

Running Head: Packaging and Labeling Materials

**Characterization of Food Packaging Materials and Labeling Application Methods:
A Case Study for a Harris Teeter Supermarket**

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Abstract

Packaging manufacturing uses a variety of materials and labeling methods to protect and promote a product. The purpose of this research study was to characterize the current state of consumer food packaging and labeling application methods in a typical supermarket that may assist in product development decisions. This involved categorizing the types of display package materials, label materials, and label application methods. In addition, the relationship of the display package material to the label material and label application methods was investigated. Learning more about the current divisions of packaging materials creates predictions for packaging trends and streamlines the product development process.

Keywords: packaging, labeling, materials, product development, case study, supermarket

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Introduction

Consumers are increasingly concerned about the products that they purchase. This concern will have an influence on development trends, including the design and production of labeled and packaged products. Therefore, research focusing on improving product development is a primary concern for research investigation in the packaging industry. This research study focused on display packaging materials, label materials, and label application methods. The study characterized trends in packaging materials and determined relationships between materials and labeling methods.

A variety of stakeholders are involved in the product development process. Therefore, how companies balance the expectations of their stakeholders with their product development process is what will determine how companies advance in the future. When the influences on packaging development are explored at the development stage, packages can be designed to meet specific economic, environmental, and aesthetic goals.

A major factor in the development process is creating a cost-effective product at a price point at which the customer agrees is in line with the value of the product. In order to create value, the product must have critical benefits that separate it from its competitors and make it worth the cost to the consumer (Kahn, 2005). The cost of a package is often dependent upon the materials, manufacturing processes, printing, and assembly process used to create the product. Development projects need to be priced competitively, provide good profit margins, and ample return on investment (Bruce & Biemans, 1995).

“Design for the environment is the systematic consideration of design performance with respect to environmental, health, safety, and sustainability objectives over the full product and process life cycle” (Fiksel, 2009, p. 6). Many companies are performing environmental analyses

on their products to determine the most environmentally friendly options. Trends for the industry show that consumers are becoming more environmentally conscious. To improve the sustainability of manufacturing practices, environmental impact studies are beneficial for analyzing production operations and establishing environmentally friendly development practices (Jedlicka, 2009).

The environmental impact of a product can be analyzed through a Life Cycle Analysis (LCA), which divides the components of a product life cycle into pre-production, production, distribution, use, and disposal (Vezzoli & Manzini, 2008). It is a comprehensive assessment of inputs and outputs for each of the areas of a product life cycle to evaluate how the components of a process affect the environment (Jedlicka, 2009). An LCA analyses can help determine what practices are best for the environment as a whole instead of utilizing a common, but perhaps less effective, method of process improvement. For example, research has shown that recycling is not always the most environmentally friendly option for some materials and processes (Azapagic, 1999). Therefore, an analysis of individual manufacturing selections is a necessity for a complete environmental review.

One of the main functions of a package is to promote the product within (Soroka, 2002). Product promotion is accomplished by using structural and graphic designs that get the attention of consumers. The design of a package is what attracts a consumer to a product and explains the contents (Giles, 2000). This can be achieved through color selection, text, shapes, textures, material, and an integration of the structure and graphics (Eldred, 2009). Many packages undergo evaluation by consumer focus groups to help with the selection of aesthetic design choices (Doyle, 1996). Labeling provides a way for companies to market their products while only

changing a small portion of the packaging. This allows for cost savings, flexible marketing programs, and additional product options (Giles, 2000).

Statement of the Problem

Products that are produced with optimized efficiency, consideration for environmental concerns, and attention-grabbing designs will be crucial to compete in the world marketplace of the future. Studying product development procedures provides recommendations for future packaging and labeling development decisions. The study provides a baseline characterization of food packaging in a typical supermarket. Learning the current division of materials and labeling methods used for packaging characterizes the current state of the industry and identifies areas where packaging improvements may be made. Investigating packaging and labeling provides insight into current material and label selections that can help to streamline future product development. Analyzed packaging trends identify relationships between material and design choices that can help packaging product developers make informed decisions when developing packaging.

Research Questions

- 1) What is the percentage of each type of display package material used for labeled products found in a typical supermarket?
- 2) What is the percentage of each type of label material used for labeled products found in a typical supermarket?
- 3) What is the percentage of each type of label application method used for labeled products found in a typical supermarket?

