

FRITO LAY SUNCHIPS-PACKAGING ANALYSIS

[ANALISIS KEMASAN SUNCHIPS FRITO LAY]

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ABSTRACT

Frito-Lay SunChips merupakan produk keripik kentang premium ditargetkan untuk pasar orang muda yang menyadari kesehatan. Produk tersebut memakai kemasan film plastik berlapis-lapis yang dirancang untuk memberikan semua sifat fungsional yang diharapkan seperti perlindungan dari kerusakan fisik, isolasi dari lingkungan luar, memfasilitasi pengiriman, penanganan dalam pengaturan ritel. Selain itu, paket tersebut dirancang untuk menarik target pasar melalui penggunaan beberapa pesan untuk menunjukkan relevansi produk kepada kaum muda yang menyadari kesehatan dan ramah lingkungan.

Kata kunci : *Frito-Lay SunChips, kemasan film, VFFS, gas nitrogen, ramah lingkungan*

INTRODUCTION

SunChips are a family of snack chips manufactured and sold by Frito Lay North America, Inc. that is a division of PepsiCo. The SunChips line consist of six flavors (Original, Harvest Cheddar, Garden Salsa, French Onion, Creamy Roasted Garlic, and Parmesan & Herb) of multigrain snack chips (“SunChips.com,” 2012).

The chips are packaged in a nitrogen flushed multi-layer laminated flexible film bag to preserve the freshness and to protect the relatively fragile chips during distribution, storage and retailing. An outside contractor or contractors, the name of which Frito-Lay will not divulge manufactures the film used to produce the bag.

Frito-Lays SunChips are packaged in a matte finished bag printed with muted colors to differentiate the product from other glossy and flashy packages. The package has a smooth, almost soft, feel that gives an impression of quality. The primary color, blue for the original flavor, has a black grid pattern to give the impression of a textured fabric or other natural material. The graphics are simple compared to other products with the main display panel on

the front of the package displaying the SunChips logo, the flavor, and a picture of the chips and cheese or vegetables depending on the flavor. (Figure 1-A) The back of bag contains a very large nutrition and ingredient panel taking up the majority of the left side of the bag (the nutrition and ingredient label is required by law under FDA regulation 21 CFR 101.xxx) and the SunChips logo and health claims dominating the right side. (Figure 1-B) At the lower left side is the UPC bar code which when scanned with a smart phone provides additional information about the nutritional qualities of the product. Furthermore, along the bottom are multi-colored dots used as print registration marks during the package printing process. (Figure 1-B) SunChips are displayed along with other Frito-Lay products on the snack food aisle of the supermarket.

Market Positioning

Frito-Lays SunChips are positioned as a healthy and environmentally sensitive snack food targeted at consumers who are aware of and concerned about the health impacts of the foods they consume. The front of the package contains four references to the healthy attributes of the product. (Figure 1-A, highlighted in red.) On the left there is an official looking stamp graphic highlighting the all-natural ingredients,

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below that a picture of a cereal grain with the words “18g of whole grain goodness”, and along the bottom left in all capital letters the words “MULTIGRAIN SNACKS”. In the center of the package under the flavor it states “Great Multigrain Taste”. Also on the front of the

package (Figure 1-A, highlighted in yellow) is the Triangle K kosher symbol (“Triangle K,” 2013) indicating that the product ingredients and the manufacturing facility have passed inspection by an orthodox Rabbi and are allowable for consumption by orthodox Jewish people.



Figure 1-A and B. SunChips package front and back. Photographed by the authors April 2013

The back of the package (Figure 1-B, highlighted in red) contains an additional three references to the healthy qualities of the product. Just above the very large nutrition label, which shows great confidence in the products nutritional qualities, is the claim the product contains “30% less fat than regular potato chips”. On the right side under the SunChips logo it states “Naturally Delicious” and text emphasizing the whole grain content, which is the same text available when scanning the UPC bar code (Figure 2). Finally there is a stylized box with a checklist of the all-natural ingredients.

