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A comparison of material preferences by chocolatiers and consumers

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A Comparison of Material Preferences by Chocolatiers and Consumers

By

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College of Applied Science and Technology
Rochester Institute of Technology
Rochester, New York

CERTIFICATE OF APPROVAL

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M. S. DEGREE THESIS

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for the requirements for the
Master of Science Degree

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Dedication

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A COMPARISON OF MATERIAL PREFERENCES BY CHOCOLATIERS AND CONSUMERS

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Jillian L. Sinclair

Abstract

Premium solid and hollow chocolate theme-shaped figures are special to consumers' celebrations. Due to chocolates' high quality ingredients there was a focus on product preservation. Two packaging materials, aluminum foil wrap and clear cellophane bags were evaluated for maintaining product quality from the perspective of chocolatiers and consumers. Two different surveys were developed. One survey was mailed to a selection of chocolate manufacturers to gather information about chocolate production. The other survey, completed by volunteers, asked about their chocolate purchasing experiences. The conclusion showed that consumers favored one packaging material based on their purchasing experience while the chocolate manufacturers considered the other material as a better choice for product preservation.

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Introduction

Try imagining a person who does not enjoy the unique flavor of chocolate, one of the top selling confectionary products available year round. Since chocolate products vary in price, quality and in form (truffles, bars, and covered nuts/candies), seasonal, specialty chocolates, molded into either solid or hollow shapes for every theme, occasion or character (in the form of Christmas Santas, Easter eggs and rabbits, Valentine's hearts and fictional Halloween characters) are examples of chocolate novelties that are marketed for a limited time prior to and during each occasion. Consumers on the other hand may want something more eye-appealing, something that screams 'look at me, what a great gift I am'. Consumers like to include these kinds of chocolate products as gifts to family and friends, and as part of their celebratory occasions to be served to guests, or saved for self-indulgence. As a result, chocolate manufacturers would very much like to know what would be the best way to package and distribute these products in the most economical and profitable way.

Chocolate manufacturers pay attention to every detail in their chocolate making process. Chocolatiers make their chocolate with high-grade ingredients, providing rich flavor, and their production creativity is unlimited when they try to create a stunning shelf-presence with themed chocolate figures catering to festive occasions.

Chocolatiers need to comprehend the chocolate's sensitivity characteristics and attempt to preserve the products by reducing the probability of environmental interferences. The exposure to tampering and other dangers such as humidity, absorption and loss of moisture, fluctuation of temperature and inessential contaminants can lead to

deterioration of the chocolate's features as time progresses, producing a negative experience for the purchaser. Chocolates are produced in advance of the marketing efforts for each holiday. Once chocolate novelties depart from the manufacturing site, they require preservation and safety during distribution. The question for chocolatiers becomes what materials will best protect and most enhance the finest chocolates they can deliver to their consumers.

Because there are an infinite number of packaging materials for chocolate, the focus here will be limited to a comparison of the two of the most common materials used in packaging chocolates: aluminum foil wrap and clear cellophane bags. Each material will be evaluated in terms of performance in providing optimum product protection, optimum shelf life, and optimum appearance by both chocolatiers and consumers.

Literature Review

The sources gathered for the Literature Review section analyze the quality of packaging materials in greater detail. Additional publications from the internet and packaging magazines were used to support the focus of the study.

The Science of Chocolate

Chocolate is a complex solid material consisting of cocoa, sugar and fat (mainly cocoa butter and milk fat) and its properties transform into a liquid in the mouth during consumption. "Much of the taste and sensual pleasure in eating chocolate comes from its smooth flow in the mouth" (Beckett, 2002). An essential component of chocolate comes from the cacao beans. Chocolatiers are driven to purchase the best cacao beans available through careful research and precise selection. The cacao beans undergo on-farm

fermentation and once they are fermented, they are promptly packed and shipped for daily orders. This process requires additional time and effort for farmers in taking these extra critical steps in preserving the integrity of the most vital high-quality ingredient: cocoa but chocolatiers are willing to pay higher prices (Beckett, 2002).

Chocolate products vary in flavor quality, shade of color and texture due to the quantity of cocoa that chocolatiers use in their mixtures, "the greater the cocoa content, the higher the quality of the chocolate. Thus, bitter chocolate, with a cocoa mass content of 60%, is the highest grade of chocolate" (Chocolate, Solid TIS: Transport Information Service). There is a difference between types of chocolate, not specifically how they are made, but in the quantity and quality of ingredients used. The quantity of ingredients used to produce each type of chocolate are as follows:

Chocolate Type	Cocoa Mass (%)	Milk Solids (%)	Milk Fat (%)	Sugar (%)
Full-Cream Milk Chocolate	30	18	4.5	<47.5
Sweetened Dairy Chocolate	25	14	14	60
Bittersweet Chocolate	50	0	0	<50
Bitter Chocolate	60	0	0	<40

Transport Information Service

The cheaper chocolates, for example, sold by big box retailers, are mass produced and often have a waxy flavor quality compared to specialty chocolate manufacturers like Godiva who use a high-grade quality cocoa giving rich, lavish flavor. Cheaper chocolate consists of lower grade ingredients that "…contain low cocoa content and have a higher concentration of vegetable oils and chemicals" (Gourmet Chocolate, 2006).

Dark and milk chocolate can both be considered as specialty chocolate and they are the main focus for this research. Both dark and milk chocolate have different storage

duration and they contain anti-oxidants (agents that slow down the oxidation process). Milk chocolate can be kept for up to five months depending on the milk solids it contains whereas dark chocolate tends to last longer (Jacques Torres Chocolate, 2005). Packaging plays a significant role in preserving the chocolate whether it is dark or milk chocolate. The maximum storage duration times for dark and milk chocolate are as follows:

Type of Chocolate	Maximum Duration of Storage
Dark Chocolate	9 months
Milk Chocolate	3-5 months

Transport Information Service

Production and Development

To create appealing theme-shaped novelties is a time consuming procedure as chocolate goes through many diverse stages from initial production to the final product. Chocolate is manufactured by liquid processing techniques which include melting and tempering liquid chocolate, then it is poured carefully into molds; “chocolate (in slabs) and chocolate products such as individually filled chocolates and hollow molded figures are delicious, energy-rich products of the confectionery industry” (Chocolate, Solid. TIS). Time and skill are required for positive results of detailed molded chocolate. Chocolate manufacturers want to create the best chocolate to encourage consumers to include their product with their holiday purchases.

Chocolate makers need every advantage to protect the chocolate from disintegration when it goes into production and likewise it also needs to be protected prior to and during merchandising. Manufacturers need to maximize the chocolate’s quality for extended periods of time through effective packaging. Chocolate is considered a perishable product and is vulnerable to disintegration when exposed to environmental

risks. Moisture absorption, humidity, UV exposure, fluctuation of temperature, occurrence of bloom and chemical odor absorption are factors which can cause chocolate deformities and must be forestalled. Environmental factors can vary each day and the chocolatiers' requirements for product protection are to adjust steadily to the surrounding environment so that their products may maintain a healthy appearance with no noticeable degradation (Chocolate & Couverture).

Environmental Factors

Chocolate needs to be stored in a dry area to avoid contact with humidity; "Chocolate should be protected against humidity and stored where the maximum relative humidity is 70%" (About Chocolate, 2005). Humidity is a pervasive form of moisture and risk of condensation of water on the chocolate needs to be avoided; "the formation of a water film on the chocolate may cause sugars to dissolve, which may re-crystallise on the surface causing sugar whitening" (Chocolate & Couverture). The taste of chocolate will deteriorate when it comes in contact with water while the loss of moisture will cause chocolate to crumble.

Exposure to UV light and/or to air accelerates oxidative changes within the fat in chocolate and causes its taste quality to deteriorate rapidly. Chocolate should be kept out of the light and stored in a sealed container/bag; "it is very important to protect the chocolate by storing it in the security of closed packaging" (About Chocolate, 2005).

Chocolate needs to present a firm consistency in order to be attractive within the ambient temperature range. Higher temperatures, above 25°C (77°F), softens the

chocolate causing it to lose its gloss and "…may destabilize the crystalline structure of the chocolate and give the appearance of a fatty white stain" (Chocolate & Couverture). Lower storage temperatures in a refrigerator/freezer should be avoided as condensation will form when the chocolate is removed and brought to room temperature. "The ideal temperature for storing chocolate is between 54°F and 68°F (12°C and 20°C)" (About Chocolate, 2005). Chocolatiers need to ensure their products' appearance does not show signs of degradation after being exposed to excessive changes in temperature, "at as low a temperature of 21°C, chocolate deteriorates with respect to both appearance and taste" (Chocolate, Solid. TIS). Therefore, fluctuation of temperatures should be avoided since fat bloom could result.

Fat bloom is a common problem for the confectionery industry and chocolate makers' are concerned with the appearance of contamination within the chocolate. The biggest impact comes from the visual complexion of the chocolate becoming unsatisfactory to consumers. Fat bloom appears when chocolate is covered in a moldy-looking white film. The bloom is caused by a variety of factors that change the fat structure in chocolate, for example, poor tempering and incorrect cooling methods (Davies, 2001). Warm storage conditions and the presence of additional fats that are incompatible with the cocoa butter cause the bloom. "The cocoa butter has 'bloomed' because the chocolate got warm enough for the cocoa butter's crystalline bonds to break and re-form in a 'sloppy' pattern" (Chocolate Facts, Scharffen Berger, 2005).

One final risk to consider is the acceleration of the chocolate's taste and aroma changing, as chocolate can absorb strong odors from chemicals or other foods. Chocolate

should not give off undesirable odors but rather offer an aroma of rich cocoa (TargetWoman.com, 2005). If chocolate is not stored properly, it can pick up unpleasant odors such as "…chemical smell, overly perfumed or too strongly flavored, overwhelming sweetness or dustiness" (Penner, 1998). A chocolate maker's priority is that after tasting the chocolate, the appealing taste should linger.

Transport and Distribution

Naturally, chocolate products are specially produced and distributed to different stores within or outside of their state of manufacture. The means of transportation include rail, ship, truck, and aircraft. Chocolatiers need to be cautious that their delicate products are packaged well enough to withstand the various shipment methods during distribution.

A range of obstacles can occur while transporting chocolate. Any means of transport may be difficult with unexpected impact and pressure-sensitivity impacting the chocolate. Season, distribution route, trip duration and the type of container may vary and may cause chocolate damage but the biggest problem is the relatively low melting point of chocolate, "28°C" (Chocolate, Solid. TIS). Risks like solar radiation and other heat sources (engine rooms, double bottom tanks) may fluctuate to a high temperature reaching the melting point and the chocolate will show signs of degradation.

Packaging materials should have sufficient mechanical strength to prevent hazards during transport as the chocolates go through diverse distribution channels and contact with environmental risk needs to be avoided as much as possible. Common containers do not have any protection against external temperature fluctuations and the

biggest drawback is that external temperatures can transmit quickly through the thin walls to the inside of the container. Chocolates packaged in corrugated shippers are more sensitive to moisture and loss of stability; because, “damp conditions may also reduce the quality of the chocolate itself, for example by causing sugar bloom, rancidity, mold and a musty odor” (Chocolate, Solid. TIS). The ideal container for transporting chocolate appears to be a refrigerated container as it has insulated walls which are less sensitive to any external temperature fluctuations. The refrigerated containers can allow the cool temperature to be maintained through the journey (Chocolate, Solid, TIS.).

During transportation, the packages must be secured as a way to prevent them from damaging each other and they must to be handled with maximum care. Filling spaces between the packages or the pallets is highly recommended as a way to prevent tipping and to help ensure the chocolate products will arrive in stores in the same excellent condition as when they left the manufacturing sites.

Packaging

To reduce the feasibility of degradation, the chocolate requires the use of a protective shield: packaging. Packaging serves two purposes: preservation and visual enhancement. The first purpose of packaging is to keep perishable chocolate fresh and in top condition by acting as a barrier to environmental risks and slowing changes of chocolate’s properties, for example, melting because of temperature fluctuations. “The ideal packaging needs to give protection against absorption or loss of moisture, absorption of foreign odors and protection from any contaminants” (MF Hamburg, 2003).

To prevent any contact, the chocolatier's strategy is to seal chocolate novelties in an airtight and waterproof package to prolong shelf life.

The second purpose of packaging is to enhance the beauty of the final product. Chocolate wrapped in elegant packaging with beautiful graphics adds value for the consumers. "The packaging is important because most people are giving the product as a gift. It's all the extras—the printing, the stamping, the decorations—that really make it into a gift" (Bertrand, 2003). Great marketing appeal is what gives chocolate novelties a refreshing look, the stand-up 3-dimensional packaging rather than the traditional lay-flat display gives better shelf visibility and the two selected packaging materials: aluminum foil wrap and clear cellophane bags give the added protection for consumer safety.

Eye-catching packaging can be expensive due to the breakdown of product and material costs such as numerous processing stages, the careful, precise molding and the creativity of packaging material used. The high price of chocolates can be a deterrent to greater consumer spending. However, a higher price does not always influence consumers. When consumers perceive quality, they are willing to spend more for a lesser amount of chocolate and will be repeat consumers for fresh products. Once the holiday or occasion ends, the products are marked down to lower prices yet still maintain a profit for the manufacturers. On the positive side, the packaged products have a prolonged, stable shelf life for months until consumption. A label consisting of the expiration date is adhered to the product to inform consumers about the shelf life date of the product and when it becomes no longer edible.

The two main packaging materials widely used in the chocolate industry in the

protection and packaging of delicate chocolate products are aluminum foil wrap, and clear cellophane bags. The Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) have approved the packaging materials for food service, “these high quality, crisp clear cello bags are made in the USA and meet FDA requirements for direct food contact” (Great Scents, 2006). Package analysis will show how both materials will each serve to extend the optimum shelf life and meet maximum quality standards.

Firstly, aluminum foil is a lightweight metal-based material made of a complex multi-layered sheet which is created during the manufacturing process. It comes in thin sheets to make it extremely pliable and can be bent or wrapped around the chocolate products with ease. “The thinnest foil used for wrapping chocolates may be only 6 microns thick” (Foil Packaging). The material consists of alloys including iron, silicon and manganese and tiny amounts of copper for extra strength. Heavier aluminum foils achieve bright, metallic colors by using the anodizing process; “Anodizing creates an oxide layer on the aluminum surface that can accept colored dyes or metallic salts” (Aluminum Foil) and is a good example of aluminum being used to create an economical gold-looking foil even though it is not made out of real gold (Bertrand, 2003).

Aluminum foil has a dull side and a shiny side and both have significant purposes. The dull side of the foil acts as a barrier to properties like light exposure and it slows down the disintegration process when storing chocolate products. The shiny side provides decorative potential to give the products maximum visual impact and striking packaging design. The foil is wrapped tightly on the surface of chocolate theme-shaped novelties to

display precise features, for example, chocolate Santas, Easter rabbits or other special figures; “it grabs your attention and adds to the appeal of the product look, whether that be funky, colorful kids characters or up-scale imagery aimed more specifically at adults” (‘A Glittering Success!’, 2003). Once unwrapped, the chocolate portrays its distinguished detailed lines on the surface and looks more realistic. Since aluminum foil has multi-layers, its advantage is its high compatibility with various converting operations such as lacquering, printing, priming, laminating, embossing and cutting not specifically in that order (Pierce, 2002).

The unique and versatile properties of aluminum foil wrap and its applications listed above make it an essential material. See the chart below:

PROPERTIES	**APPLICATIONS**
Barrier Protection	-Acts as a complete barrier against the penetration of light, moisture and flavors. -Stops contamination and the loss of organoleptic characteristics.
Decorative/Printability Potential	-Printing compatibility to create stunning graphic design and shelf presence.
Hygiene, Safety & Product Security	-Protects against contamination and product tampering.
Mechanical Properties	-Provides deadfold characteristic (foil stays folded and is easy to open. -Provides embossed surface designs.
Heat Performance	-Withstands high temperatures without distorting or melting. -Conducts and dissipates heat quickly; ideal for heat-sealing processes.
Environmental Considerations	-Potential for recycling; lightweight for efficient transport. -Easily laminated with other materials thus saving resources. -Saves weight. -Reduces spoilage.

European Aluminum Foil Association

A significant factor to consider favoring the use of aluminum foil that is not mentioned in the chart is the protection against insects. “Cocoa moths (also known in the US as almond moths) and meal moths may attack chocolate. Nut chocolate may also suffer attack from flour beetles and dried fruit moths” (Confectionery, 2004). The ‘insect proof’ foil is used for chocolate novelties containing nuts and raisins to protect it from attracting insects. This special foil is carefully designed with specific layers: protective lacquering, slip coating, embossing, heat-seal lacquering and aluminum foiling. The heat-seal coating has a low sealing temperature to protect the chocolate. Other advantages of using the ‘insect proof’ foil are that it is tamper proof, chloride free and FDA approved (European Aluminum Foil Association, 2003). The benefit of using insect proof foil is not considered in this research because the foil is specially designed for chocolate novelties exported to warm climates and the state of manufacture does not have enduring warm conditions.

