New Material in Package Design

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Abstract. Materials selection is hugely important in packaging design. In some cases, the visual tone of a piece of packaging may derive from its use of a substrate like Polypropylene, which is typically seen as modern and contemporary. Alternatively, the visual tone may derive from the careful juxtaposition of different materials – some smooth, some textured. Everyday materials in unexpected context can provide a unique experience. Materials are most commonly paired with certain package types: Corrugated fiberboard boxes, glass bottles, and aluminum cans are classic examples. This is where the design mind can start reformulating to have corrugated plastic boxes, aluminum bottles, or even plastic cans.

Keywords: plastic, aluminum, package, boxes, bottles, cans

INTRODUCTION

New packaging use, most probably, less materials, but with optimized functions, friendly production processes, because of environment problems, especially in the E.U. countries, that demand that 50% of steel packaging be made of recyclable materials, 60% of glass and paper and 22% of plastic (Ulrich and Eppinger, 1995).

Glass and aluminum packaging are being used more frequently in Europe in the last few years, due to the pressures regarding environment and energy. According to the European Federation for Glass Containers (FEVE), in 2007, the quantity of glass packages has risen by 4%. This is due to the more frequent usage of glass in packing food products, wine and cosmetics, after using a lower cost plastic packaging. This occurs because Europeans are very conscious of non-environmental damaging materials, and glass is made in a 100% proportion of recyclable materials such as sand, sodium bicarbonate and calcarius.

MATERIALS AND METHODS

The Boisset Family Estates Winery admits that, with all their over one hundred history of French winery culture, they must think very careful of the impact over the environment and they have decided to change the original glass packaging to Tetra Pack paper that reduces the carbon imprint up to 10%.

4SIGHT Inc., the company that produces the design of new Pepsi Co. and Lipton Ice Tea bottles, announces that the new bottle will reduce up to 20% the use of plastic materials, without major and identity modifications to the original design. A team of researchers from Valencia Polytechnic University (VPU) has found the format to produce a biodegradable plastic using the skin of almenre; the material is non-toxic, and besides is bio degradable, being good for the creation of flexible pieces.

It looks like it is a material that can be used to replace wood in manufacturing toys and furniture accessories.
The researchers of Alcoi Polytechnic University have used extrusion techniques to obtain these very flexible pieces. The grinded almendra skin gives the final product a color and texture similar to the wood.

These processes are used in making toys and balloons, but also for furniture accessories and ornament pieces, as explains Prof. José Enrique Crespo.

In order to obtain this alternative material for wood, polyvinyl dust is mixed with a toxic and biodegradable plastic from which results a viscous paste, named Plastisol, and to which the almendre grinded skin is added, forming a mass that undertakes the extrusion process.

RESULTS AND DISCUSSION

Using almendra skin leads to an environment benefit, favors the recycling of these residues because it is a natural additive, it does not contaminate, quite on the contrary. Among the applications of this material, the toy sector leads, one of the motors of Alicante economy, the production of which is based on plasticized polyvinyl. The material, although used for toys, can also find use in the furniture and automobile sectors. In the case of furniture, it is used to obtain similar pieces but with a more attractive esthetic and a lower cost, and in the automobile industry it can be applied to producing auxiliary pieces and various components.

European countries that use glass more frequently are Portugal (18%) and Turkey (12%), the larger market being Germany, with 4 million tones of production, i.e. 20% of the total European Union market production (www.abc-pack.com). Regarding aluminum foil usage, the European Association for Aluminum Foils (EAFA) reports that ¾ of the aluminum foils are used in packaging. But the quantity used this year has dropped by 5%. But EAFA believes that aluminum will be used more frequently, as well as its recyclable attribute (www.abc-pack.com).

The 35 mm or video films will become efficient in the near future as well. There are a few companies, such as Siemens AG, in Germany, that, at present, create technology for electronic paper, to produce digital labels, and will enter the market as soon as the cost is acceptable. The technology now widely available is that of „liquid lens”, produced by Genie Technology that will make visible movements appear on or in plastic bottles. „GWrap” is also produced by the company, allowing for 3D presentations on the wrappings, using 3 mm film in the micro lens set. The company that has already used this technology is America’s Vacumet; they applied it on the beer can, which has become the most well sold package in the Dominican Republic. At the same time, Cold Activated Bottle has offered last year beer bottles that change their color.

Every year, in the aforementioned categories there are some permutations and variations. The variations offer details like plastic with a texture or sensitive to the heat, or anti sliding rubber or extra sticky rubber. Every detail offers another element to intensify the experience of the product or package. Next, we will try to learn of new materials.

a) KU-GREEN PACKAGING
Fiber made package that uses tapioca starch. This patented composition incorporates 90% cassava starch, 10% plant fiber and a small quantity of food additives. Because it is design temporary, it is an excellent option for single use food packaging, catered food, open-air food fairs or catering packaging.

b) NATURAL METABOLIX PLASTIC
Polihidroxialconat is the name of polymers produced of natural resources through a process of fermentation of sugars and natural oil. A possible replacement for many plastic
materials used in plastics modeling through injection. In other words, a more easily discarded packaging.