- 4) What is the corresponding relationship between display packaging material and labeling material?
- 5) What is the corresponding relationship between display packaging material and label application method?

Limitations of the Study

The study was a case study that was limited to labeled food packaging at a single supermarket location. Therefore, results were not wholly representative of the packaging industry due to differences in store inventory and store size. For the purpose of this study, a display package will refer to the package as presented to the consumer in the store, regardless of additional packaging contained inside.

Product types may vary regionally, which prevents the case study from drawing conclusions for other supermarkets and the industry as a whole. The case study took place at Harris Teeter located in Boone, NC. Harris Teeter is a supermarket chain made up of 192 retail stores that are located in the eastern United States (Harris Teeter, 2010). The observations were completed within a 30-day period to minimize product changeover and store reorganization. The sampled products were food products that have a label on the primary display packaging. If an item did not have a label, it was not analyzed and recorded.

Research Methods

Product information was collected by examining labeled products and documenting characteristics to place the products into defined categories. See appendix A for the division of categories. The study employed descriptive and ex post facto quantitative research methods to

analyze the packaging to determine display package material, label material, and labeling method.

Purposeful sampling was used to select the products that will be analyzed for the study. The sample consisted of all labeled food products at the case study location (Harris Teeter in Boone, NC). The packages were limited to only display packages with a label. This did not include packages with additional labeling inside the display package (ex. Beer bottles inside a paperboard case). In addition, labeled products did not include items that received a label when the customer requested the product (ex. Some deli and bakery items). Products that had a label, but no display packaging, were also not included in the study (ex. Non-packaged produce items). Additionally, data collection did not include endcap displays since those are repeated items for promotions.

Research was conducted as a quantitative study by analyzing all of the products that met the study qualifications. See Appendix A for the categories. Products were examined to determine display packaging material, label material, and labeling method. Display packaging material was determined by utilizing the recycling symbol on the package and through visual inspection. Label material and labeling method were determined based on visual and tactile inspection. The item information was recorded in-store and was then entered into Microsoft Excel to create a product database.

Primary package material, label material, and label application method were recorded, tabulated, and analyzed for frequency of use for each category. See Appendix A for categories. The selections of materials and labeling methods show the relationship between the various choices that are available when developing a package and the trends for each category.

Research Findings

At the Harris Teeter case study location, 6,976 labeled food products were analyzed for the study. The percentages of display package materials are displayed in Figure 1. The percentages of label materials are displayed in Figure 2. The percentages of label application methods are displayed in Figure 3.

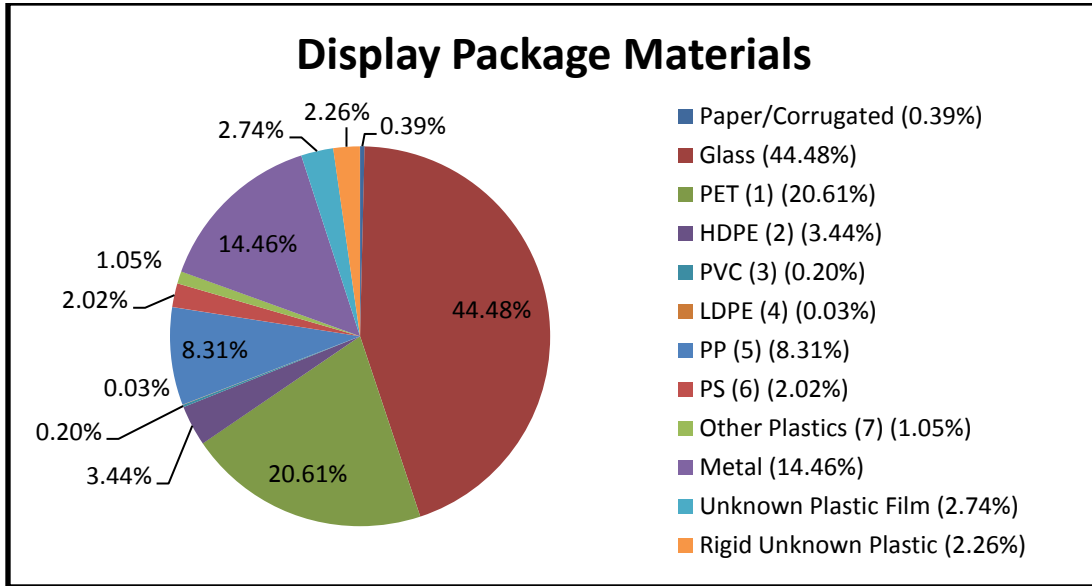


Figure 1. Percentages of display packaging materials for labeled food products at the Harris Teeter case study location.