Secondly, clear cellophane bags (polypropylene) are made from a lightweight cellulose base sheet that consists of Saran (PvDC) coating on both sides. It is an economical material that offers a combination of outstanding physical, mechanical and thermal properties when storing chocolate products (Universal Plastics, 2004). The standard measurement for cellophane thickness is 1.2 millimeters polypropylene as it provides exceptional clarity for the best chocolate presentation; “Polypropylene bags have long been the choice for product presentation and preserving freshness” (Polyproplyene Bags, 2004).

Clear cellophane bag’s essential properties and its applications are portrayed in

the following chart:

PROPERTIES	**APPLICATIONS**
Barrier Protection	-Excellent oxygen barrier. -Excellent vapor and moisture barriers -Excellent aroma barrier.
Decorative/Printability Potential	-Excellent product viewing -Add appealing ribbon-tying or cards. -Excellent for gift bag use.
Hygiene, Safety & Product Security	-Protects against contamination and product tampering. -Non-toxic.
Mechanical Properties	-Excellent puncture resistance. -High tensile strength. -Resistant to staining. -Strong impact resistance.
Heat Performance	-High heat resistance. -Excellent heat sealable.
Environmental Considerations	-Sustainability should reflect the package's affect on energy and resources. PvDC cellophane is lightweight for more efficient transport; high yield perton of material; although it is potentially recyclable, it is not
PROPERTIES	APPLICATIONS
Environmental Considerations	recycled. It will either end up in a landfill or incinerated.

Since the cellophane bags are transparent, chocolate makers often use their unlimited creativity in producing the chocolate products by adding a vibrant sugar confectionary colored icing on its surface. This icing creates visual appeal because the see-through bags give consumers a good view of the chocolate whereas foil keeps the product entirely covered; "the film is crisp, glossy and very transparent which gives a high quality finish to the look of the overall package" (The Wrap on Cellophane, 2003).

Most molded figurines are created with a flat bottom so they don't rely on the cellophane bag for standing support. "(The bags) have a foldover bottom. The foldover

bottom provides added strength and prevents your products from pushing through" (CelloBags.com, 2006). Colorful grasses or wooden shavings are sometimes used at the base of the product to increase the visual appeal. A tie twist or an elastic ribbon is used to seal the bag as a way to maintain freshness. To make the final product more appealing, vibrant festive ribbons are applied to stimulate consumers' purchasing decisions.

Methodology

The research data for this study was gathered by means of a survey targeted at two separate audiences: The chocolatiers that were selected are categorized as 'mom and pop' businesses. They have the ability to manufacture chocolate through multiple stages: production, packaging, storage and marketing under one roof. These types of businesses often complete their packaging manually compared to the automated assembly resources in larger companies. The packaging used by smaller chocolate businesses has its own unique format that no larger companies would display in the same manner. These are chocolate-making businesses who manufacture chocolate within their state of manufacture.

The other target audience were consumers who have previously or currently purchased the products. Since chocolate is a worldwide product, the scope of the survey was designed to look at a sample area of a designated proximity to the upstate New York region. Also, because the participants completing the consumer survey are local residents, it makes sense for consistency to poll chocolatiers from the same area.

Two versions of the survey were created with open-ended questions for both groups to select the most applicable answers about the quality of packaging materials.

Included in the survey for the chocolatiers are questions about four major areas: the business itself, production for specialty occasions, chocolate quality and shelf life. All of these inquiries are tied to the packaging materials and will attempt to prove which one offers a better, or prolonged shelf life. A sample of the cover letter is found in Appendix, 58. The survey was mailed to 122 chocolate companies in the manufacture region (Appendix, 59). About five days after the surveys were mailed, a follow-up letter was sent to ensure they received the survey package, and as a reminder for completion and return (Appendix, 63). In order to receive accurate data, the ideal contact person(s) to fill out the survey were either the owner of the smaller chocolate companies or Managers of Production or Research & Development, someone who was familiar with the chocolate making and packaging. The survey also included a basic schemata of the steps required for chocolate production and distribution (Appendix, 64). Responders were asked to fill in the approximate days required for each of these steps.

To be sensitive to the chocolatiers' tight schedules, the survey was a multiple-choice questionnaire for quick and easy completion. Self-addressed stamped envelopes were included for the chocolatiers to return the survey promptly. Extra information was welcome if they had further input about the products' extended shelf life. When a survey was not returned after the deadline, a follow-up by email or phone call occurred to encourage participation in the survey.

For a different perspective and a quicker response, the survey to consumers was distributed directly (Appendix, 66). Approximately 100-125 consumers were randomly selected from diverse departments at the National Technical Institute for the Deaf

(NTID), a college at Rochester Institute of Technology. An email was sent by e-blast to notify interested consumers the dates, times and locations available for filling out the survey (Appendix, 65). This version of the survey focused on consumers' experiences with the product and asked about four major areas: personal information, product preference, shelf life and chocolate quality. Respondents had the opportunity to express their opinions about the chocolate's shelf life and its packaging. Upon completing the survey, consumers were offered a tempting reward: chocolate!

Data Analysis

Sample data were collected from consumers through personal contact and from chocolatiers through mail in questionnaires. The consumers' responses about the quality of chocolate and its packaging differed in terms of their past purchasing experiences. The chocolatiers' responses differed on their chocolate making processes and their preferences toward packaging materials.

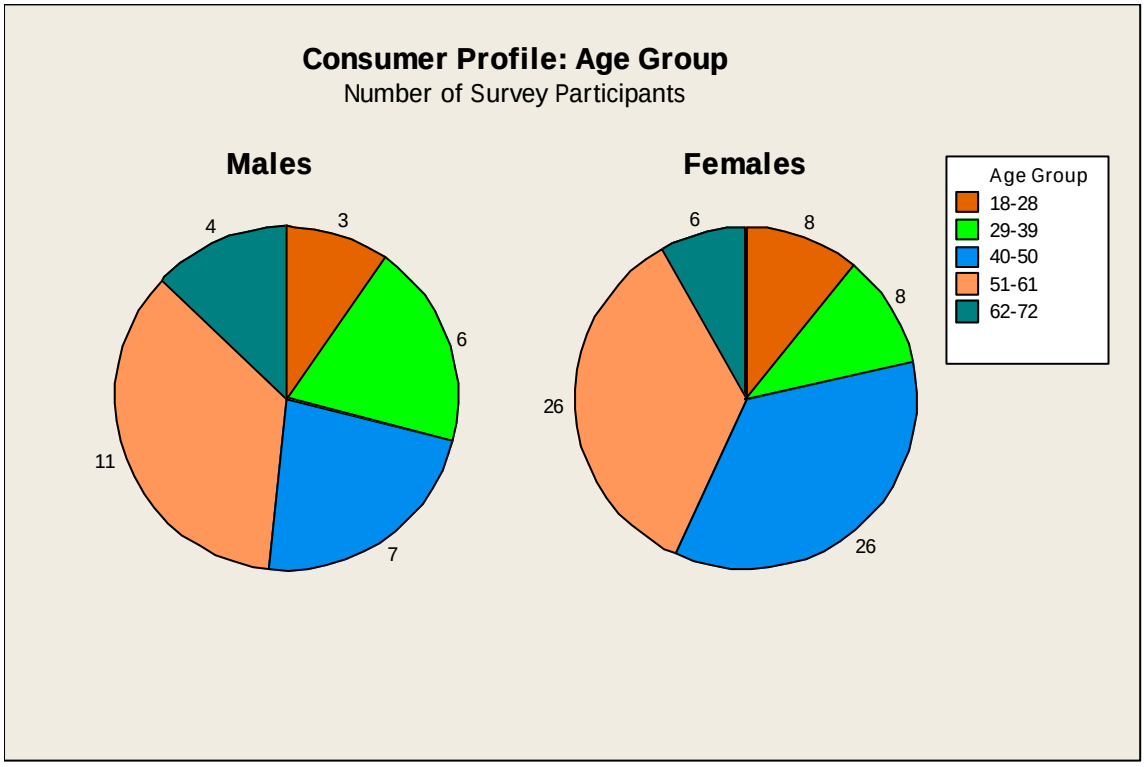
The responses of both the consumers and chocolatiers clearly identified which one of the two packaging materials had a longer shelf life and secondly, which protected the chocolate's sensitivity needs from degradation. The greater the number of responses returned allowed for a more accurate interpretation of data.

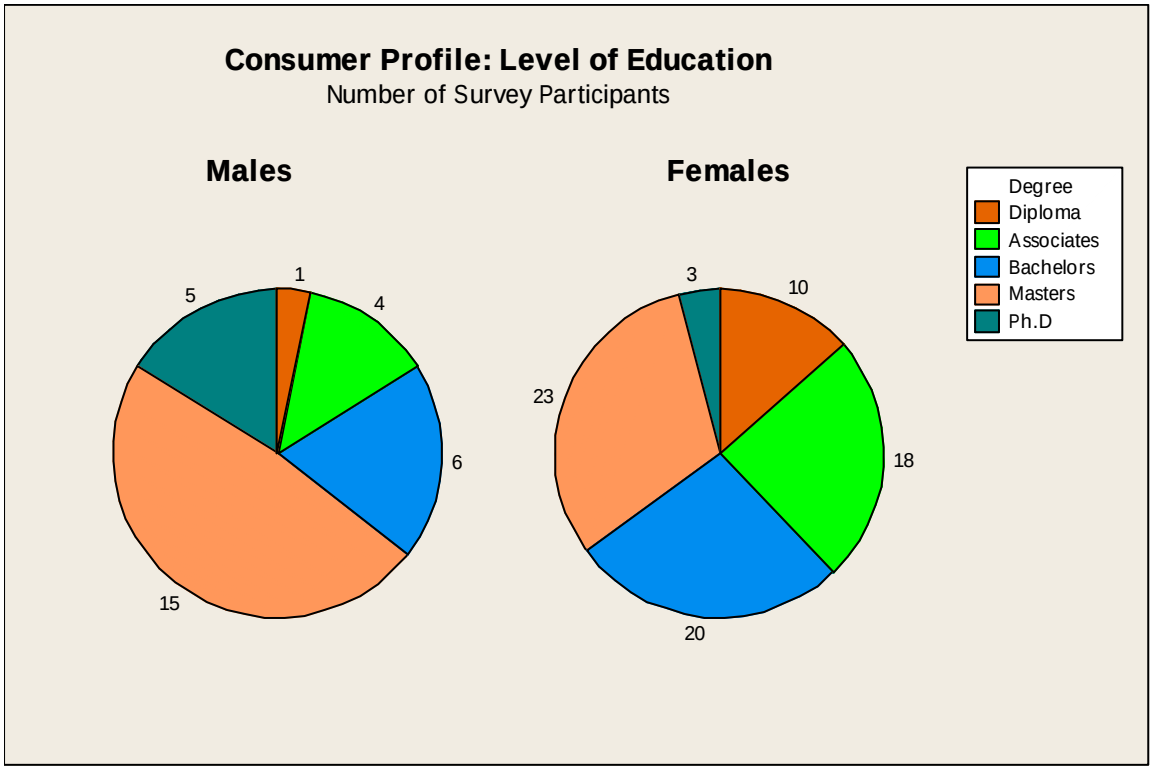
From the 549 email addresses, the consumer survey generated 105 responses showing a good cross section of answers ranging from personal preferences for products to holidays and packaging materials. Participants from the NTID community were notified through email and those interested filled out the survey. A small office was reserved for two days to accommodate the participants' busy schedules. The e-blast

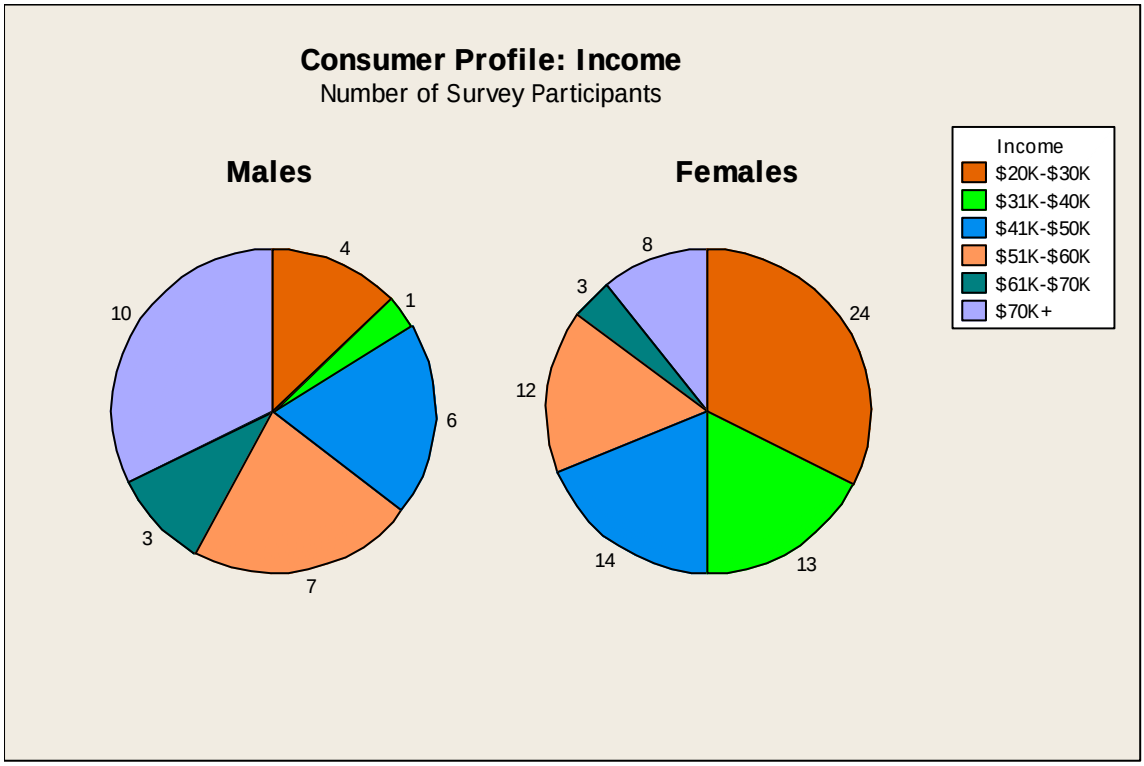
successfully drew a 19% response rate because of the topic and chocolate graphic.

