer guidance is available to rationalize the diversity of marks and confusing labeling. Even the U.S. Federal Trade Commission Guidelines for packaging deal mostly with recyclability issues, and they specifically state that the agency has insufficient information to provide guidance on sustainable packaging.¹³

Independent testing designed to verify the labeling claims is not readily available, nor is the type of evidence for verification fully defined at this time. There is no universally recognized method to establish how environmentally friendly a package actually is. Despite donning an array of symbols, squiggles and numbers, it is not possible for most consumers to determine the earth-friendliness of the package overall. This is an important missing link in the evolution of this industry and an area that is likely to get more attention as the industry evolves.

In many regions, there are movements to address major public health problems such as obesity and heart disease. In the United States, this is being met by a call to put more informative labels regarding food content on packages, allowing consumers to make healthier choices. The First Lady of the United States, Michelle Obama, has challenged food manufacturers to participate in this effort. A parallel movement is needed for green packaging, to help consumers around the world make more educated choices about the content and containers for their food.

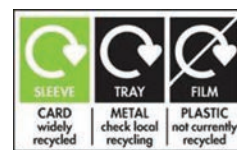
The universal symbol for recyclability, shown here, is one result of the effort to create better labeling



for recyclables. Packages that are recyclable are also frequently marked based on official composition standards that allow consumers to sort waste. But, this symbol still does

not certify that the container is actually earth friendly.

Another such label, specific to the recyclability of packaging, is the “OPRL: On-Pack Recycling Label” which operates in the United Kingdom



to provide “a standard consumer recycling label, that is simple and consistent and provides sufficient information

to make it easy for consumers to recycle more packaging, more often.” (<http://www.ecolabelindex.com/ecolabel/on-pack-recycling-label-oprl>).

As in the case of recycling, the need is for simple, clear and consistent guidelines on the eco-friendliness of the packaging.

Big Room Inc., in conjunction with the World Resources Institute, maintains a database of global eco-labels to aid in understanding the new genre of symbols appearing on packages. Their report, the Ecolabel Index, tracks 373 ecolabels in 214 countries and 25 industries.

¹³ <http://www.ftc.gov/bcp/grnrule/guides980427.htm#260.5>.

The U.S. Sustainable Packaging Coalition (SPC) (<http://www.sustainablepackaging.org>) is developing metrics that will be useful in evaluating whether “green” packaging lives up to its claims, and helping packaging companies design packages more thoughtfully.

Several industry groups are working to repair the confusion in green packaging labeling. One is The Consumer Goods Forum which has a project on sustainability in packaging called the Global Packaging Project (GPP), and is now working on multiple test projects to support the effort. The GPP includes members from Tetra Pak, Tesco, Crown Europe, Owens-Illinois and Sealed Air from the packaging sector, and Wal-Mart, Kraft, Nestle, Coca-Cola and Unilever from the retail and food industries. GPP is also trying to take European developments in this area into account by working with guidelines developed by the European Organization for Packaging and the Environment (EUROPEN).

Jane Bickerstaffe of INCPEN put an interesting perspective on green packaging when she said, “It has confused people by implying that there is such a thing as ‘green packaging,’ whereas all packaging is ‘green’ provided it is used to protect more resources than it uses and that it ensures

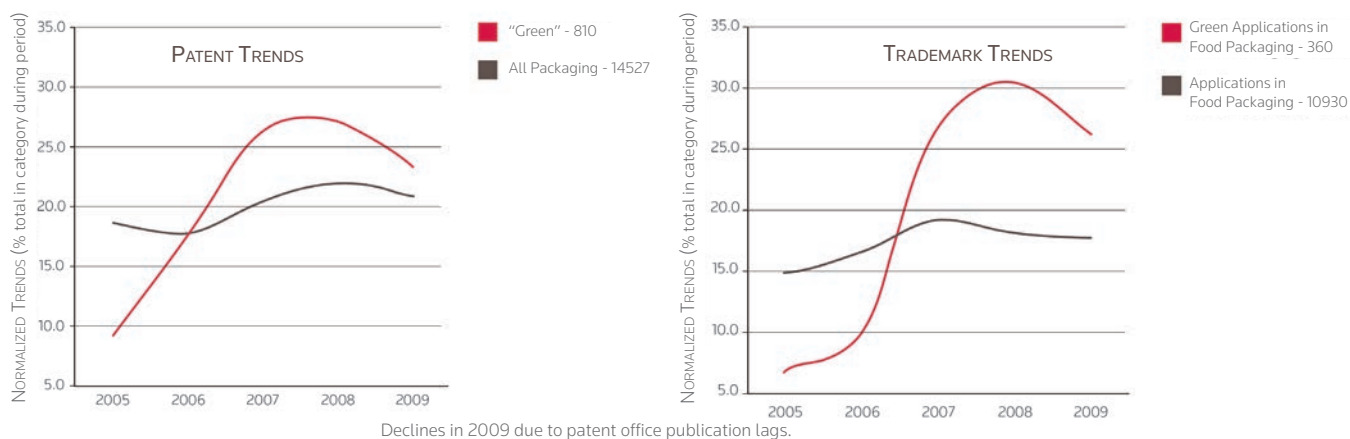
food does not go to waste. In any case, proper sustainability is a balance between using a sensible amount of materials/energy/water to deliver foods from point of production to point of consumption, delivering food in wholesome condition and at a cost that is sensible.”