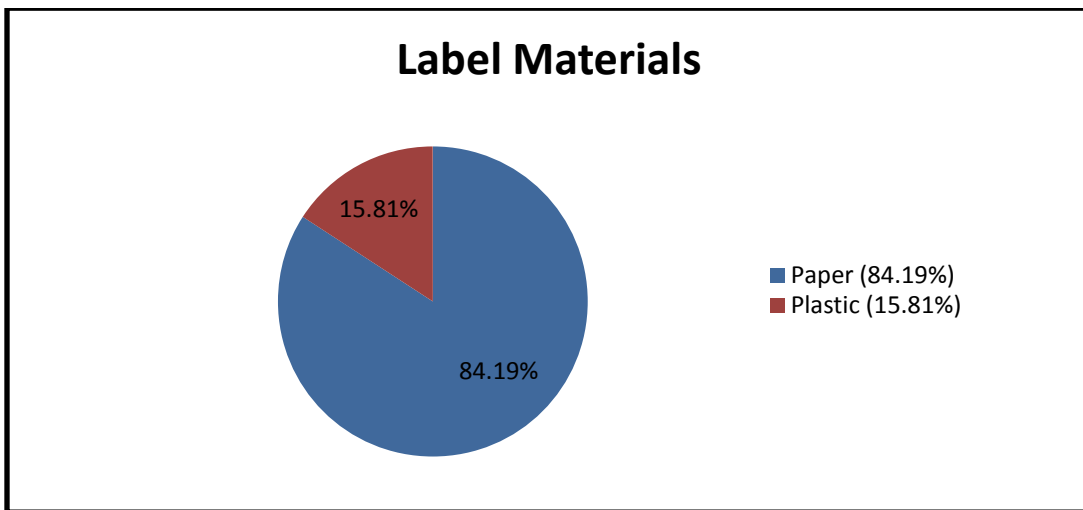


Figure 2. Percentages of label materials for labeled food products at the Harris Teeter case study location.