Additional statements and claims are made about the product on the SunChips web site. These claims include a statement that information from the FDA as to how the consumption of diets rich in whole grains and low in saturated fats may help reduce the risk for heart attack. Additionally it is claimed that SunChips have less sodium than some microwave popcorn. The popcorn used for comparison must be buttered and salted as popcorn has zero sodium (“SunChips.com,” 2012).

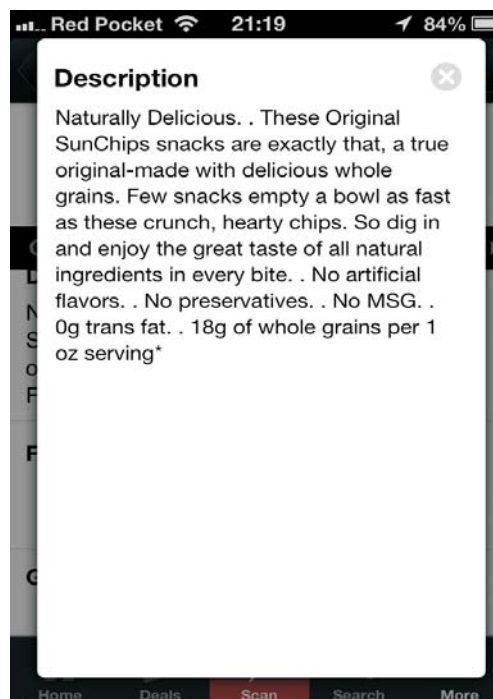


Figure 2 – i Phone screen capture after scanning the SunChips UPC code. Taken April 2013.

Nutritional Claims

Although this paper is concerned with the product-package combination, given the extensive health claims on the package it is helpful to do a superficial examination of these claims as compared to other products. SunChips original flavor contains 18g of whole grains and it is noted that the FDA recommends at least 48g/d. (“SunChips.com,” 2012) Whole grains are correlated with dietary fiber, but taken alone, the amount of whole grains used says very little about the *healthiness* of the food product. Looking at the total fat content, saturated fat,

sodium and the ratio of total carbohydrates to dietary fiber will suit our purpose. Table 1 compares the information per 100g of product. As can be seen the claims made on the package are for the most part accurate as compared to other potato chips targeted at a similar demographic (Lays Classic Potato Chips are included as a reference or normal product). Most importantly, the ratio of total carbohydrates to dietary fiber is 6.0. A value of less than 10 is considered good and is typical of whole grain products. (Murphy, 2001) notice that the Pringles multigrain product has a ratio of 16.

Table 1. Comparative Nutrition Data

	Lays Classic Potato Chips	SunChips Original Flavor	Baked Lays Original Potato Crisps	Kettle Brand Organic Potato Chips	Pringles Multigrain Truly Original
Total Fat (g/100g)	35.71	21.43	7.14	32.14	28.57
Saturated Fat (g/100g)	5.36	3.57	0.00	3.57	7.14
Sodium (mg/100g)	607.14	428.57	482.14	410.71	535.71
Ratio of total carbohydrates to dietary fiber (total carbs/dietary fiber in g)	15.00	6.00	11.50	16.00	16.00

Note: Data for each product was obtained from the manufactures respective web sites. (“Frito Lay,” 2013) (“SunChips.com,” 2012) (“Frito Lay,” 2013) (“Kettle Chips,” 2013) (“Pringles,” 2013)

Green Credentials

Being perceived as environmentally sensitive is an important part of any companies marketing strategy. Frito-Lays SunChips division is no exception. Modesto California and Casa Grande Arizona, two out of the eight factories that make SunChips, use solar energy to supplement the factories electric power requirements. This is prominently displayed on their website (“SunChips.com,” 2012) under the “Our Planet” tab. This information is also available by scanning the bar code on the back of the package with a smart phone. They also reuse their waste water and generate energy from a biomass boiler at these factories (Hartman, 2012). Beyond the savings in operating costs at these facilities these

efforts are representative of the demographic served by SunChips, namely younger socially and environmentally aware consumers.