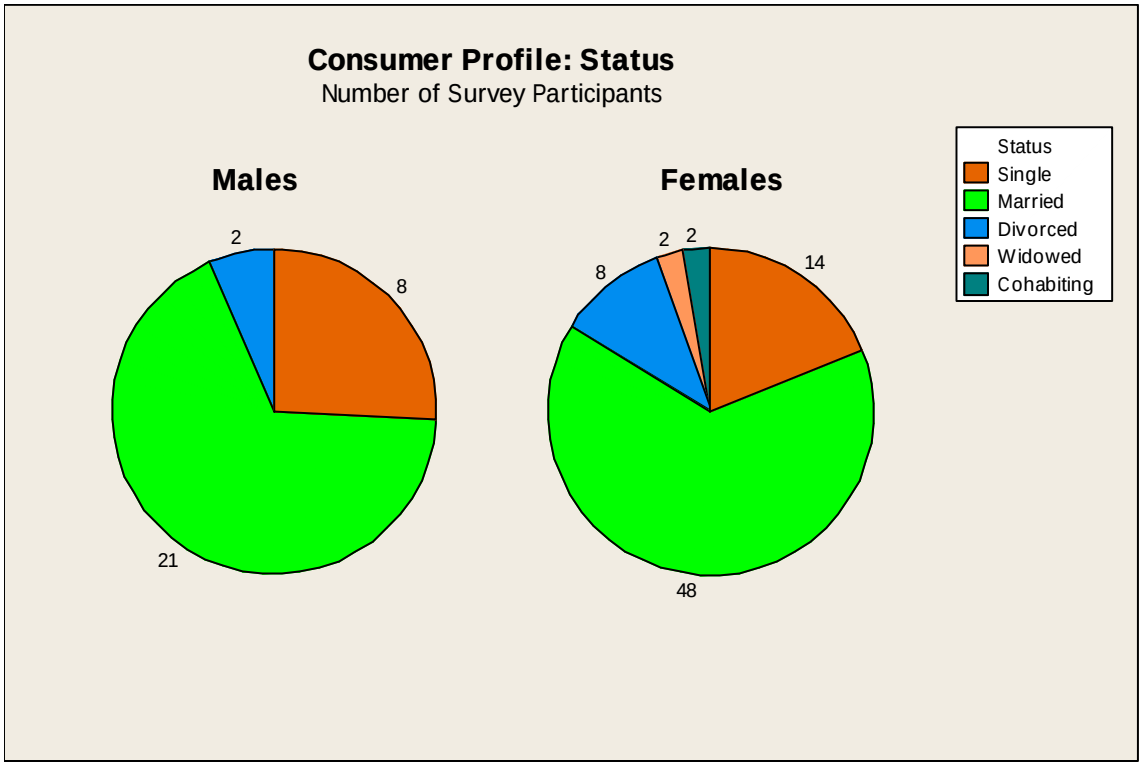
Consumer Profile

A pool of 105 candidates (31 males and 74 females) participated in the survey and the consumer profiles are identified in the following separate charts divided into age, level of education, income and status for purchasing premium chocolates:




Consumer Profile: Level of Education
Number of Survey Participants
Males
Females
Degree
Diploma
Associates
Bachelors
Masters
Ph.D
1
4
5
6
15
3
10
23
18
20


Consumer Profile: Income
Number of Survey Participants
Males
Females
Income
$20K-$30K
$31K-$40K
$41K-$50K
$51K-$60K
$61K-$70K
$70K+
4
1
10
6
3
7
8
3
24
12
14
13



Chocolate Purchase History

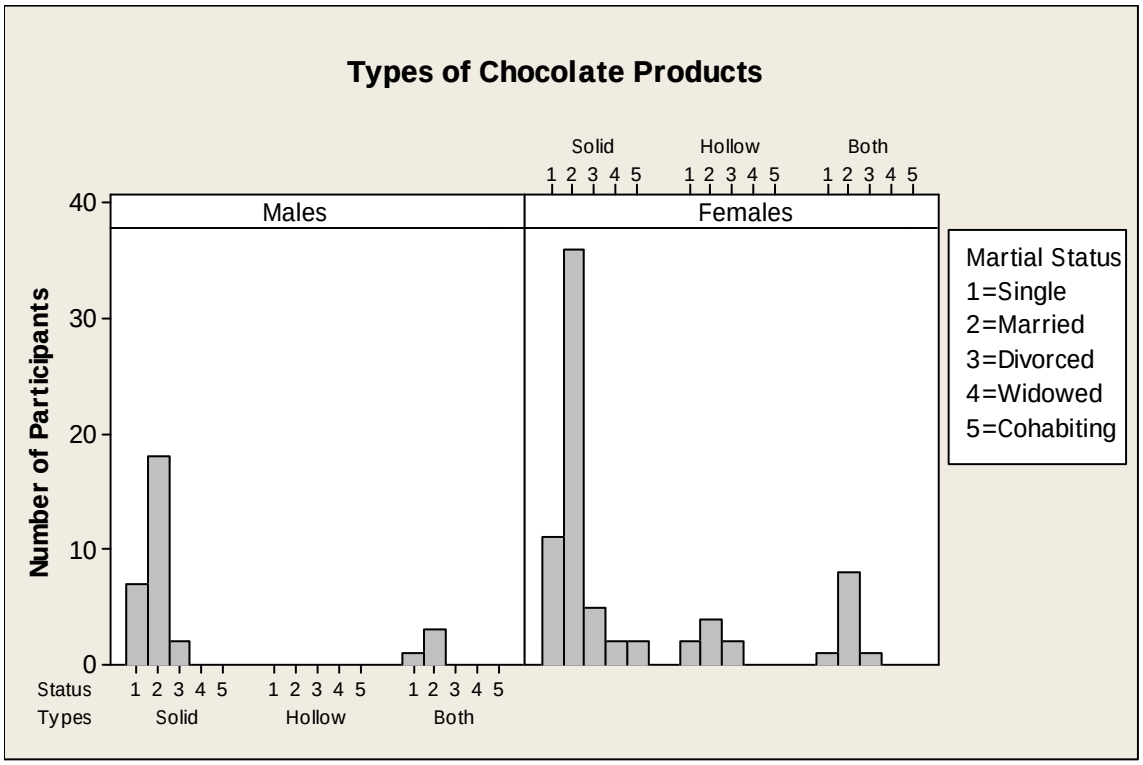
In the survey, consumers were asked if they had purchased seasonal chocolates recently or in the past. The results depicted 8 males and 23 females between the ages of 51-61 as the main target audience for purchasing chocolates compared to any other age group which is portrayed in the following:

Self Consumption vs. Gift Giving

Seasonal products are sold for two underlying purposes: consumers' personal indulgence or gift giving for certain holidays and special occasions. A total of 8 males and 14 females in the survey participation revealed they purchased chocolates for self-consumption. From that group, the majority, 4 males and 11 females were married. Again, within the married group, 6 males and 12 females purchased chocolate for gift giving. The survey showed that for both self consumption and gift giving, the target buyers were married participants and outnumbered single, divorced, widowed, or cohabiting participants by just over 2:1.

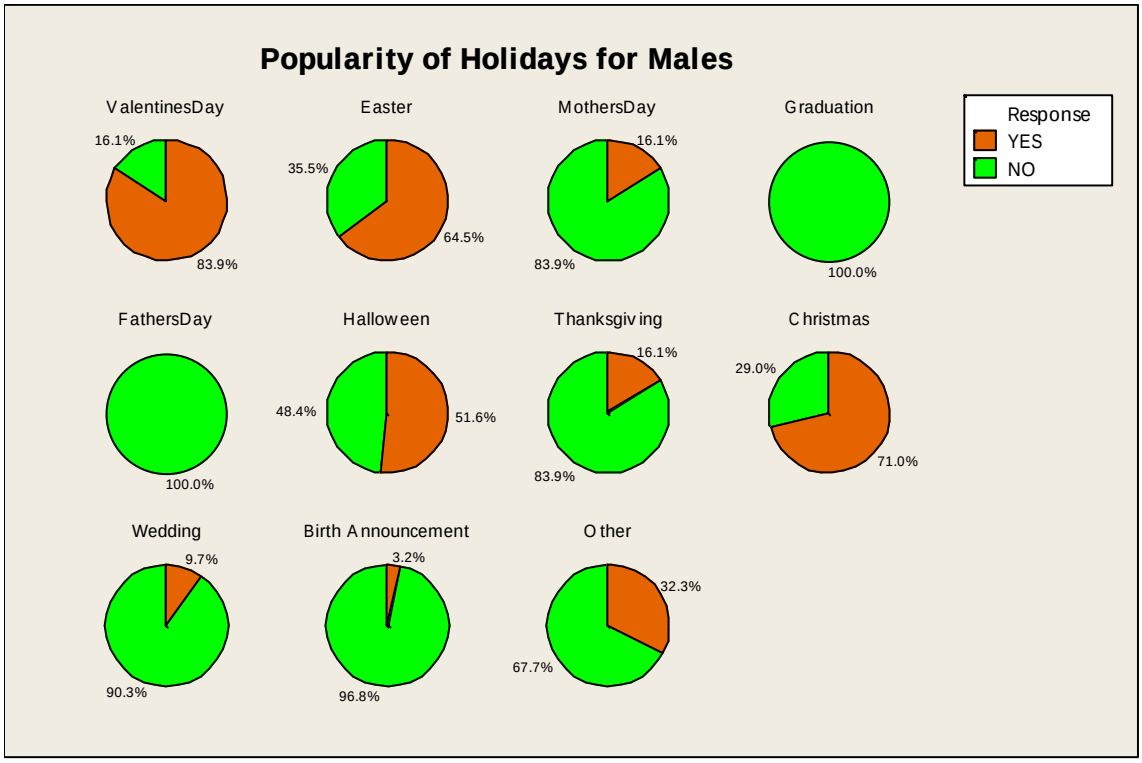
Solid and Hollow Chocolates

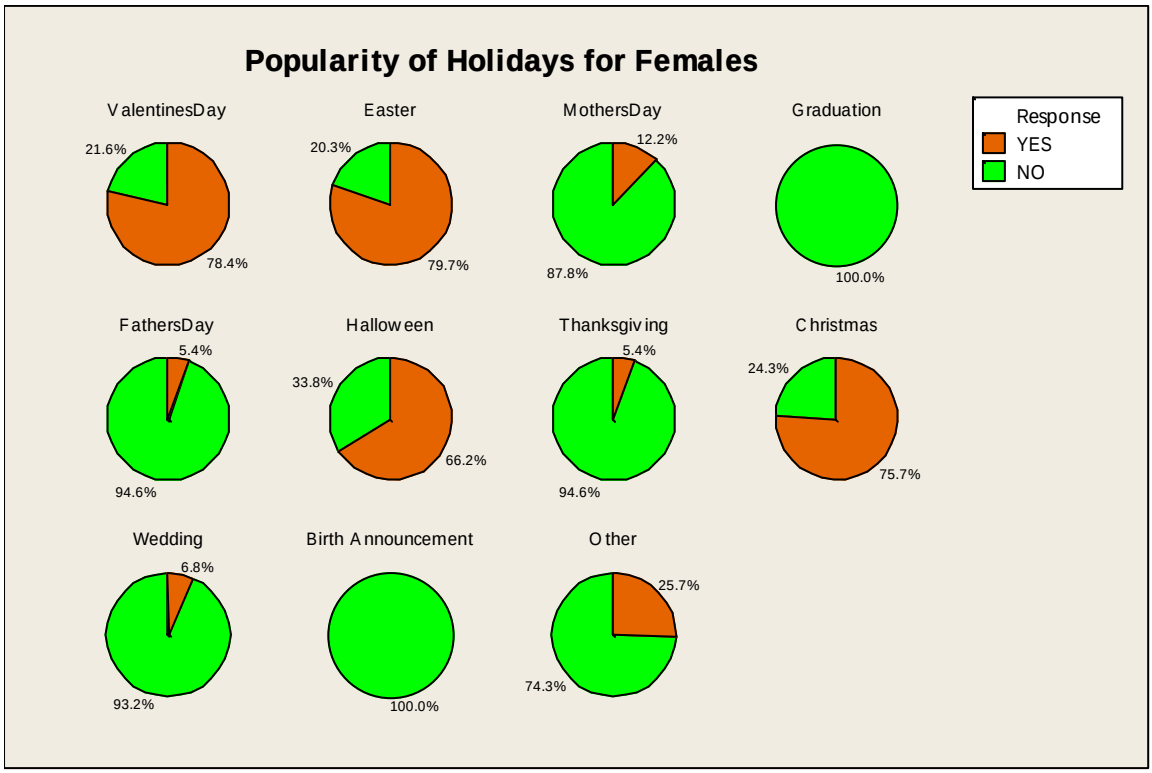
The popularity of purchasing solid seasonal products was the highest at 79% compared with the hollow products at 7.6%. Participants who purchased both types fell between the two categories at 13.3%. A total of 21 married males responded and when the data was analyzed separately, 85.7% preferred solid, 0% preferred hollow and 14.3% preferred both. A total of 48 married females demonstrated 75% preferred solid, 8.3% for solid and 16.7% for purchasing both types. While the results show that both male and female consumers prefer solid over hollow, it is those from the married category who are purchasing the greatest amount of solid chocolate products. Of course the data results vary based on consumers' preferences for whichever holiday they choose to purchase chocolate. The data results are portrayed in the following:



Popularity of Holidays

Seasonal chocolates are specially made for festive holidays and occasions to give consumers' sweet options for gift giving and entertaining. In the survey, both male and female consumers were more likely to purchase for the major Christian holidays: Easter and Christmas. Also included in the top four chocolate buying occasions were Valentine's Day and Halloween with high total percentages ranging from 64.5% to 83.9% due to the fact people usually purchase premium chocolate products for their loved ones. The less popular occasions for chocolate giving are Mother's Day, Father's Day, Thanksgiving, Wedding and Birth Announcements which consisted of lower percentages ranging from 3.2% to 16.1%. For those occasions, the data show that purchasing chocolate products is not relatively significant. For example, fresh flowers are traditionally the more popular gift for Mother's Day. In the chart, 'Other' is documented and is classified as less common occasions but participants included them as celebrations. Both males and females identified 'Other' as Hanukkah, Birthdays, Wedding Anniversary, Host Gifts, Get Well/Hospital Visits and Souvenirs with the percentages between 25.7% to 32.3%. The popularity of holidays for both males and females are illustrated in the following:


Popularity of Holidays for Males
ValentinesDay
16.1%
83.9%
Easter
35.5%
64.5%
MothersDay
16.1%
83.9%
Graduation
100.0%
FathersDay
100.0%
Halloween
48.4%
51.6%
Thanksgiving
16.1%
83.9%
Christmas
29.0%
71.0%
Wedding
9.7%
90.3%
Birth Announcement
3.2%
96.8%
Other
32.3%
67.7%
Response
YES
NO


Popularity of Holidays for Females
ValentinesDay
21.6%
78.4%
Easter
20.3%
79.7%
MothersDay
12.2%
87.8%
Graduation
100.0%
FathersDay
5.4%
94.6%
Halloween
33.8%
66.2%
Thanksgiving
5.4%
94.6%
Christmas
24.3%
75.7%
Wedding
6.8%
93.2%
Birth Announcement
100.0%
Other
25.7%
74.3%
Response
YES
NO

Cost Value

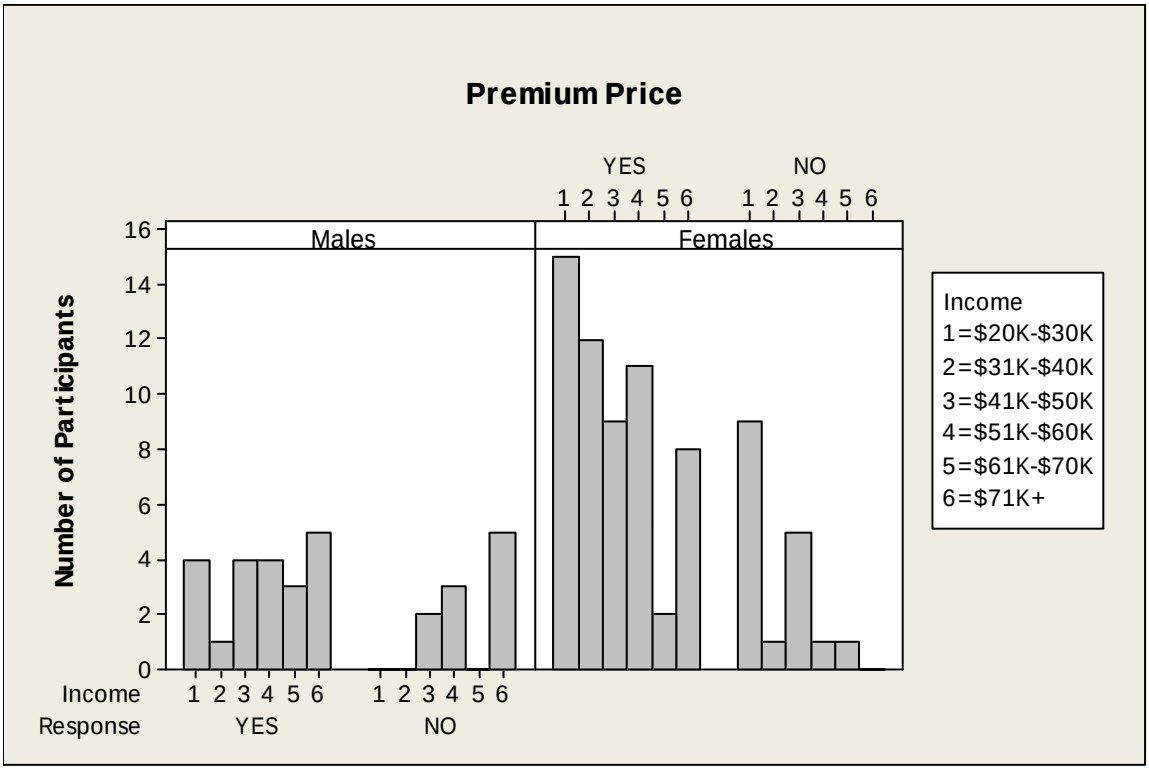
The cost of premium chocolates varies based on the amount of high-grade quality ingredient. This is not the only factor that determines a chocolate's premium price. An excessive amount of manual labor in production will increase costs. In the survey, a total of 88 participants agreed they were willing to pay more for chocolates and 17 were not interested paying a higher cost. Of that number, 9% males with an income of $70+K and 23% females with an income of $20K-$30K represented that they were willing to pay a high cost for premium chocolates. Random quotations selected from the survey are invaluable to show how consumers felt about the premium cost of chocolate:

"You get what you pay for and 'its' worth it to buy the very best because of taste and flavor."
"To me a good chocolate is worth the extra money and if you give as a gift it says you care enough to give the person an excellent chocolate."
"Size and quantity is a consideration for purchase—want to feel like you are getting your money's worth."