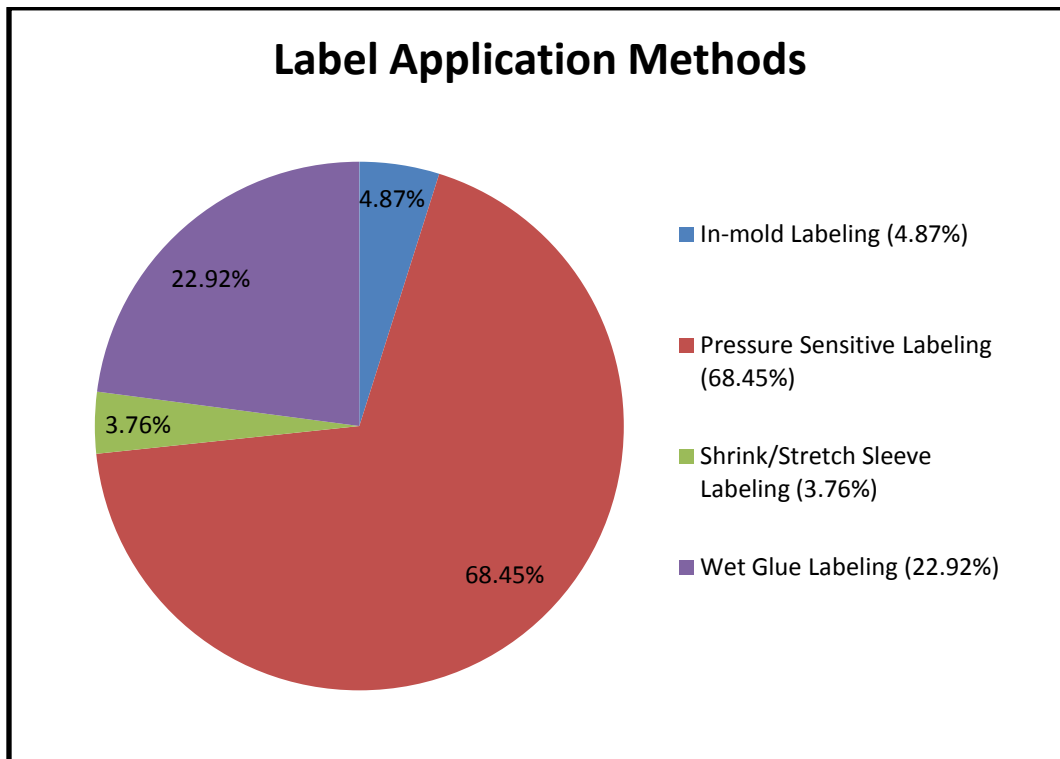


Figure 3. Percentages of label application methods for labeled food products at the Harris Teeter case study location.

To analyze the relationships between the results, the data was divided into the different categories of display package materials. Each category was then separated by label material and label application method. This analysis was performed in order to see the individual trends for each type of package material. Figure 4 shows the top five combinations of display packaging materials and label materials. Figure 4 shows the top five combinations of display packaging materials and label application methods.

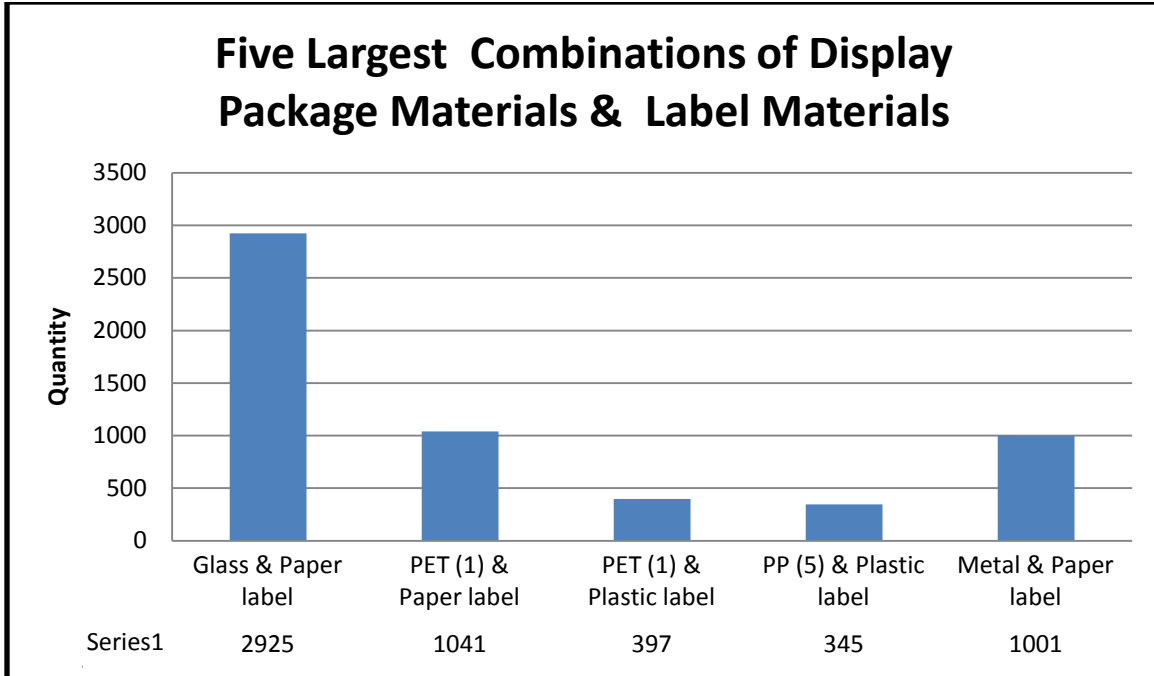


Figure 4. Five largest combinations of display package materials and label materials for labeled food products at the Harris Teeter case study location. The entire chart is available in Appendix B.