On earth day 2009 Frito-Lays announced SunChips in 100% biodegradable bags, which was made available in December of the same year (Bregar, 2011). (Figure 3) This bag, which is made from PLA (Polylactic Acid made from corn starch), was heavily promoted by the company. Only a few months later sales of SunChips slumped as consumers complained that the bags were too noisy (Vranica, 2010). Additionally the biodegradability of the bag was called into question. It turned out that the bag would only decompose in a compost pile larger than 21ft³ which could generate the heat

necessary to break down the package(Beer, 2010). The bag was eventually taken off the market after a Facebook page and a YouTube channel (Kiefaber, 2010)complaining about noise levels as high as 85dB gained widespread attention from the mainstream media and replaced with the standard Frito-Lay two layer oriented polypropylene bag(Bregar, 2011). In

2011 a new biodegradable bag was announced that used a more flexible adhesive to bond the two layers of PLA film together, but was never brought to market(Borel, 2011). By 2012 all traces that a biodegradable package ever existed had been removed from the companies web sites and marketing materials.



Figure 3 – PLA SunChips Bag. (“Pop Sop.com,” 2010)

Package Details

The current SunChips bag is manufactured using a 5 layer laminate construction. The outer layer is Polyurethane(PU) followed by a Low Density Polyethylene (LDPE) print layer and then a Polypropylene (PP) moisture barrier layer and an aluminum foil layer. The inner most layer is PU. (Information provided by Frito-Lay in response to calling their customer service phone number.) As with most snack chips the bag is a

pillow package flushed with nitrogen to protect the chips from breakage and to create a low oxygen and low moisture atmosphere inside the package (Del Nobile, 2001).

Requirements

“Potato chip packaging is designed to keep the oxygen and water partial pressures as low as possible” (Del Nobile, 2001).The low oxygen level is to reduce the amount of lipid oxidation (rancidity) taking place on the surface

of the chips and the low moisture atmosphere is to reduce the amount of water absorbed by the chips (Lolos, Oreopoulou, and Tzia, 1999). Additionally the package provides the primary protection from crushing of the potato chips.

MAP

Nitrogen gas is commonly used in modified atmosphere packaging to replace the normal atmosphere. It is chemically inert in these applications, relatively inexpensive, and generally safe to handle. Flushing the package with nitrogen to displace the majority of the normal atmosphere can extend the shelf life of the potato chips to as much as 80 days when stored at 23°C (Paik, Shint, Kimt, and Choit, 1994).

Manufacturing

The package film is supplied to the SunChips factory on large rolls produced by a third party contractor. This film is produced by bonding the individual layers together using an adhesive to form the finished package material. The printing is done to the print layer prior to forming the final laminate. The film is delivered complete and ready to be formed into the bag. The Package is formed, filled with chips and sealed in a single process using a Vertical Form-Fill and Seal machine (Lingle, 2010). Each SunChips factory has 40 VFFS machines (Hartman, 2012).

The plastic film is pulled off of the roll and formed into a tube shape by an iron in the VFFS machine. The tube is heat sealed using a flat jaw and an overlap of approximately ½ inch. The bottom of the package is then formed by a heat seal using a length wise grooved heat seal jaw (De Oliveira and De Assis Fonseca Faria, 1996). The partially sealed tubes are then cut into individual bags and the potato chips placed in the bag by a series of “cups” that measure the exact weight of the chips placed in each bag (Cuneo, 2011). The bag is then flushed with nitrogen using a tube inserted into the open end of the bag, which displaces the majority of the normal atmosphere, and the bag is sealed with a lengthwise grooved heat seal jaw. In large facilities such as the Frito-Lays SunChips factories, nitrogen is stored as a compressed gas

in large bulk storage tanks (Attaran and Grijalva, 2001). The individual bags are then loaded into corrugated cardboard boxes by an automated product handling and loading robot (Hartman, 2012).