High cost did not appear to play as important a role for females as they cared more about the quality of the chocolate. Selected responses show how female participants felt toward the quality of chocolate:

"Quality is critical."
"The smoother the chocolate, the better."
"Freshness counts and consistency of flavor, with deep, full color."
"How the chocolates look is very important to me."
"Taste and overall experience drives my purchasing."

Males with a higher income are not necessarily willing to pay high prices but they tend to purchase for their loved ones instead of their own indulgence. The data results for both males' and females' incomes are portrayed in the following:



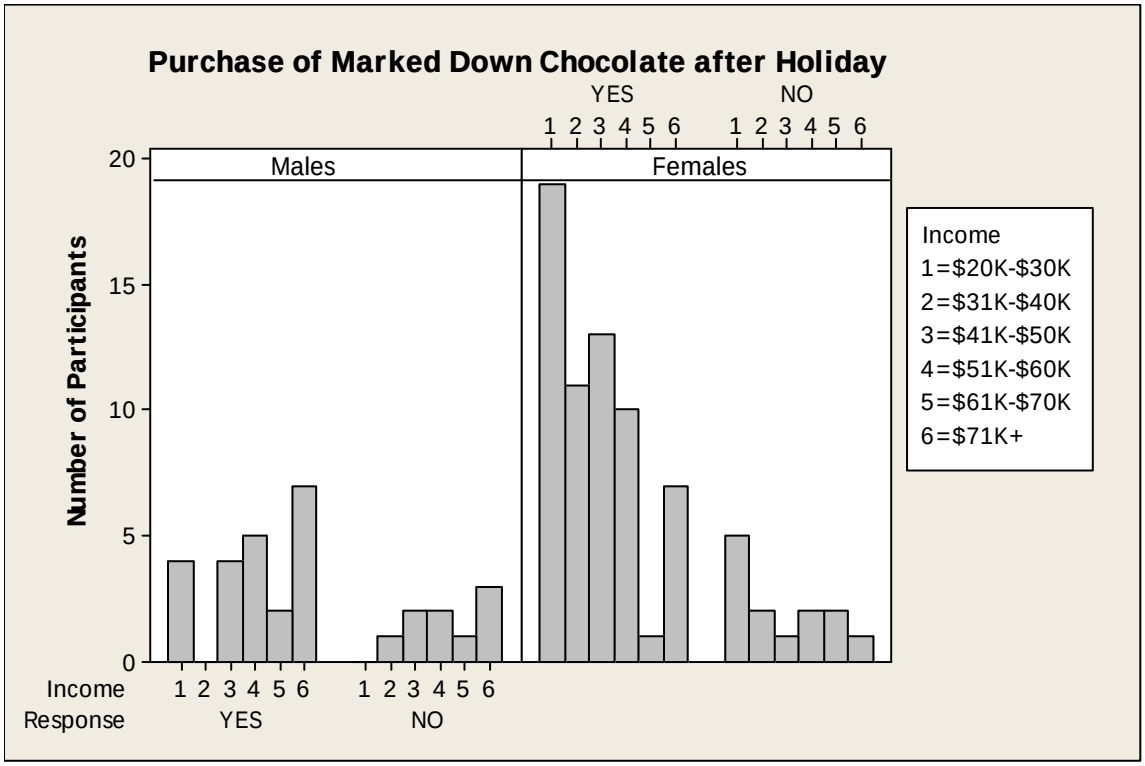
Chocolate after Holidays

Once the holidays or special events are over, overstocked seasonal products are marked down in price, providing consumers an opportunity to purchase at a reduced price. A total of 83 participants agreed that they were willing to purchase marked down chocolates for their own indulgence or use as gifts for family and friends they missed seeing during the holiday. In that pool, there was a high response with 23% of females with an income of $20K-$30K as the target buyers for marked down chocolates compared to any other income. This does not indicate they cannot afford the product at full price, but that they are economical spenders. With an income of $70+K, both males and females at 8.4% each responded that they too were willing to spend money on marked down chocolates.

Not everyone favored purchasing post-seasonal chocolates as 22 candidates commented they were not interested in discounted products. The reasons are noted below:

- Finished celebrating a holiday/special event.
- Do not want to spend more money after an excessive of holiday spending.
- Already received chocolates as gifts from families and friends.
- Not interested in having more chocolate products at home.
- Already consumed enough chocolates and not interested in adding more calories.

The data results for both males and females who purchased specialty chocolates marked down in price after the holiday is portrayed below:



Packaged Material Preferences

Specialty chocolates are packaged in universal material: aluminum foil wrap and

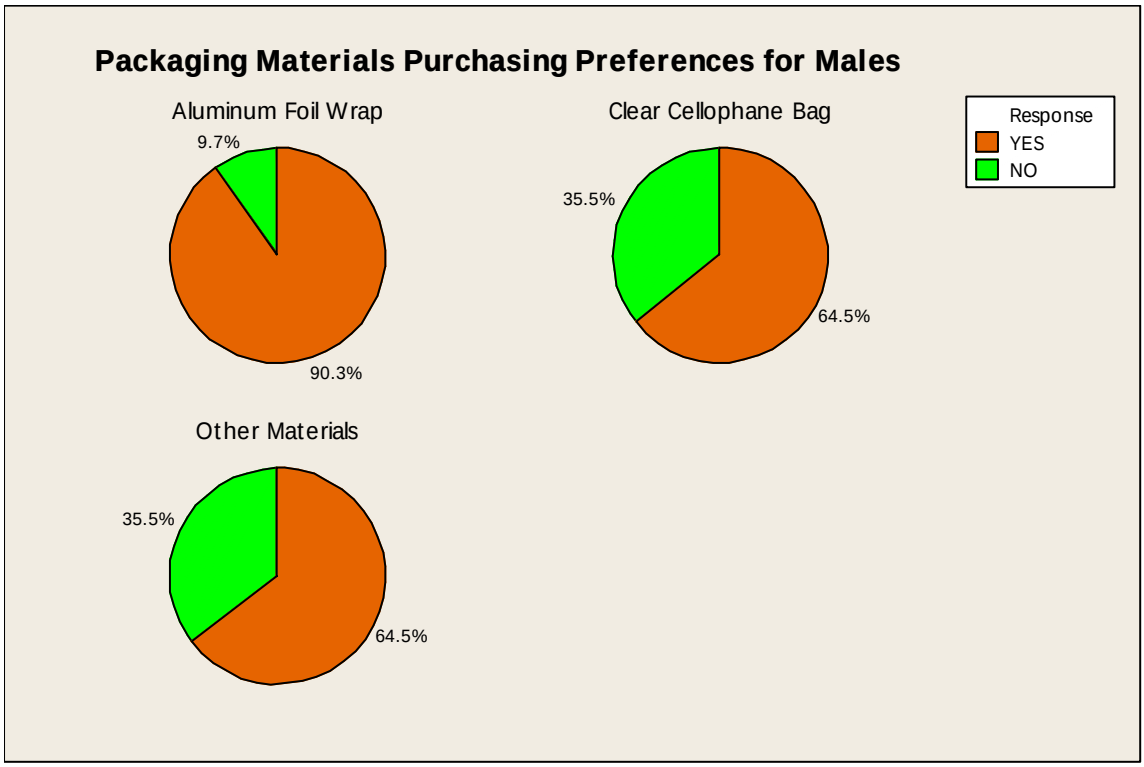
clear cellophane bags. These materials are excellent packaging materials in attracting the consumers' attention. The results indicated a high response of males and females who preferred purchasing specialty products in aluminum foil wrap over any other packaging material. 90.3% males and 91.9% females felt that aluminum foil wrap was the optimum material for many different reasons based on their experiences: strengthens the shelf life, the appearance of the 3-dimensional shape to make it more appealing and ultimately the graphics created a festive mood. Responses from survey participants who expressed their packaging concerns for maintaining freshness are as quoted:

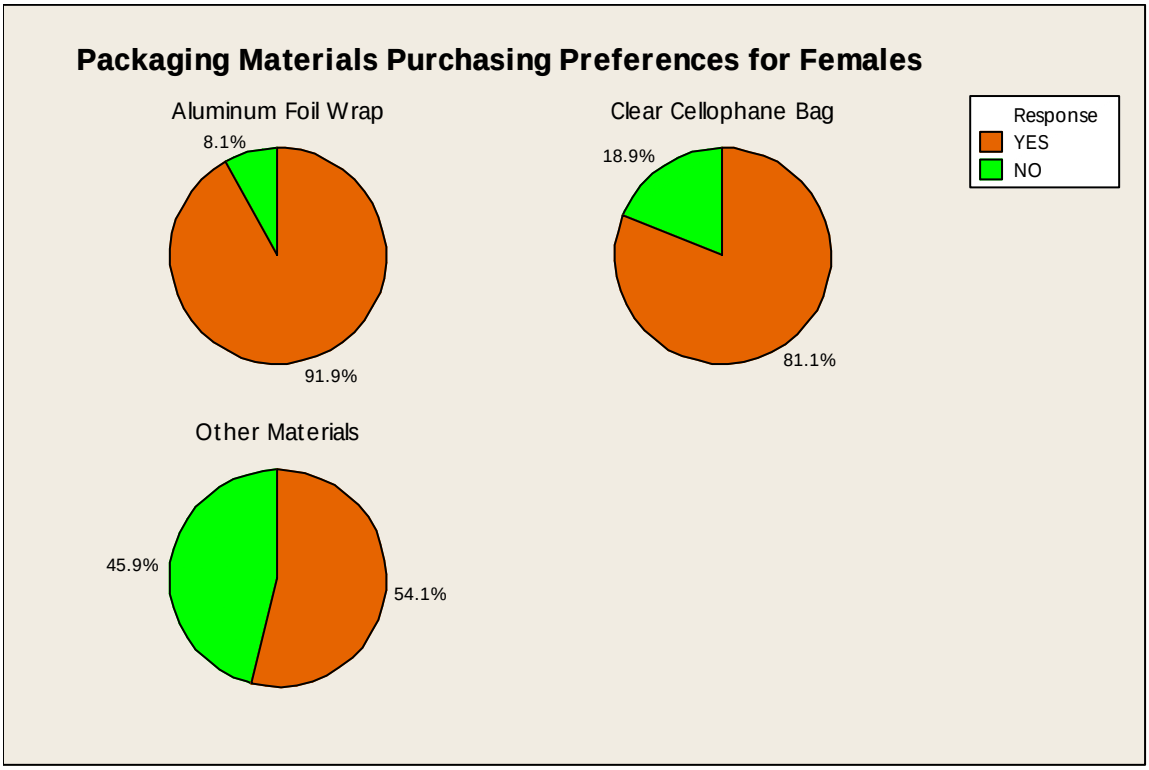
"My only concern with packaging is how fresh it keeps the candy. Looks aren't important to me—taste and freshness are."
"The higher the quality of the chocolate I think the better the packaging should be. Packaging does help appeal to our taste buds."

Clear cellophane bags were considered to be the second preference with 81.1% for females which was a higher reaction than the males at 64.5%. Males are not primary shoppers and were less concerned with the quality of the chocolates than the appealing color/graphics of the packaging. The females' perspective was entirely different than the males' for observing chocolates' appearance was more significant than the quality of the packaged material. They preferred to see the quality, shape, form and color of the product and they were not as interested in purchasing the product if the chocolate is entirely hidden in the packaged material.

Packaged materials besides aluminum foil wrap and clear cellophane bags provide alternate choices for consumers' purchasing specialty chocolates. In the survey, 'Other' is categorized as a diversity of packaging materials that were not listed, for example, boxes,

plastic clamshell and shrink wrap. The responses were high with 64.5% of males and 54.1% of females acknowledging ‘other’ as their preference. The charts illustrate the percentages of packaging material preferences for both males and females:





Storage

Once chocolate is purchased or received as a gift, consumers have the control to maintain the product's shelf life until consumption. Chocolate can maintain maximized freshness if it is in proper resealable packaging and at comfortable environmental surroundings, for instance, adequate room temperature and controlled light exposure. The data results of participant's preferences were very close for how they store their products in their homes. A higher response of 39% of males and females preferred storing their merchandise/gifts in the cupboard than the 38.1% who store it in the refrigerator. Consumers expressed that the cupboard is an ideal storage location as it provides a secluded space with no light exposures and room temperature is considered to be consistent inside and outside of the cupboard. Chocolate can be stored in the refrigerator

for a short time between 30°-32°F, to maintain optimum freshness however, the cold temperatures can have drawbacks and if left over an extended period of time, chocolate will lose its tolerance. The coating will show white streaks and when the chocolate loses its appeal it is often wasted. Storing chocolate in a specific location was not a concern for 23% of male and female participants as they commented that in most cases, the chocolate would be consumed in no time.

Chocolate Marketed in Advance

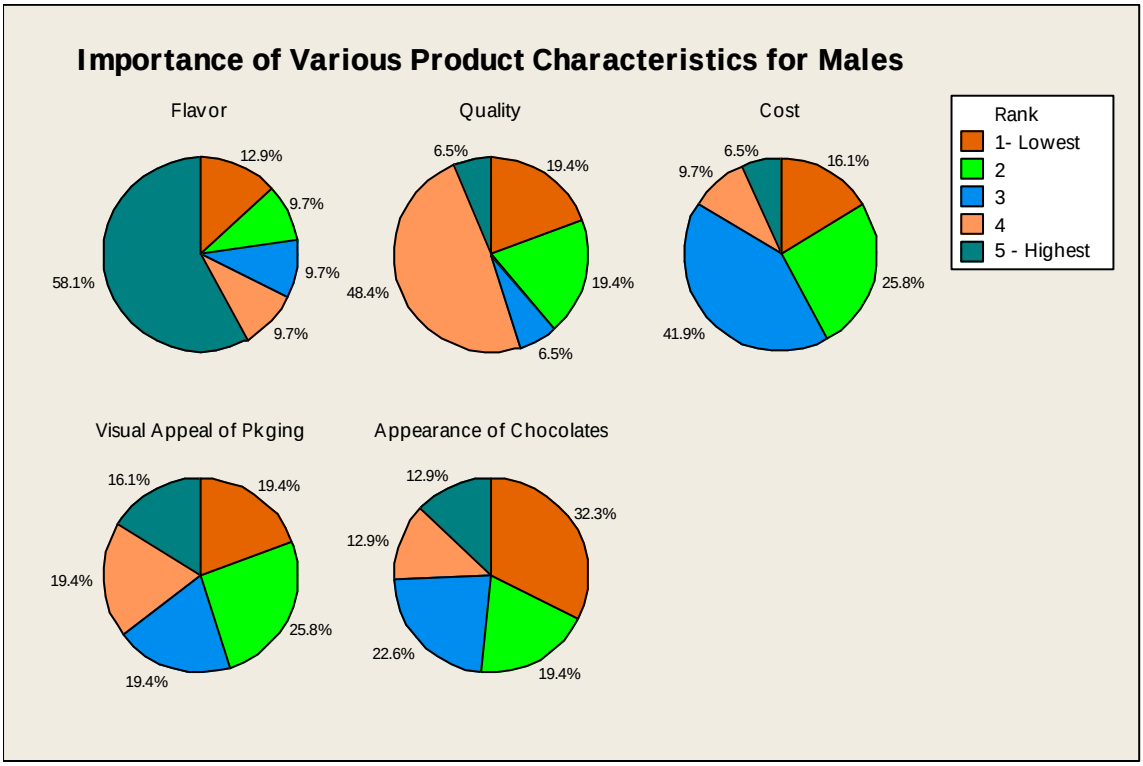
Prior to holidays/special events, chocolate is marketed on shelves from 1 to 30 days. In the survey, 23% of both males and females, said on average, they purchase chocolate 7 days before the occasion. Consumers like having the products recently made so the freshness and quality are consistent up to the day of the holiday. Seasonal chocolate novelties are fast selling products and are not on shelves for very long so the data depicts that a higher percentage of females (no matter of age, level of education or income) do their shopping earlier than males. Chocolate can maintain its freshness when marketed more than 7 days in advance for the convenience of the consumers' shopping habits. Purchasing chocolate in advance does not have a major impact on the quality and freshness as long the chocolate is in proper packaging. The challenge is the appearance of the chocolate's coating. It could show signs of degradation if consumers store it improperly but, if it is wrapped, it becomes unperceived to them.

Overall, consumers opt to purchase not too far in advance of holidays and prefer packaging that allows them to see the product.