c) TREE BARK CLOTH
Flexible modeling surfaces made from tree bark. The material is transformed through mechanic modeling from Ugandan fichus, into a soft and flexible textile, with mechanic and abrasion resistance. A very beautiful material for decorating luxury products of different shapes.

d) CASCADE’S BIOXO
Components modeled from degradable polyester, conceived to decay in three years time, versus the hundred in which the traditional polyester usually decays. Spend some time on top of the garbage dump and think what it would have been like if we would have had this material 30 years ago. Possible uses: anything that has been wrapped in polyester in the past and anything that can be kept for three years.

e) COOLEY GROUP’S MEDGUARD
Very durable polyester, weaved or with felt, is an alternative to PVC that can be incinerated without toxic emissions. Useful for packages that you know will probably be incinerated or used for fuel.

f) D2W’S DEGRADABLE PLASTIC MATERIALS
Imagine a delayed degradation of the bag conceived for a bread factory. How about 18 months? The best part is that these plastic materials made of polyethylene and polypropylene do not need special conditions; just add air. The range of possible applications is infinite – limited only by our collective imagination.

g) TATE & LYLE AND PIONEER’S BIO PDO
Fossil fuels can renew; it takes 100 years to produce more. Corn based polymers have the advantage that they renew in a year. Bio PDO is a polymer that uses 40% less energy to be produced and reduces the greenhouse gas emissions by 20%. The applications are extensive, just like the number of packages that use plastic.

h) EARTHSHELL
Packages that offer food safety, laminated from biodegradable foam. Made of potato starch, calcium carbonate, corn and recycled fibers, warm punched. Immediate application: fast-food type food; later applications: many food categories.

i) CEREPLAST
This plastic material made of polyactic acid contains a variety of biodegradable ingredients that maintain the low cost and a high degree of versatility. At present, there are 10 formulae of optimized resins for injection modeling, blowing, thermoformation and extrusion. It is a marvelous material for single use packages and other packages that imply protection and responsibility towards the environment.

j) KARELINE’S (SWEEDEN)ABS/POM/PP
All modeling through injection resins that contain a vast quantity of natural fibers. Every one of them has unique properties and applications. For example, the polyester based composites have an excellent surface quality that confers an interesting personality to jewels, cosmetics or other beauty products.

k) GARDEN GREETINGS FROM BOTANICAL PAPERWORK
Do you want to plant your package in the mind and garden of the consumer? Botanical paperwork has paper products with embedded seeds. A series of products – and of course, child products – that take society into consideration would benefit from this absolutely environment friendly attribute.

l) INNOVIA FILMS

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Warm sealed and biodegradable, it looks like a tough association. Innovia Films has struck has hit the jackpot by using 95 – 100% of regenerated wood paste. Biodegradable and worthy of the compost lot in your back yard, this material is excellent for food, house objects and personal hygiene.

m) SHEEP POO PAPER FROM CREATIVE PAPER WALES
Not to be confused with elephant or reindeer fertilizer paper. This is Sheep Poo Paper (sheep excrement paper) from Wales, the Welsh being very skilled in sheep. The sheep excrement fiber, from sheep with a lot of fiber, is an extraordinary material for those with a sense of humor and woolen clothes.

n) TERRASKIN
This polymer film has the unique capacity to decompose in sand when exposed to sun heat. The material can be heated in the microwave, it is recyclable and approved by the FDA for fat or dry foods. Obvious applications: foods and articles of calcium carbonate of salt origins (www.materialconnexion.com).

Flexible plastics are another packaging material that is waiting to attack the European beverages market. Due to the fact that they are light and have a small volume of material, the beverages bags can attract the attention of the consumer worried about the environment and of the brander that is conscious of costs. More efficient form the point of view of space, they reduce transport and deposit costs, compared to rigid bottles. Maybe the most important constraint in the growth on the market is their misfit with large quantities of liquid. Very familiar as format for immediate consumption, the bags will have to convince the market that they offer a convenient alternative of resealable packages, that they are stable on the table or in the fridge. The Coca-Cola Company was awarded at the 22nd Annual Innovation in Packaging Award Ceremony. The company’s package took first place, from the over 160 contestants, for its spectacular innovation in packaging area.

Made out of over 30% plant based material, the PlantBottle is a step ahead to the Bottle of the Furtue. It is the first of its class – beverage package made of renewable resources, 100% recyclable, just the traditional PET. It can be recycled in the present commercial recycling structure.

CONCLUSIONS

Choosing materials is significant also in controlling how a consumer thinks about a product – the initial perception, as well as the more detailed evaluation. Perceptions can be manipulated with the help of a part of the wrapping and through the sensation that the wrapping gives of when touched. Most people instinctively associate some attribute – quality, elegance, youth, exclusivity and trend conformation – with certain aspects and sensations. The silky feel of a wrapping or the combining of different materials all form an impression on the product. In some cases, the visual specific of a wrapping can derivate from using a substrate such as polypropylene, typically considered as modern and contemporary. Alternatively, the specific feel can be given by the careful way in which different materials – fine or textured – are juxtaposed.

REFERENCES