In support of Bickerstaffe’s comments, we found it was virtually impossible to identify “green” packaging patents from among the rest, because there is no bright line that separates them. To assemble a category of green patents, we relied on mention of biodegradability, recycling, barrier films and modified atmosphere, but this method arbitrarily excludes thousands of patents that reduce the waste in the food chain. But as Bickerstaffe suggests, nearly every invention on packaging contributes something to improved shelf-life, reduced waste or improved food usage. Figure 14 does show that the patents that are explicit about environmental friendliness are on a faster upward slope than packaging patents in general.

Trademarking (as identified by terms like “eco-” or “enviro-” or “clean”) is also on an upward trend to take advantage of consumer desire to be environmentally responsible. Note that declines in these charts in 2009 are due to patent office publication lags.

TRENDS OF “GREEN” PACKAGING IN PATENTS AND TRADEMARKS

FIGURE 14



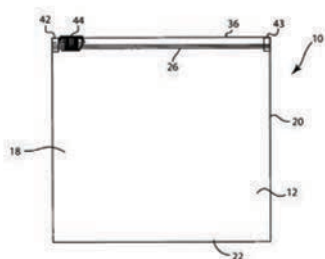
OTHER ISSUES AND TRENDS

FOOD SAFETY

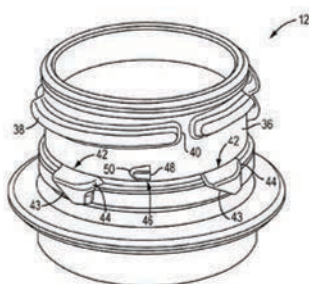
One of the most pressing issues facing the food packaging industry today is safety.

The packaging industry has responded to food-safety concerns with innovations such as:

- Tamper-evident packaging
- Sensors for maintenance of the cold chain
- Aseptic filling mechanisms for low acid foods
- Ultra-high pressure packaging



Innovations in food safety are certain to continue evolving over time as food and packaging manufacturers respond to environmental, political and other threats. One can get an idea of how the industry is responding by looking at published patent applications to see what is on the horizon, for example, a January 2011 patent application for a tamper-evident beverage seal in European application number EP2268554A2 (shown below).



"First and foremost, supply chains must be safe and secure," says Mr. Kozarsky, CEO Technical Help in Engineering and Marketing (T.H.E.M.). *"A single incidence of product tampering is capable of bringing down an entire brand in a matter of hours. As tempting as it may be to source ingredients at the lowest possible cost, overseas or otherwise, food packagers must remain vigilant when it comes to product quality on a consistent basis."*

HEALTH CONCERNS: OBESITY, NUTRITION AND THE AGING

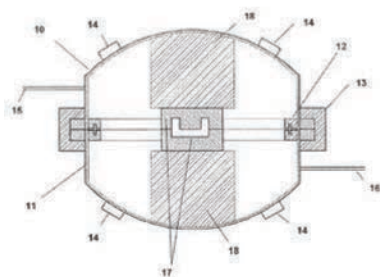
Health concerns on packaging arise not only from the need to provide a sound diet by preserving nutritional value of the food and preventing spoilage, but also from concerns that packaging materials may cause direct harm if they are ingested.

Jane Bickerstaffe commented that in the area of design, the use of single portions and ready-made foods is important *"so that in an aging population people can maintain their independence as long as possible."*

Innovations in packaging related to consumer health concerns include such things as:

- Prevention of migration of contaminants into food using coatings
- Use of biopolymers to create safer and more degradable packaging
- Single-serve packages
- Modified atmosphere packaging to preserve nutritional quality

Innovation in these areas is less prevalent than in some of the other categories as the current demand for such products is not as high as it is for others. That, in conjunction with higher production costs, reserves health-related innovations to fewer companies. That said, the companies who are innovating here are on the cutting edge of the industry and will likely be viewed as pioneers in the field in years to come. One such company is NOVAMONT SPA, which has invented a biodegradable foam product that claims to be acceptable for microwave cooking, as seen in the following patent drawing (US20100119801A1).

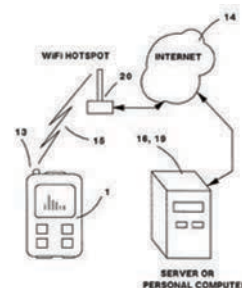


INTERACTIVE PACKAGING

The future of food packaging lies in interactive technology. Innovations in this area comprise inventions such as:

- RFID technology used to track food from source to destination
- Expanded labeling and preparation information provided via the Internet

This technology is already starting to appear in the marketplace in products like the “Electronic nutrition journal system” (US7837111B2).