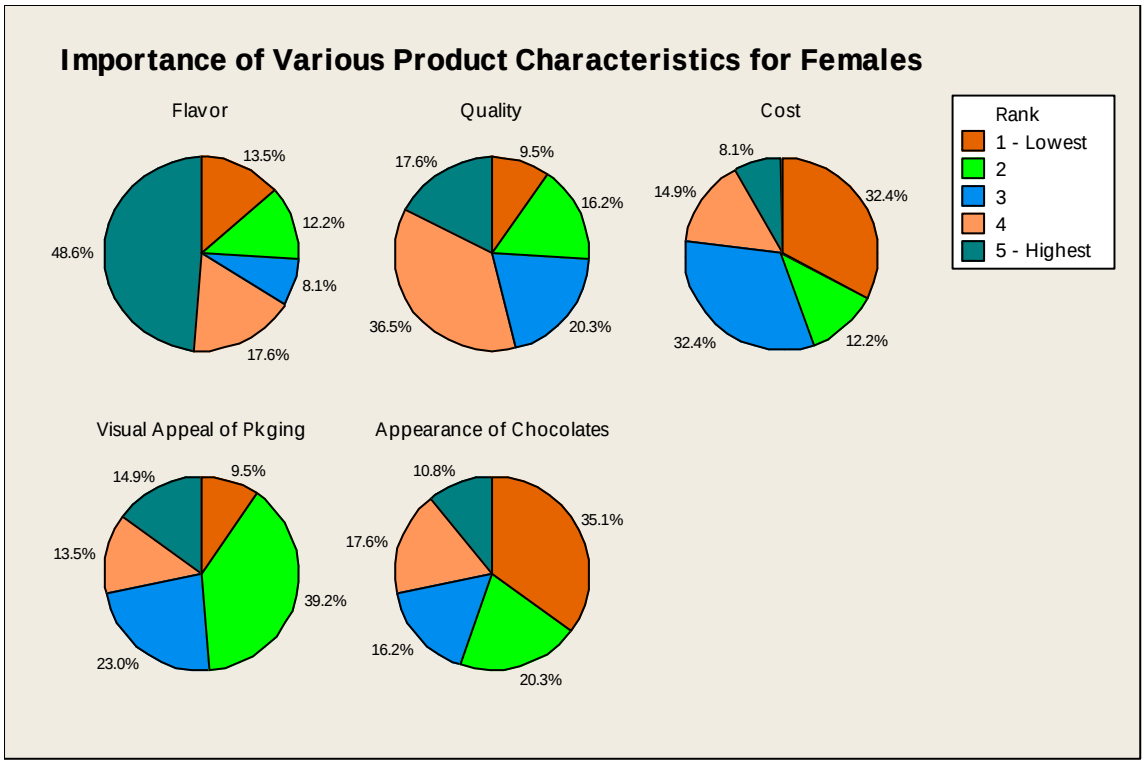
Final Product Characteristics Rank

The final chocolate product should attract the eyes of consumers to increase the appeal of the merchandise. This builds product recognition and increases the chance of influencing consumers' purchasing decisions. There are some factors the consumer is seeking when purchasing premium novelties. Five essential characteristics were identified that consumers believe are beneficial to them: richness of flavor, quality of the chocolate, cost, visual appeal of packaging and appearance of the chocolate's coating. The top, most essential characteristic consumers are looking for in the final product is the flavor with males at 58.1% and females at 48.6%.

According to the survey, 31 males ranked the characteristics they look for in a product from highest to lowest: 58.1% flavor, 16.1% visual appeal of packaging, 12.9% appearance of chocolate and both quality and cost are resulted equally at 6.5% each. The chart illustrates each characteristic and its ranking from lowest to highest importance for male consumers:



As for the 74 females, their ranking was as follows: 48.6% flavor, 17.6% quality, 14.9% visual appeal of packaging, 10.8% appearance of chocolate and 8.1% cost. Females take time to look at the packaging and the coating of the chocolate more often than males. Cost is ranked as the least important and did not have an influence for either female or male consumers. The chart illustrates each characteristic and its ranking from lowest to highest importance for female consumers:



Packaging Characteristics Stimulation

Consumers' purchasing preferences vary based on their experience with the product. Aluminum foil wrap and clear cellophane bags offer different characteristics that often affect consumer's purchasing choice. Factors such as packaging material, color, graphics and surface embellishment will be discussed in greater depth with the results from the survey. The largest target audience is compiled of people with similar background profiles. Their characteristics are as follows:

- Married.
- Average age for both males and females is 51-61.
- Highest level of education obtained for both males and females is Masters.
- Females fall in the $20-$30K range of income. Males are in both ranges: $41K-$50K and $70K+.

Premium chocolate requires that it be stored in a sealed packaging container in

order to have a prolonged, healthy shelf life, but the significance is that the packaging material also needs to be presentable to appeal to consumers. Referring to the survey, the results portrayed 61% of consumers who ranked aluminum foil wrap 3rd in the list. Consumers feel the advantage of having premium chocolate tightly wrapped in foil keeps it away from unwanted environmental influences. Foil offers shelf life stability with reduced penetration of unnecessary air to affect the chocolate's coating. Foil is ideal for an extended storage time and helps chocolate maintain its healthy look.

Clear cellophane bags help to draw consumers because the chocolate inside is visible. The challenge is determining how long the chocolate will maintain its freshness once purchased because any degradation is visible to the consumer through the packaging. In the survey, 39% consumers selected clear cellophane bags as 2nd rank in the list.

Color on packaging plays an important role because it can influence thinking, change actions and cause reactions. It can irritate or soothe consumers' eyes, increase their blood pressure and increase their appetite. Packaging colors are selected for certain holidays/events, for example, red, green, white, gold and silver are commonly associated with Christmas. The preferences of the target audience showed that 70% of consumers from the survey ranked color on aluminum foil wrap as second highest as it creates positive moods. As for other consumers who do not favor vibrant colors, clear color themed bags were preferred. The data depicted 30% of the consumers ranked stimulation from color on clear cellophane bags as 3rd.

The implementation of graphics on clear cellophane bag provides creativity and

detailed features on aluminum foil wrap make the figurines more realistic. The graphics are used from simple to complex forms either in 2-dimensional or 3-dimensional shapes depending on the holiday characters. The graphics on foil had the highest response with 73% of consumers from the survey ranking them as number one on the list. Graphics on foil is a profitable material as it stimulates a festive (and purchasing) mood in consumers. Graphics applied on clear cellophane bags is less common since the goal is for the chocolate to be visible. However, to make the final product more appealing, a tag or a small card with graphics attached is often used to increase positive stimulation. 27% consumers ranked graphics on bags as 4^{th}.

Last but not least is the chocolate's surface. Surface embellishment is created in two different manners. The first is the detailing features on molded chocolate and the second is the frosting/icing applied for additional visual appeal of the final product. In the survey, surface embellishment of foil was ranked as 4^{th} and last by 32% of consumers. Features on a chocolate's surface were not stimulating enough to some consumers. The clear cellophane bag was ranked as the favored packaging material from 68% of the consumers. They are most stimulated by viewing the chocolate covered with decorated frosting/icing through clear cellophane bags.

The chart illustrates the data results and rank order from 105 survey participants as what they were most stimulated by when purchasing the product:

Characteristics	**Aluminum Foil Wrap**	**Clear Cellophane Bags**
Packaging Material	61% (3^{rd})	39% (2^{nd})
Color	70% (2^{nd})	30% (3^{rd})
Graphics	73% (1^{st})	27% (4^{th})
Surface Embellishment	32% (4^{th})	68% (1^{st})

Chocolatiers' Perspectives

The consumers' data about their packaging preferences does not give the ultimate answer for chocolate's freshness. The focus will now shift toward the chocolatiers to discover their packaging preferences for chocolate products. There may be a gap in thinking between what consumers and chocolatiers consider as the ideal packaging.

Obtaining responses from chocolatiers was a challenge with the rate of return at 13%. Some of the reasons the chocolatiers were not able to respond the survey were as follows:

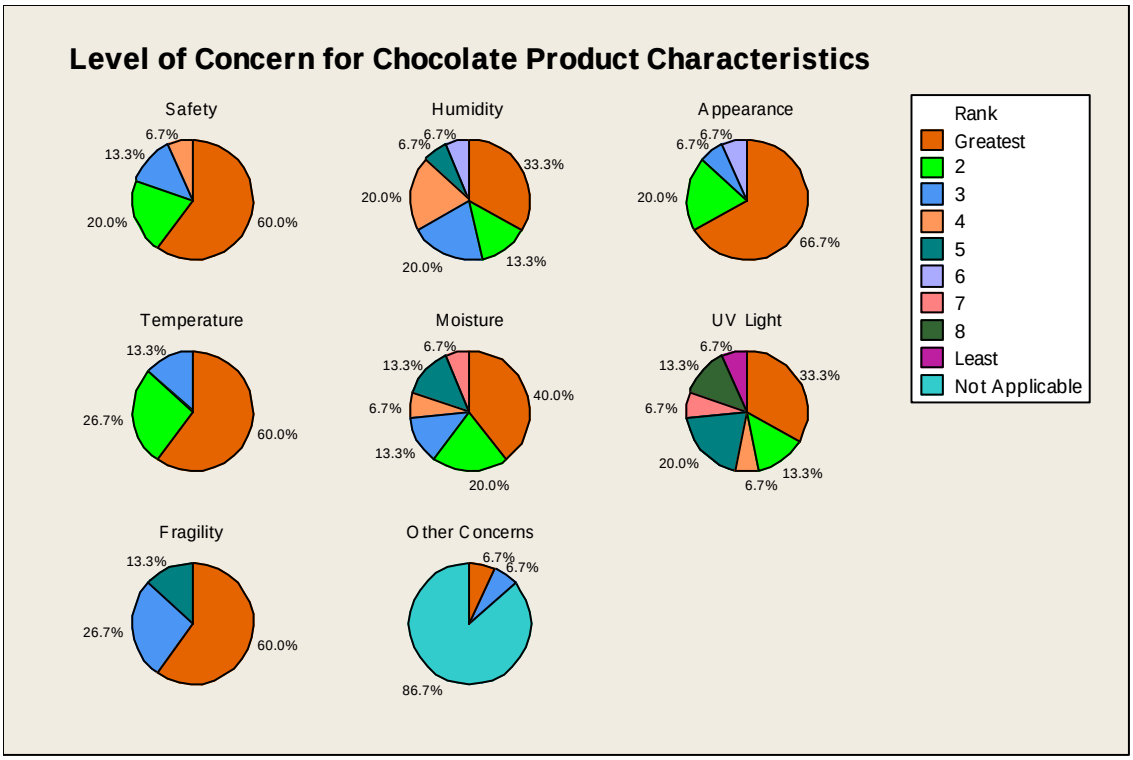
- Large chocolate businesses have a policy indicating they are not willing to release confidential information to the public.
- Tied with tight schedules with upcoming holidays (ex. Halloween, Thanksgiving, Christmas and New Year).
- Chocolate business that just opened and no history information to share.
- Chocolate business names misinterpreted by consumers assuming that they are chocolate-making company. For example, "Chocolate Barn", a sheep/poultry breeder. The reason they named the company "Chocolate Barn" is they simply painted the barn brown.
- Tied with personal issues: family matters and business trips.
- Incorrect mailing addresses were returned and they cannot be reached.
- Chocolate suppliers found the questions were not applicable to them.

Manufacture Locations

Ultimately a chocolate company's goal is to earn profits by merchandising their product. They focus on the product's every detail. A great deal of work goes into the final product from the choice of high-grade ingredients to detailed molds to style of packaging. Their priority is for their products to maintain shelf life stability and to satisfy consumer's needs. Premium chocolates are often handmade and produced on premises in small or family-owned shoppes. This makes chocolate seem higher quality and one-of-a-kind

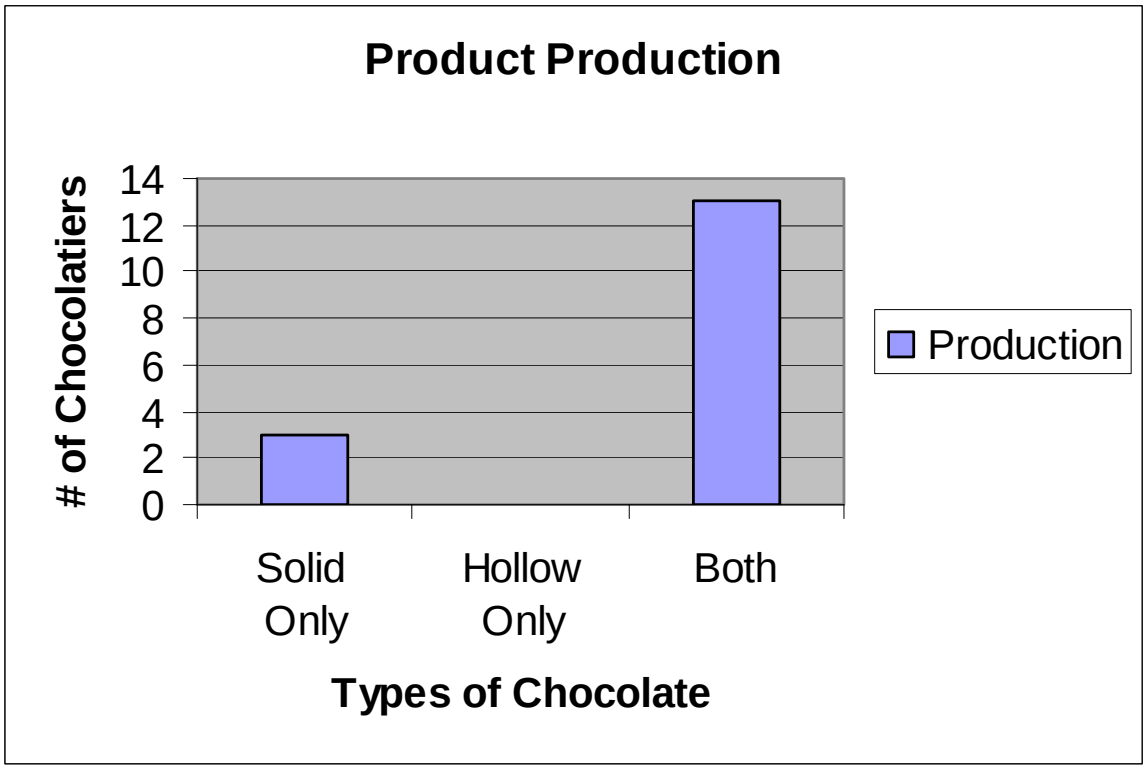
compared to the lesser quality through mass production systems. According to the survey, 94% of the chocolatiers produce their seasonal products on-site and distributing chocolate nationwide or internationally is not a part of their marketing. The data indicated 88% of the businesses market and distribute their products locally. This demonstrates that consumers obtain the freshest product they can buy within their region.

Chocolatiers still have to ensure their products are packaged properly for various distribution channels. This does not refer to out of state or international distribution but how consumers handle the product once it leaves the store. Chocolatiers expressed their concerns about the chocolate's quality and keeping its shape until consumption. Appearance is considered to be the biggest concern of any of the other characteristics with the percentage at 68.8%, because the surface of the mold is what makes the product more appealing to consumers. Temperature sensitivity computed at 62.5% was the second highest concern for chocolatiers, followed by fragility and safety at 56.3%. Again, the attributes of the product are crucial to maintaining the visual quality. 'Other' characteristics that were not listed in the survey were two chocolatiers who replied to having significant concerns about whether the packaging was environmentally friendly and the quality of chocolate. The chart exhibiting the remaining essential characteristics that concerned chocolatiers are in the following:



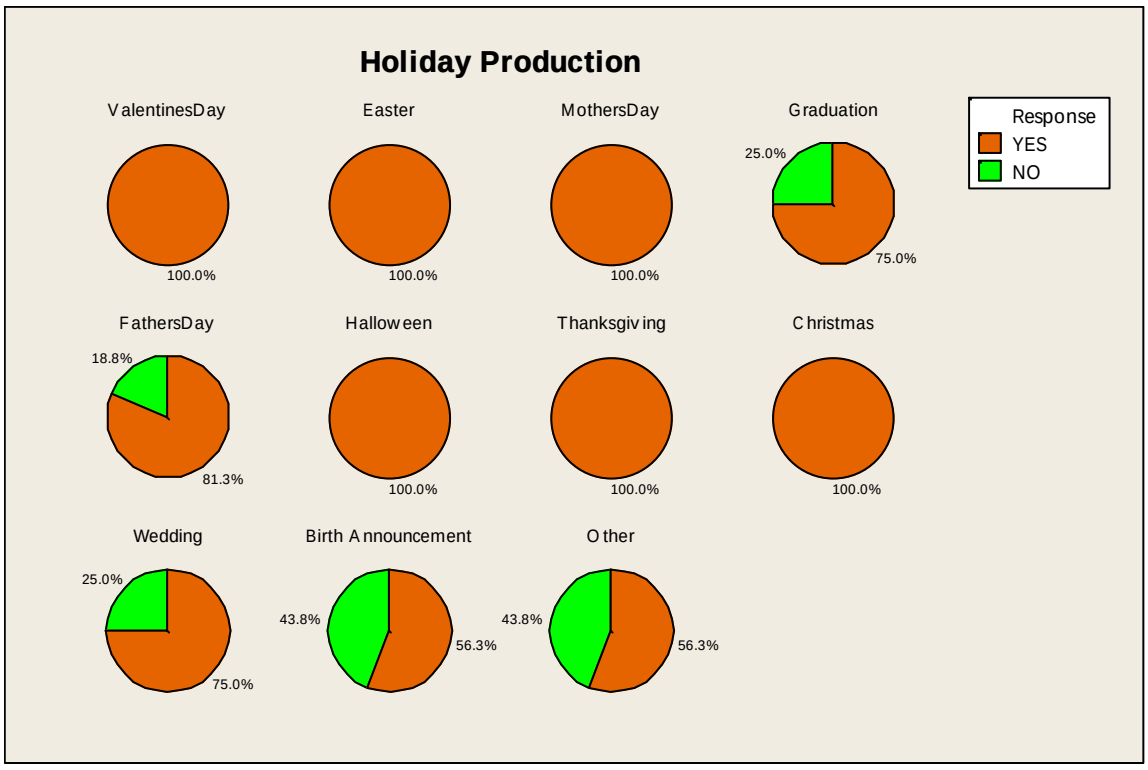
Solid vs. Hollow

Seasonal chocolate comes in many forms and chocolatiers specialized in solid, hollow, and both types depending on the holidays/special events. Referring to the survey, the solid outweighed the hollow by 18.75% since the benefits of manufacturing solid, seasonal figurines are that the quantity of chocolate is greater than the hollow and the product is also less fragile. Since chocolate can be a high-grade premium product and consumers are willing to purchase at a higher price there is a greater quantity of chocolate involved. About 81.25% of the chocolatiers preferred to manufacture both solid and hollow premium chocolate products to allow consumers choice to purchase.