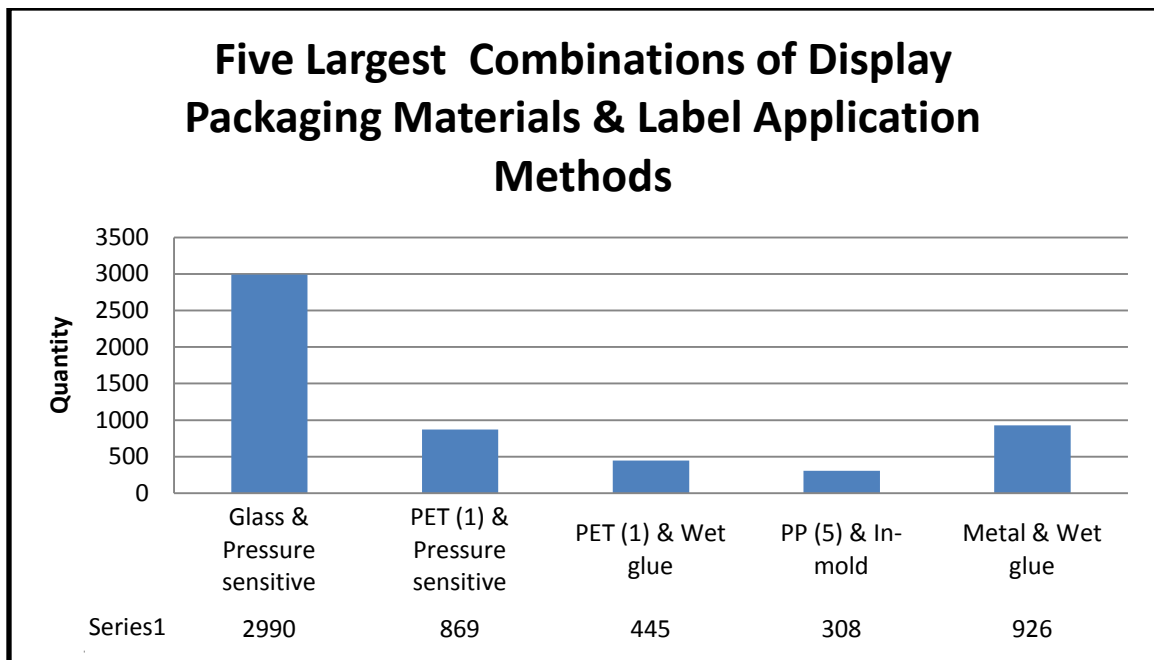


Figure 5. Five largest combinations of display package materials and label application methods for labeled food products at the Harris Teeter case study location. The entire chart is available in Appendix C.

Discussion

The results of the study show that there are definite trends in display package materials, label materials, and label application methods. For the primary display package material, glass had the largest percentage at 44.48% followed by PET with 20.61%. When developing products these would be the two material categories that would most likely be considered when there are no concerns about barrier properties. An interesting observation was that 2.26% rigid plastics had no visible recycling symbol, which is surprising that some companies would not put that information on their package to make their products seem more environmentally friendly. Additionally, the products that had less than 3% of the display packaging material distribution (see Figure 1) would likely benefit from reevaluating the package's material selection. While some selection may be based on barrier property needs, these products could be produced more economically or with other design options.

Paper labels were by far a greater percentage than plastic labels. Paper labels were 84.19% of labeled items compared to 15.81% for plastic labels. This is most likely due to the comparative cost between the two material selections. Paper labels are significantly cheaper than plastic labels, but plastic is used when the product needs to be seen clearly, to give the product a more high-end look, or for a specific method of label application (shrink/stretch sleeve or in-mold).

Label application methods were varied. Pressure sensitive labeling was the most prevalent at 68.45%. This is most likely due to the fact that it is relatively inexpensive, easy to apply, and works with multiple label materials, sizes, and shapes. The second highest labeling method was wet glue which is also an inexpensive process that works with many materials. It is often used for cans and bottles with smooth cylindrical surfaces. The shrink/stretch sleeve and

in-mold labeling application methods are used to add value to a product or to label a product with an unusual shape.

The label materials and display package materials led to a variety of combinations. The most popular selections were glass & paper, PET & paper, metal & paper, PET & plastic, and PP & plastic. This supports the trend identified previously, that glass and PET are the most popular materials and paper is the most popular label material. The metal packages have no use for plastic labels so most packages have a paper label. The PP packages were often used for in-mold labeling, which requires a plastic label.

The label application method was often dependent upon the display packaging material. For example, the majority of glass packaging used pressure sensitive labeling. This is most likely due to the need for the label to prevent it from slipping off the package, which could lead to dropping the package and breakage. The other popular combinations of display package materials and label application method were metal & wet glue, PET & pressure sensitive, PET & wet glue, and PP & in-mold. These trends support the previous results and show the most common selection.