Seal Integrity

The integrity of the heat seal is important for a number of reasons. A stronger seal allows less overlap or seal width, which reduces the amount of packaging material, used for each bag. Also the seal must withstand the shaking and vibration normal in the handling of the package from manufacture to the consumer’s kitchen. Also, the seal must withstand any pressure changes due to altitude changes during distribution (“I’m the Guy Who Made Snack Bags So Impossible to Open,” n.d.). A number of factors influence the performance of the heat seal. Jaw profile has a substantial impact of the strength and the ease of opening of the package by the consumer. A length wise grooved heat seal jaw provides the best compromise of those competing requirements (De Oliveira and De Assis Fonseca Faria, 1996). Additionally the types of plastics used in the films have a great effect not only on the seal integrity but also on the speed at which the VFFS machine can be run. The longer it takes to produce a “good” seal, the slower the machine can operate (Clark and Wagner Jr., 2002). Also, any moisture present on the film during heat sealing can affect its strength (Mihindukulasuriya and Lim, 2012). The seals are tested using ASTM standard testing methods (ASTM International, 2013).

Tamper Evidence

Potato chip bags do not present an easy target for tampering. The laminated nature of the film makes it nearly impossible to open the bag and reseal it without damaging the film in ways that are readily seen. Also, the loss of pressure inside the bag is obvious when the consumer removes the bag from the supermarket shelf.

Advantages and Disadvantages

The advantages of the nitrogen flushed pillow package are many and the disadvantages

few. Only a few manufactures use alternative packages and then for marketing reasons more than performance issues. Advantages include low cost, high production throughput, reliability, and large surface area for graphics and so forth. The disadvantages are that the bags are not easily recyclable. The performance of the pillow package for chips has been established over many years and remains the top choice for snack chip manufactures.

Manufactures such as Pringles use a cardboard tube for their products. This does make them stand out from the other products and makes stacking them on supermarket shelves easier.

Secondary Packaging

SunChips are packaged as described above and then placed in corrugated cardboard boxes. These boxes are then stacked on a pallet and shrink wrapped for stability during handling and distribution. Frito-Lay attempts to reuse the cardboard boxes when possible (Hartman, 2012).

Distribution and Storage

The bags are placed into the secondary packaging by automated robots and then stacked onto pallets for distribution and storage. There are no major issues with the distribution and handling of potato chip packages other than not using hooks or other such means to handle the boxes, as that would puncture the bags.

Safety

Nitrogen gas is generally considered safe in most open environments. It is considered a simple suffocate in enclosed spaces. OSHA has a maze of regulations that control the safe handling and use of nitrogen gas and the safety procedures for groceries in a warehouse environment (OSHA 3220-10N 2004). Simply put, handling potato chips is much safer than heavy products such as canned goods. A box of potato chips is not going to kill a worker if it falls on their head.

Cost

Frito-Lay has not disclosed the sources of their plastic film to the authors making it

difficult to gauge the relative cost of the material. Generally the cost/performance ratio of the nitrogen pillow package and the associated machinery has been worked out over the decades it has been in use. One factor that might change the cost calculus in the future would be more stringent environmental regulations aimed at controlling the amount of plastic that goes into the waste stream.

Shelf-Life

The shelf-life of nitrogen flushed pillow packaged chips such as SunChips is determined by the amount of oxygen and moisture in the headspace of the package. The VFFS and nitrogen flushing manufacturing process generally results in a shelf-life of 80 days (Del Nobile, 2001). The use of aluminum in the laminate provides a package that, when undamaged, is relatively impermeable to oxygen and water vapor (Lamberti and Escher, 2007).

Recycling

SunChip bags cannot be readily recycled at this time. Frito-Lay has a relationship with TerraCycle to up-cycle the used bags into other consumer goods such as hand bags ("TerraCycle.com," 2013).

Conclusions

The SunChips package is a combination of well proven technologies with a distinctive look that suits the target demographic. Recommendations for those looking at similar package development would be to continue the research into biodegradable package materials. The time will come when the amount of solid waste produced becomes an acute problem and regulations force the use of new technologies and materials.

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