Special Occasions

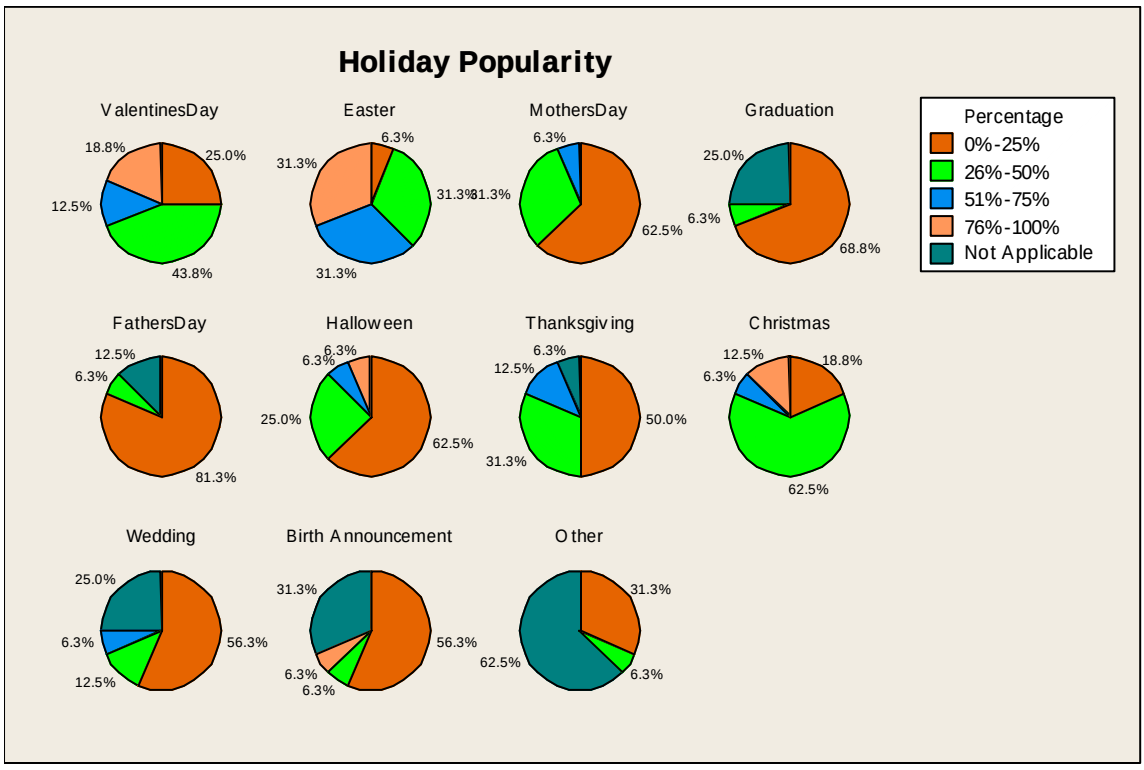
Seasonal chocolate is commonly produced and marketed for every holiday/special event as chocolatiers want their products to be an important part of consumer's celebration. The holidays/occasions when the most chocolate is sold are Valentine's Day, Easter, Mother's Day, Halloween, Thanksgiving and Christmas. The chart portrays both majority and minority holidays in the following:



In the 'Other' category, are holidays/occasions on the main list when chocolatiers still create products to fit into consumers' celebration:

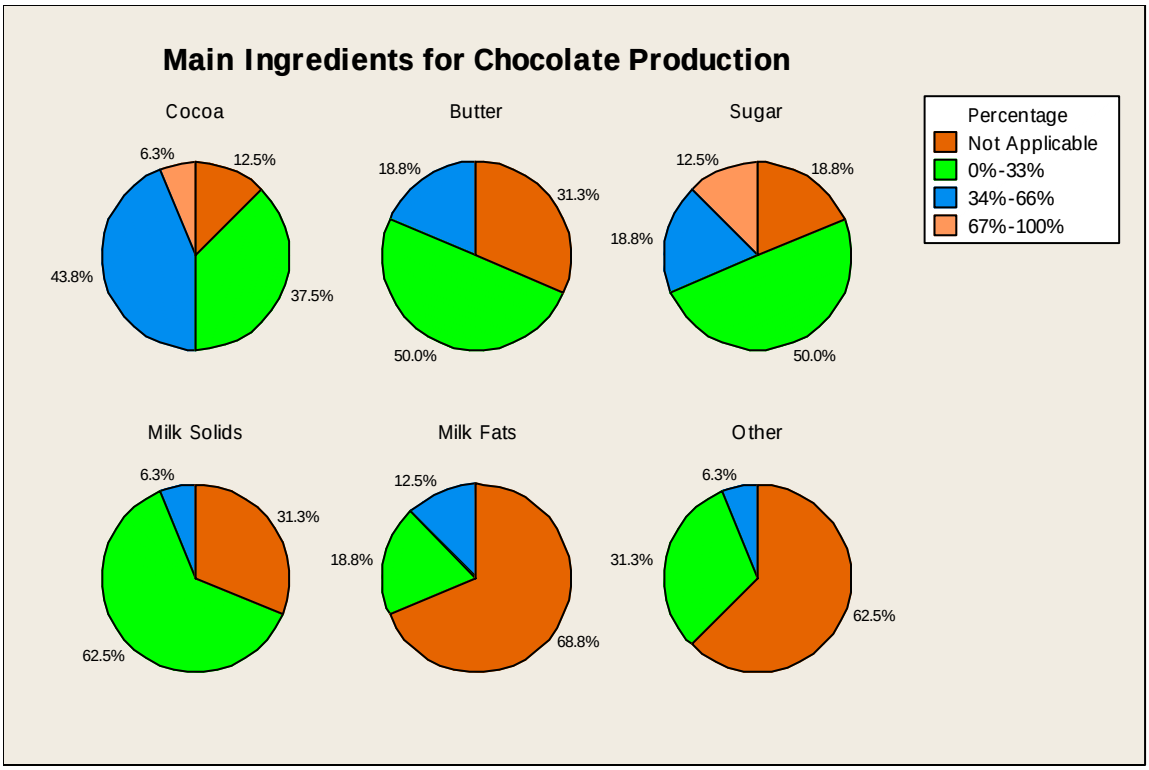
- Sweet Sixteen
- Communion
- Bar/Bat Mitzvahs
- Corporate Orders
- Baby Shower
- Confirmation
- Custom Made
- Secretary's Day
- Hanukkah
- Teacher/End of School
- Admin. Professional Day
- Passover
- Wedding Shower
- Anniversary
- Earth Day

For more precise data, the percentages calculated in quarters for all holidays that are most popular to the sale of specialty chocolate products are as follows:



Main Ingredients

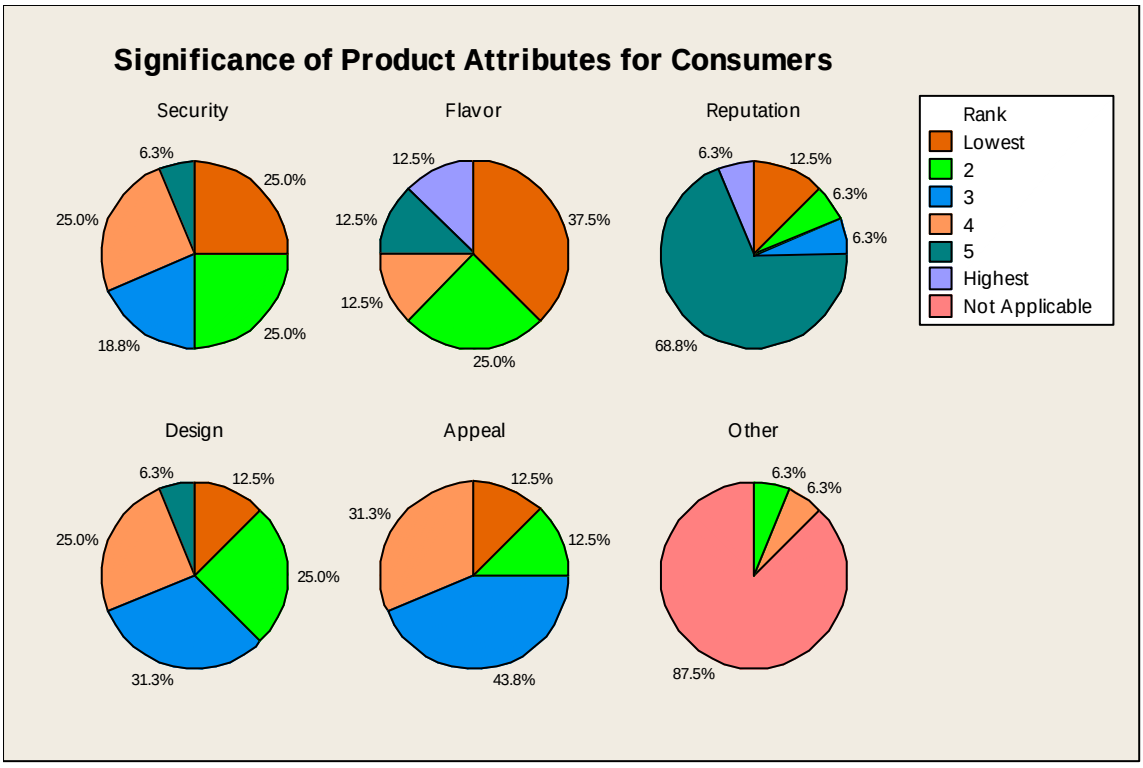
Premium chocolate contains high-grade ingredients for the best quality taste and the challenge is to protect the chocolate against degradation. Chocolatiers were not willing to share their secret recipes, however, they were willing to indicate the percentages of ingredients measured in thirds indicating how much has been used for production. Main ingredients with the percentages of 34%-66% were cocoa at 43.8% as the highest followed by butter and sugar at 18.8% compared to others. The chart depicts the percentages of main ingredients chocolatiers used for their products:



'Other' is noted as flavoring oils, chocolate discs, vanillin and cocoa butter.

Significant Attributes

Chocolatiers need to comprehend the consumer's perspective for what attributes they consider most significant when purchasing premium products. The data indicated 12.5% of chocolatiers felt the favor quality is the highest priority to consumers. The second essential attribute was the chocolatiers' reputation which ranked at 68.8%. Preserving company recognition is vital to chocolatiers to provide consumers with positive experiences and encourage them to return for more chocolate. Additional attributes which are ranked from lowest to highest significance are illustrated in the following chart:

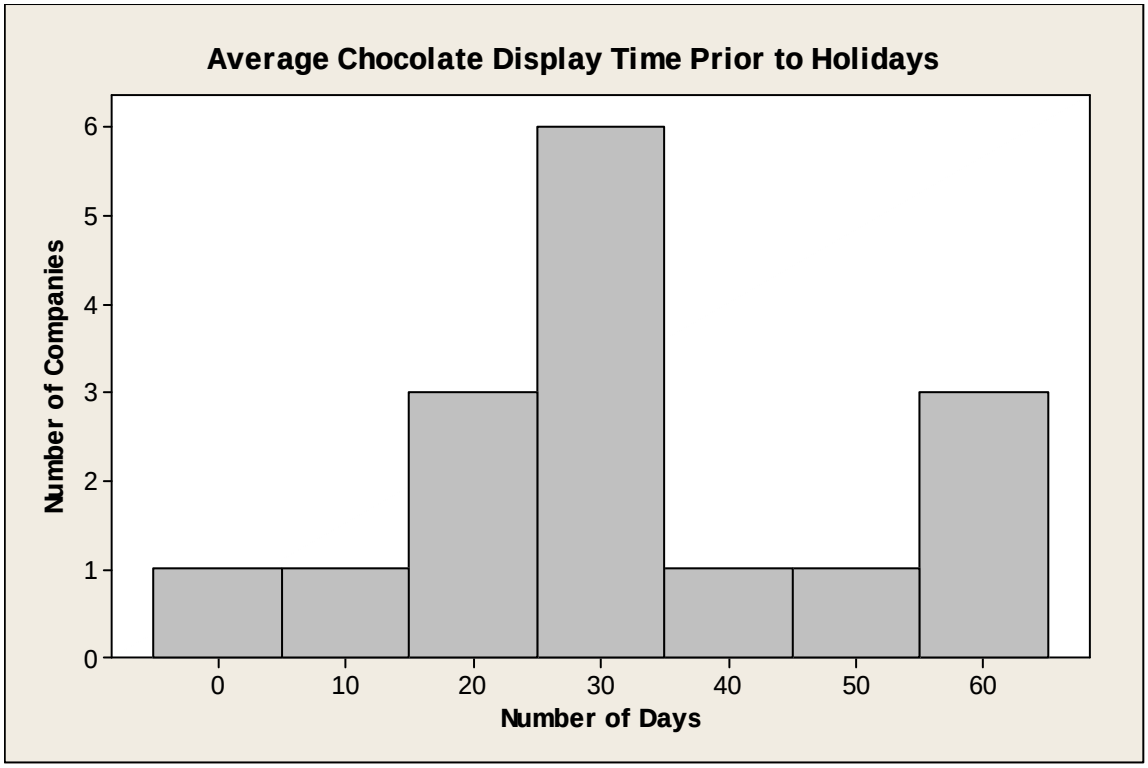


Chocolatiers noted price and personal interest in the 'Other' category.