It is exciting to think of the possibilities in the future of food packaging, when you marry the evolution of food production itself with advancements in packaging technology.

Futurist Anne Lise Kjaer expects we will see more interactive packaging.

“The future will see touch sensitive and responsive packaging – today we call it RFID-enabled packaging,” says Ms. Kjaer. “With cloud culture now a reality, you simply scan the packaging with your mobile phone and in no time collect everything you could possibly want to know about the product from the cloud.”



“Proper sustainability is a balance between using a sensible amount of materials/energy/water to deliver foods from point of production to point of consumption, delivering food in a wholesome condition and at a cost that is sensible.”

*-Jane Bickerstaffe
Director
Industry Council for Packaging and the Environment*

CONCLUSION

Intellectual property offers powerful rights to companies, allowing them to turn their investments in innovation into competitive advantage and succeed in their markets. Innovation in packaging is protected using various forms of IP, including invention patents, design patents and trademarks. In addition, scholarly publications often are used to establish priority in innovation. This report analyzes the use of different forms of intellectual property by the companies that either make packaging or use it in food and beverage production.

The suppliers of packaging (B2B companies that sell to food and beverage producers) are responsible for a large share of the R&D on packaging materials and methods. This R&D contributes to the improvement of the food and beverage supply, and the resulting inventions are protected primarily through patents that may be either invention patents or design patents.

In contrast, the producers of packaged food and beverages (B2C companies that sell directly to consumers) do file patents, but they may focus more on design patents than invention patents. Their strongest emphasis is reserved for trademarks that support their brand identity, and they are more likely to litigate in defense of trademarks than patents.

The academic and government entities active in packaging research are focused on monitoring and safety, and are also strongly interested in nanomaterials for packaging.

A revolution is underway in food packaging to reduce the quantity and environmental impact of packaging materials. Kenco recently announced the launch of their Eco refill packs with 97% less packaging. Patrons of Quiznos, a Denver-based (USA) sandwich chain, will soon be “eating salads out of bowls made from sugarcane pulp and dabbing their mouths with napkins made from recycled materials”.¹⁴ With his patent protection, one entrepreneur is seeking to transform the milk bottling industry with his biodegradable paper milk bottle that can be made of recycled materials while providing a food-safe environment.¹⁵

Nevertheless, labeling that identifies truly green packaging by a set of common standards is still not available. There is a need for shared action to fill this void and set guidelines defining what it means for a package to be environmentally friendly, and then finding a way to verify when packaging actually meets those guidelines and when it is misleading to consumers.

As we have seen, much of the recent technical innovation in packaging is oriented toward improving barrier properties of packaging material to prolong the shelf life of fresh produce and reduce the weight and amount of packaging materials through the use of nano-materials. These developments are driven by consumer concerns about the impact of spoiled and wasted produce and concerns about excess packaging materials, which contribute to the already large problem of scarce landfill resources and a degradation of the environment. The packaging

¹⁴ “Quiznos Embraces Green Packaging,” Julie Jargon, Wall Street Journal, February 23, 2010.

¹⁵ Thomson Innovation® application number WO2007066090 filed in 13 jurisdictions including major territories like China, Korea and Japan; described in “The Milk Bottle That is Made from Paper,” Kasmira Jefford, The Sunday Times, July 5, 2009.

industry can help feed an expanding population and also reduce the carbon footprint through innovations in materials and design.

The future of packaging innovation involves improving the health of consumers and of our planet through the integration of accepted technological advancements and the use of “friendly” materials. A cost/benefit analysis will, however, determine how quickly and ubiquitously such initiatives are accepted. Given global economic conditions, consumers may not yet be willing to pay for RFID technology that, as an example, tracks food purchases and package/transit time from farm to shelf while simultaneously rating the eco-friendliness of the packaging.

Convenience in packaging provides many benefits for consumers, and may reduce food wastage. Surely with all the innovations arising in the packaging industry, convenience need not stand in the way of conscience, and it will surely be possible to deliver packaging improvements that contribute both to convenience and to conscientious protection of the environment. With the addition of clear and consistent standards and methods to test a package against those standards, the industry may respond by satisfying both needs, rather than making it an either/or situation.



REUTERS/Vivek Prakash

RESEARCH TOOLS

Most of the research for this report was conducted using Thomson Innovation[®], the world’s most comprehensive IP research and analysis platform. This robust platform also incorporates the Derwent World Patents Index[®] (DWPISM) database, which contains over 20 million unique inventions covering more than 42.5 million patent documents. Additional analysis work was done using Thomson Data Analyzer[™], the IP industry’s leading data analysis solution that transforms large amounts of IP data into actionable intelligence.

Trademark research was conducted using SAEGIS[™], the most advanced global online trademark screening and research solution.

Litigation information was gathered using IP Monitor, the Thomson Reuters Westlaw legal research and information services platform.

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