Suggestions for Further Research

To further study packaging trends, the research could be expanded to include additional products and additional case study locations. Another extension of the research would involve interviewing packaging product developers about factors that affect product development and the rationale behind development decisions. This would provide correlative data to explain the identified trends in this study. Future research could also look at packaging comparisons within specific categories.

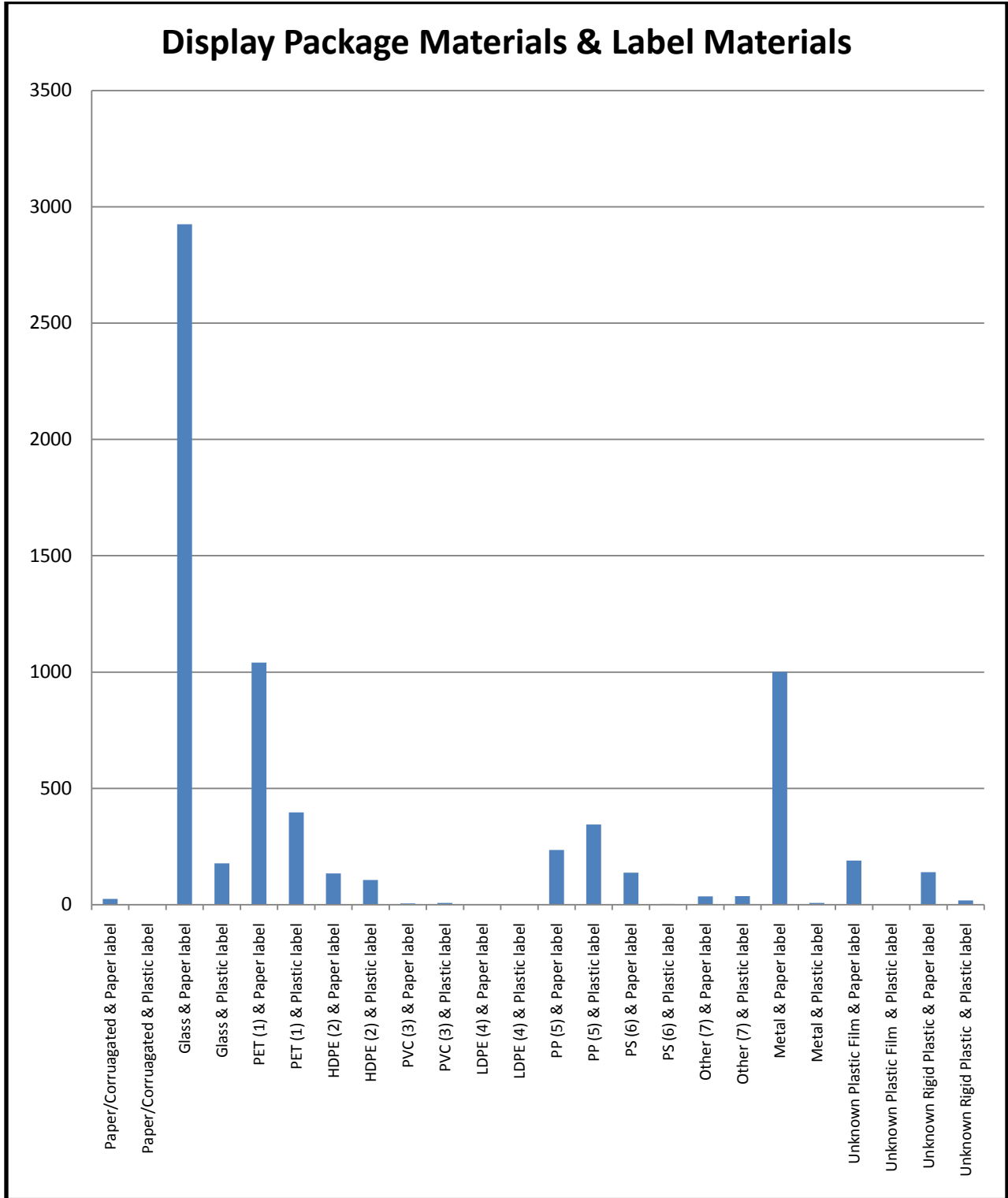
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Appendix A