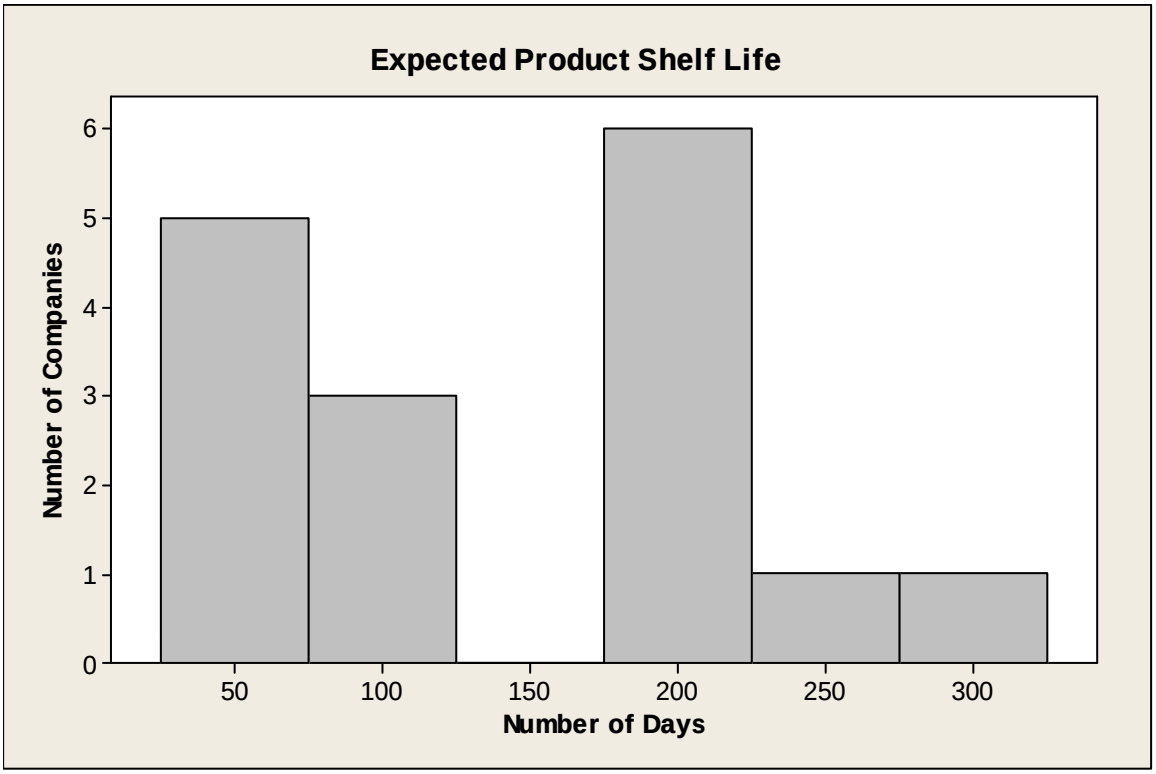
Shelf Life Expectancy

With the delicacy of premium novelties' high-grade ingredients, extra care and quality control need to be taken for better shelf life stability. Proper packaging and stable environmental settings allow chocolate to be produced in advance. The data from 16 chocolatiers expressed a diverse range of advanced production from 3 to 120 days with the average being 32.1 days being a practical time before entering the marketplace. When holidays/special events are approaching, the products are transferred from cooling storage to in-store displays. Thirty-eight percent (38%) of the chocolatiers expressed the highest average that their products are marketed is 30 days before the occasion, allowing flexibility for consumers' purchasing time. The diagram illustrates the range of

anticipated number of days dedicated to in-store displays and marketing before the occasion:

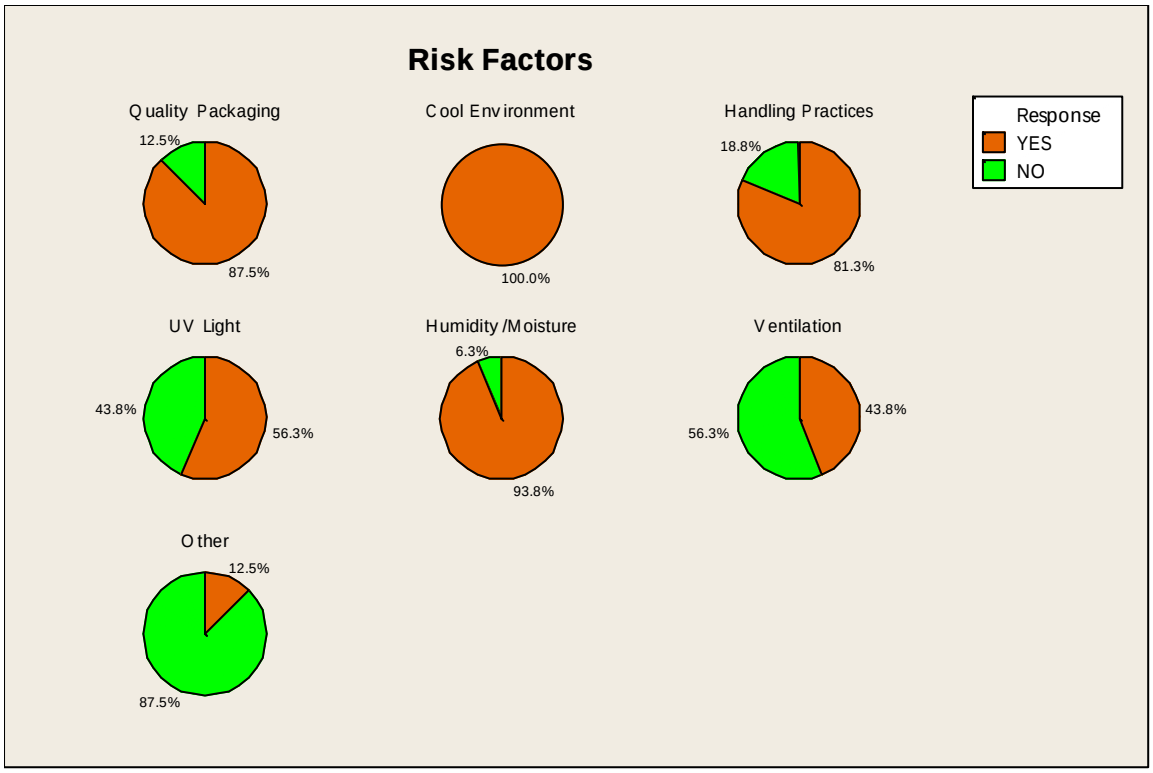


The chocolate's shelf life does not terminate at the instant they are sold and off the shelves. The shelf life must remain consistent until the day of the consumer's celebration and consumption. The optimum expected shelf life for the chocolate is 180 days revealed by 38% of the chocolatiers. After 180 days, the chances of the chocolate's quality are likely to diminish. The chart depicting the premium products' expected shelf life from 16 chocolatiers is in the following:



Risk Factors

Extending the shelf life for the greatest number of days is a priority for the chocolatiers and they try to develop strategies to prevent common risk factors from occurring. The greatest source of prevention is to maintain a consistently cool environment since unexpected temperature fluctuations can cause chocolate to degrade. Illustrated in the chart are strategies to prevent common risk factors to maximize chocolate's shelf life:



'Other' is identified as avoidance of storing products near strong odors.

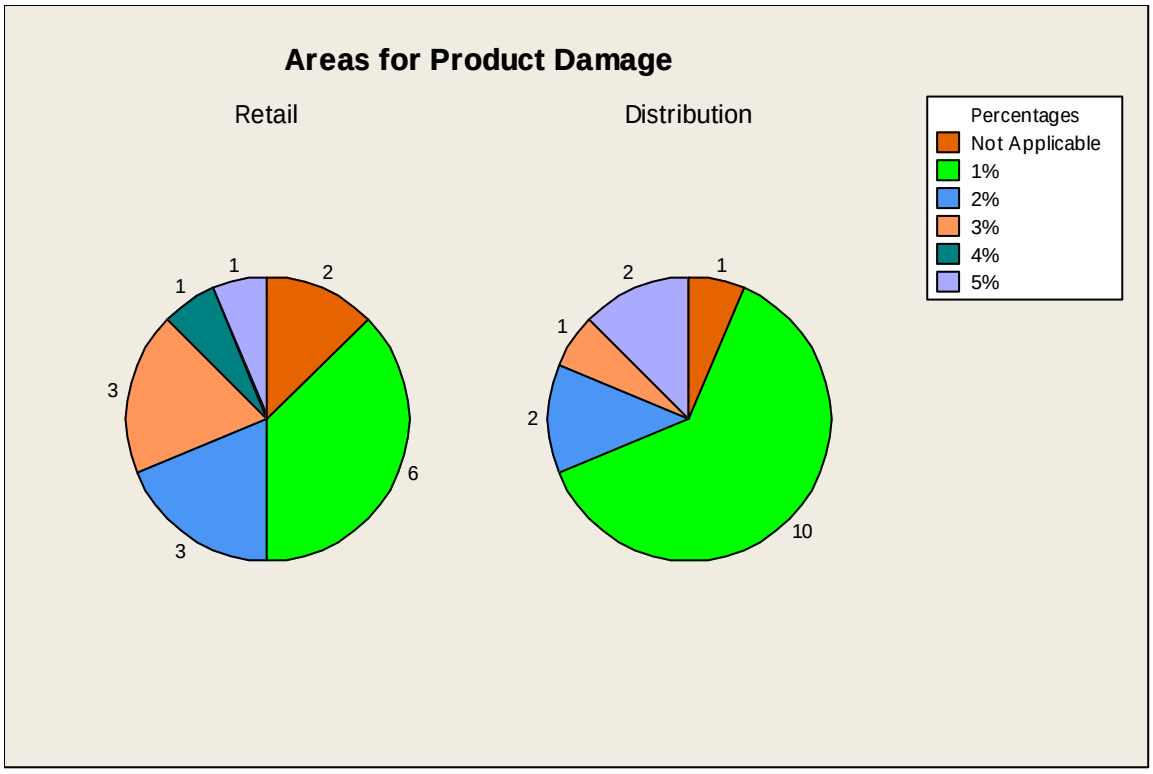
Packaging Commonly Used

Packaging maintains the chocolate's delicate properties and provides product safety once it departs from the premises. Packaging comes in a spectrum of sizes and types that serves one purpose—to maximize the shelf life of the chocolate until it is edible. The clear cellophane bag is a highly preferable material at 87.5% and only a small percentage of 12.5% favored aluminum foil wrap. The visible novelties able to be seen through the packaging are ideal to boost the sales for chocolatiers. A positive note for foil wrap is that it does maximize the shelf life but hidden chocolate is not smart marketing for 87.5% of the chocolatiers. Consumers enjoy viewing the actual product instead of just the packaging. Both cellophane bags and foil wrap are not the only preferred materials as

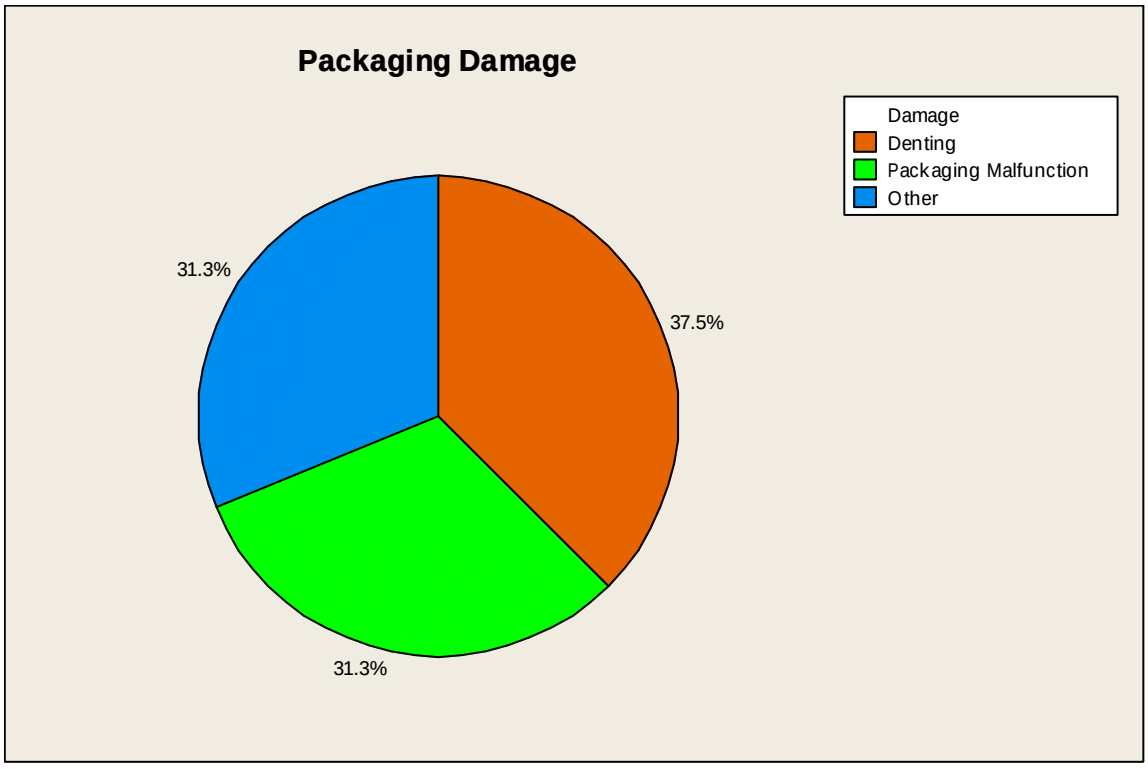
62.5% of the chocolatiers selected ‘other’ that are beneficial for their products. They are identified as thermoform/plastic mold, plastic food wrap, tins, paperboard boxes, shrink wrap and sulfurized paper with padding to absorb shocks.

Damages

Family-owned shoppes prefer to keep their business small so their specialty products are unique and handmade. Since their product is fragile, careful packaging is a challenge for chocolatiers. Damage can occur within packaging and chocolate can lose its form in two different locations: during distribution or at the retail shops. The condition of the packaging when it reaches its destination varies on how it is handled through distribution channels. Not all packaging with products inside arrive in excellent condition and damage from distribution is a common, recurring dilemma. It portrays a higher response of damages compared to retail shops:



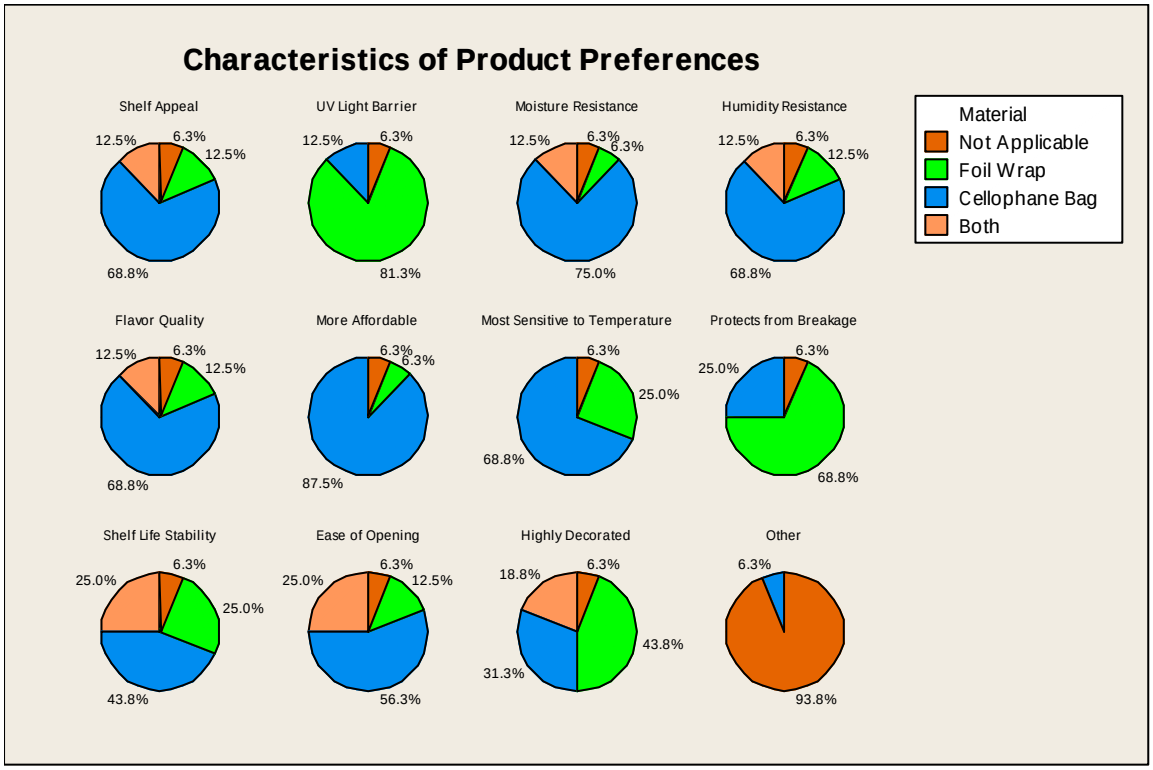
Furthermore, damages are not from distribution alone but also occur on the premises where chocolate is manufactured. This indicates careless handling while chocolate is being packaged. The result below identified the types of potential damage. Denting is the most common problem for both distribution and at retail shops at 37.5%. Additional packaging could help reduce denting. The 'Other' was identified as crushed, breakage/dropped and rough handling. Melting and packaging malfunction were tied at 31.3%. The chart illustrates the aspect of damages occurring in packaging in the distribution and retail environments:



Characteristics of Product Preferences

Clear cellophane bags and aluminum foil wrap material each have their own strengths but one exceeds the other depending on the tolerance of the environmental surroundings. Chocolatiers stated which packaging material they felt was the most ideal