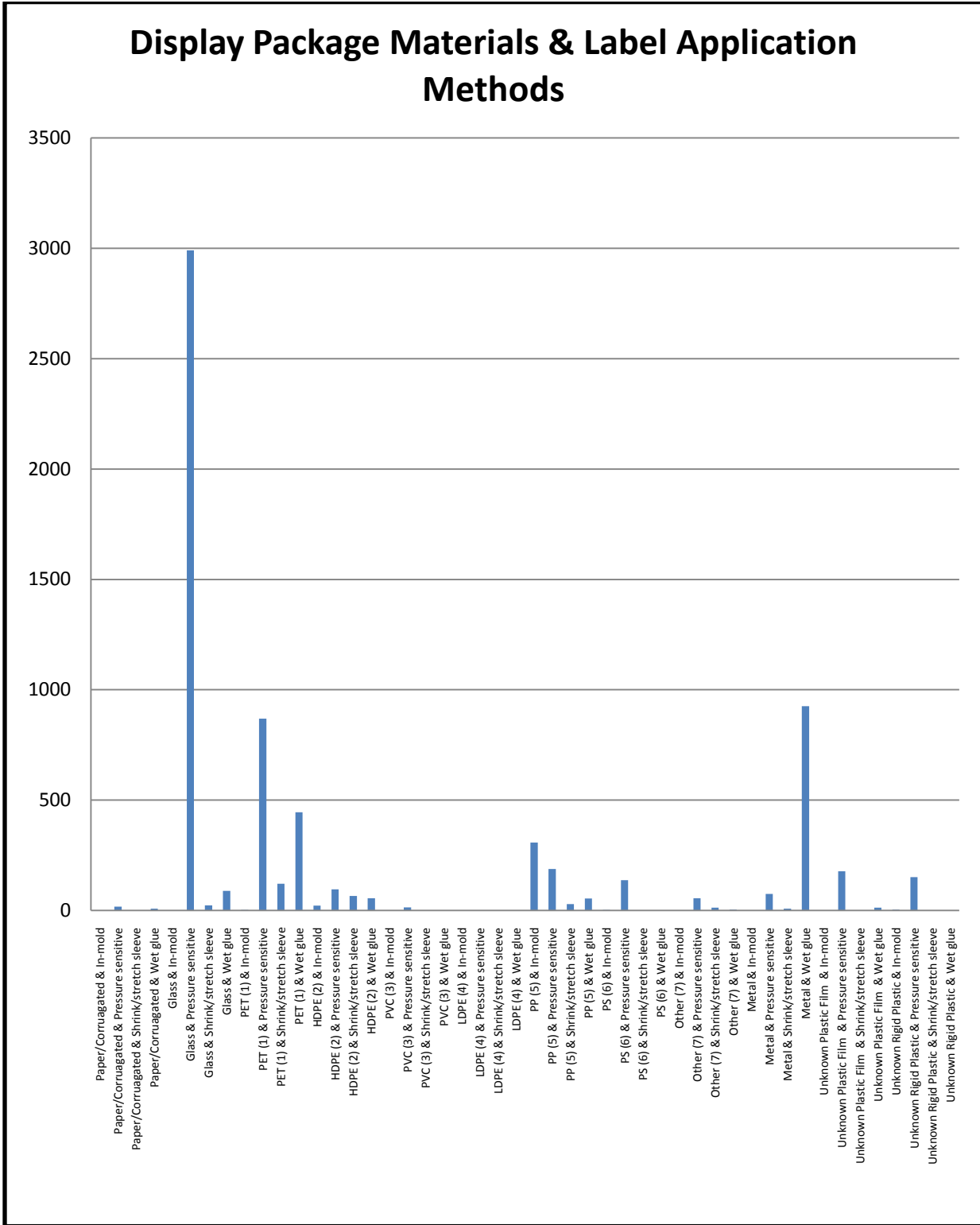
Display Package Material	Label Material	Labeling Method
Corrugated, Microflute, Paperboard	Paper	Wet Glue
Glass	Plastic	Pressure Sensitive
PET (1)		Shrink/Stretch Sleeve
HDPE (2)		In-mold
PVC (3)		
LDPE (4)		
PP (5)		
PS (6)		
Other (7)		
Rigid -Unknown Plastic		
Film -Unknown plastic		
Metal		

Appendix B



Combinations of display package materials and label materials for labeled food products at the Harris Teeter case study location.

Appendix C



Combinations of display package materials and label application methods for labeled food products at the Harris Teeter case study location.