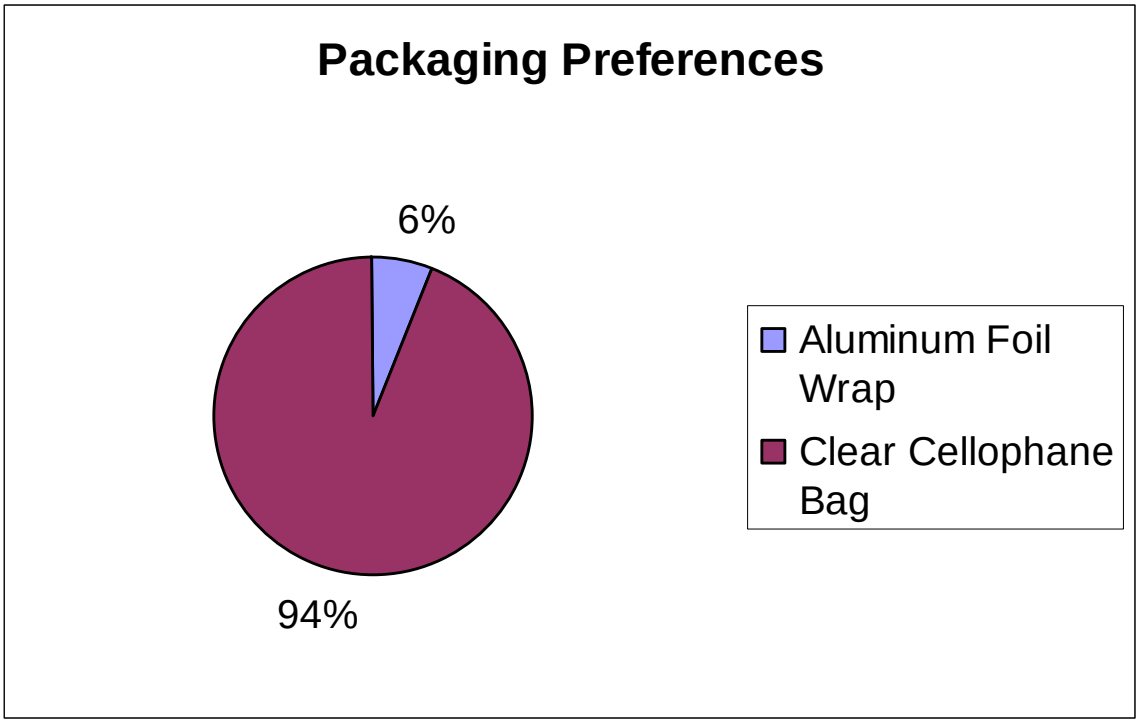
to maximize chocolate quality. According to the survey, the clear cellophane bag is the most ideal packaging material as it outperformed aluminum foil wrap in eight48 characteristic categories. The remaining three characteristics: UV light barrier (81.3%), protection from breakage (68.8%) and highly embossed/decorated (43.8%) scored higher for aluminum foil wrap. It is evident the material and quality of foil outperforms clear cellophane bags in those three categories for extended shelf life. Both materials are portrayed with the characteristics that can lead to longer shelf life. 'Other' is identified as easy to use.



Ideal Packaging Preference

Both materials have advantages for chocolate's quality and freshness. The

challenge chocolatiers face is to ensure the material maintains the product's shelf life and avoids deterioration before it reaches the final stage. According to statistics, 94% of the chocolatiers preferred clear cellophane bags as it is proven to maximize the shelf life.



Aluminum foil wrap was rated at only 6%, because it does not meet one or more characteristics that extend the shelf life. Chocolatiers expressed clear cellophane bags as their highlighted packaging material preference. The following statements are a few true and exact quotations chocolatiers wrote from the survey. Their identity remains anonymous:

- "Looks nice (shows product) and can be sealed to preserve freshness."
- "…It allows the customer to view the detail in each novelty. It's also less expensive than aluminum foil wrap."
- "Can monitor its appearance and guides me as to the time life of the product. I know when it has to be pulled."
- "Consumers can also see what the product they are purchasing looks like."
- "Cheap, easy to use, one size holds many different shapes and sizes of products, can be tied tightly to keep air out."

The following data is not the focus of this study however it is helpful to understand the preliminary stages that the chocolate endures prior to packaging. Chocolatiers need to overcome the challenges in producing top-quality chocolate successfully by working closely to ensure their products have a healthy shelf life.

STAGE	**CHALLENGES**
Production	• Intensive labor/rising costs for raw material. • Space is limited. • Maintaining staff. • Temperature/ventilation. • Seasonal; production line must increase dramatically.
Storage	• High energy costs for A/C. • Space is scarce. • High utility costs. • Cool, dry area needs to be monitored closely.
Marketing	• High advertising costs. • Fewer retail outlets; more chain stores. • Identifying target audience. • Right packaging, portion size and premium price.
Shelf Life Span	• Produce small batches at a time in a time span. • Use special code to track the freshness of products.
Packaging	• Very labor intensive. • High material costs. • Creativity of unique packaging is time consuming and costly. • Awkwardness for shipping; sizes and shapes not standard.
Other	• Nutritional labeling is mandatory for safety health code. Special labeling machines needed to be purchased and chocolate has to be sent to a lab for analysis at own costs.

All names of the chocolate companies/contact person(s) and participating consumers remained anonymous to protect their privacy throughout the research.

Conclusion

In closing, after learning many details about both consumers' and chocolatiers' views about chocolate, it was clear that their perceptions and packaging preferences varied. The final results showed that the target buyers for purchasing high quality, seasonal, premium chocolate are those who were married, between the age groups 40-61 for females and 51-61 for males, had Masters degrees and had an income of $20K-$30K for females and $70K+ for males. The data indicated that those consumers, especially females, were the main purchasers for chocolate. Consumers with similar background profiles demonstrated a pattern of preferring aluminum foil wrap 91.1% of the time when purchasing chocolate. From their positive purchasing experiences, they felt that the foil packaging material extended the shelf life longer than the clear cellophane bags because the foil being tightly wrapped allowed better protection from environmental interference. Furthermore, the 3-dimensional shapes with enriched graphics attracted adults and children more than the clear cellophane bags during holidays.

Technically, the clear cellophane bag was also preferred but for a smaller pool of target buyers at 72.8%. One benefit was the visibility of the actual product through the packaging in order to see the characteristics of the chocolate. The second reason was that those buyers were not interested in paying high costs on elaborate packaging but rather in the quality of the chocolate. Quality was considered to be a main concern so careful packaging needs to be the focus for a better shelf life.

Based on the data results, the business sector did show a different packaging material preference than the consumer sector due to their background knowledge of

manufacturing challenges.

First of all, the results provided interesting facts that showed similarities for both the consumers and chocolatiers. Solid, seasonal novelties were the type consumers liked to purchase. They were more popular than hollow chocolates and chocolatiers knew that. be sold for popular holidays. The data for both consumers and chocolatiers show similarity in holiday popularity.

The data indicated chocolatiers and their consumers' believe the most significant attribute of the chocolate is the flavor. However, while chocolatiers are also concerned with flavor, their second highest attribute of concern is the visual appearance of the chocolate.

According to the data, chocolatiers' preference for packaging their products was clear cellophane bags at 87.5%. The material has benefits over foil wrap at 12.5% for various reasons. Greater visibility of the chocolate through the bag is ideal for chocolatiers as they believe consumers like to view the actual product. Also, the material costs are economical to chocolatiers and they believe it extends the shelf life better than the foil. Environmental conditions need to be monitored for continued quality control against humidity, moisture and handling practices. Also, damage needs to be recognized and minimized for both distribution and at retail stores.

Other significant information chocolatiers need to know about consumers' needs were hinted at in this research. Chocolatiers welcome consumers' suggestions about the chocolate quality for future improvement. According to the survey, responses asking for more content information about the quality of chocolate are as quoted:

“Cocoa content should be indicated.”
“Clear labeling of ingredients especially nuts or other things.”
“More ‘sugar-free’ candy—more of population are becoming diabetic but still want to enjoy it.”
“I now prefer a higher cocoa content and fewer additives.”

In addition, a basic schematic of the steps required for chocolate production and shelf life. Each step is significant to the chocolate making process but not every step is applicable to each company.

1st Step
- Production of chocolate: adding ingredients, conching and tempering
- Molds and decorations: cool and harden
- Amount of time for completion: 56.25% of chocolatiers performed this task in 1 day.

2nd Step
- Packaging and distribution
- Storage in cool temperature
- Amount of time for completion: 43.75% of chocolatiers performed this task in 30 days.

3rd Step
- Displaying and marketing
- Amount of time for completion: 31.25% of chocolatiers performed this task in 30 days.

4th Step
- Discount sale
- Amount of time for completion: 81.25% of chocolatiers performed this task in 0 days.

The goal of this research was to uncover which packaging material provides a better shelf life for premium chocolate: clear cellophane bags or aluminum foil wrap. Additionally, which material was preferred by both consumers and chocolatiers? Each group clearly showed they had a material preference (consumers liked foil wrap while chocolatiers preferred cellophane bags) but their choices differed. Clearly, if chocolatiers have the scientific proof that cellophane bags are better than aluminum foil that should be the final result. However, because consumers prefer premium chocolate in aluminum foil, chocolatiers will need to continue to produce products packaged in both materials and ensure both maintain product freshness. Furthermore, chocolatiers need to use eye-appealing packaging material and perhaps brand recognition as a way to motivate consumers to purchase their products.

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APPENDICES

Need RIT Letterhead

Date

Company's Name
Contact Person
Street Name
City, State Zip Code

Dear: Sir/Madam,

I am pursuing a Master's degree from the Packaging Science Program at the Rochester Institute of Technology and am in the process of doing packaging research on specialty chocolate products for my thesis.

My goal is to compare two packaging materials: aluminum foil wrap and clear cellophane bags and whether one allows an extended shelf-life for seasonal, high-quality chocolates (relating to freshness and appearance) for consumers in New York State. I'm considering seasonal, high-quality chocolates as those specific to holiday and celebratory occasions meaning, hollow or solid molded chocolates.

I'm sending a straight forward questionnaire to randomly selected chocolate companies in New York State to find out about packaging choices and considerations for chocolate products. Also included is a basic schematic of the steps required for chocolate production and distribution. I'm interested in finding out from your company how much time each step requires.

Your responses and information about your company would be greatly appreciated and will remain anonymous in my research. Upon completion, please return the survey in the self-addressed envelope by September 29, 2006.

Thank you in advance for your time and input. If you have any questions, please do not hesitate to contact me.

Sincerely,

Jillian Sinclair
Masters of Science Candidate
(585) 797-0228
jlsnca@yahoo.com

Specialty Chocolate Survey Business Name: _____

BUSINESS

1. Does your business produce seasonal chocolates on-site?
   Please check one: YES ❑ NO ❑

2. If no, where are your specialty chocolate orders distributed?
   Please check one of the following:

LOCATION	PLEASE CHECK ONE
Within New York State	❑
Outside New York State	❑
International	❑

3. When chocolates are packaged for distribution, please rank from 1 'greatest' to 9 'least concern' which characteristics are the greatest concerns for your chocolate products?

CHARACTERISTICS	GREATEST CONCERN								LEAST CONCERN
Fragility	1	2	3	4	5	6	7	8	9
UV Light Exposure	1	2	3	4	5	6	7	8	9
Temperature Sensitivity	1	2	3	4	5	6	7	8	9
Moisture Resistance	1	2	3	4	5	6	7	8	9
Humidity Resistance	1	2	3	4	5	6	7	8	9
Ease of Packaging	1	2	3	4	5	6	7	8	9
Hygiene, Safety and Product Security	1	2	3	4	5	6	7	8	9
Chocolate Appearance (Bloomfat {Aged} presence)	1	2	3	4	5	6	7	8	9
Other: _____	1	2	3	4	5	6	7	8	9

4. Which of the following product formats does your business produce?
   Please check all that apply.

PRODUCT	YES	NO
Solid Chocolates	❑	❑
Hollow Chocolates	❑	❑

SPECIAL OCCASIONS

5. In which holidays does your business sell specialty chocolate products?
   Please check all that apply.

- ❑ Valentine's Day
- ❑ Easter
- ❑ Mother's Day
- ❑ Graduation
- ❑ Father's Day
- ❑ Halloween
- ❑ Thanksgiving
- ❑ Christmas
- ❑ Wedding
- ❑ Birth Announcement
- ❑ Other: Please identify: _____

6. Circle the percentages (calculated in quarters) for all holidays which are MOST popular to the sale of specialty chocolate products.

HOLIDAY	PERCENTAGES			
Valentine's Day	0%-25%	26%-50%	51%-75%	76%-100%
Easter	0%-25%	26%-50%	51%-75%	76%-100%
Mother's Day	0%-25%	26%-50%	51%-75%	76%-100%
Graduation	0%-25%	26%-50%	51%-75%	76%-100%
Father's Day	0%-25%	26%-50%	51%-75%	76%-100%
Halloween	0%-25%	26%-50%	51%-75%	76%-100%
Thanksgiving	0%-25%	26%-50%	51%-75%	76%-100%
Christmas	0%-25%	26%-50%	51%-75%	76%-100%
Wedding	0%-25%	26%-50%	51%-75%	76%-100%
Birth Announcement	0%-25%	26%-50%	51%-75%	76%-100%
Other:_____	0%-25%	26%-50%	51%-75%	76%-100%

QUALITY

7. Check the applicable main ingredients used for producing high chocolate quality. Please circle the percentages used in the product.

Please check all that apply	PERCENTAGES CALCULATED IN THIRDS		
❑ Cocoa	0%-33%	34%-66%	67%-100%
❑ Butter	0%-33%	34%-66%	67%-100%
❑ Sugar	0%-33%	34%-66%	67%-100%
❑ Milk Solids	0%-33%	34%-66%	67%-100%
❑ Milk Fats	0%-33%	34%-66%	67%-100%
❑ Other**	0%-33%	34%-66%	67%-100%

**If checked 'other', please identify the ingredient used in specialty chocolate products that are not on the list _____

8. What attributes does your business believe are significant to customers when they are purchasing specialty chocolate products? Please rank in order 1 'lowest' to 6 'highest'.

ATTRIBUTES	RANK (1 'lowest' to 6 'highest')					
Reputation	1	2	3	4	5	6
Packaging Design (decorative/printability)	1	2	3	4	5	6
Shelf Appeal	1	2	3	4	5	6
Flavor Quality	1	2	3	4	5	6
Hygiene, Safety and Product Security	1	2	3	4	5	6
Other: please identify _____	1	2	3	4	5	6

9. Identify the challenges your company faces today when providing top-quality chocolate in the areas of:

Production: _____

Storage: _____

Marketing: _____

Shelf life span: _____

Packaging: _____

Other: _____

10. Indicate any improvements or suggestions from customers about the quality of your chocolate?

_____

_____

_____

SHELF-LIFE

11a. Please indicate the number of days your business holds or stores the specialty chocolate products before entering the market place. _____ Days.

11b. Please indicate the anticipated number of days dedicated to in-store displays and marketing before the occasion. _____ Days.

11c. Please indicate the expected shelf-life of your chocolate product. _____ Days.

12. Please check the appropriate strategies for preventing risk factors to chocolate's properties and to maximize shelf-life.

RISK FACTORS	CHECK ALL THAT APPLY
Quality Packaging	❑
Cool Environment	❑
Appropriate Handling Practices	❑
Protection from UV light (sunlight, florescent lighting)	❑
Minimum Levels of Humidity/Moisture	❑
Control of Ventilation	❑
Other: please identify _____	❑

PACKAGING

13. Indicate the type of packaging your business commonly uses to maintain the chocolate's delicate properties. Please check all that apply.

- ❑ Aluminum Foil wrap
- ❑ Clear Cellophane Bag
- ❑ Other. Please identify:_____

14. Roughly, what percentage of your product gets damaged through?

Distribution: _____%

At the retail outlets: _____%

14b. How is the packaging damaged if it happens? Please check all that apply:

- ❑ Denting
- ❑ Packaging Malfunction (ex. Ripping)
- ❑ Other: _____

15. Which is the ideal packaging to maximize the chocolate quality for each characteristic? Please check one for each category or check both category if applicable.

	MATERIAL	
CHARACTERISTICS	Aluminum Foil Wrap	Clear Cellophane Bag
Provides Shelf Appeal	❑	❑
Provides UV Light Barrier	❑	❑
Provides Moisture Resistance	❑	❑
Provides Humidity Resistance	❑	❑
Preserves Flavor Quality	❑	❑
Is More Affordable	❑	❑
Most Sensitive to Temperature	❑	❑
Protects Chocolate from Breaking/Chipping	❑	❑
Enhances Shelf Life Stability	❑	❑
Provides Ease of Opening	❑	❑
Can be Embossed or Highly Decorated	❑	❑
Other: _____	❑	❑

16. Which of the two packaging material do you strongly believe maximizes the chocolate's shelf life? (ex. Packaging material has a role in preserving chocolate during storage, distribution, and merchandise). Please check one.

- ❑ Aluminum Foil Wrap
- ❑ Clear Cellophane Bag

Why is this packaging material your choice?

_____

_____

_____

Additional comments:

_____

_____

_____

Thank you for your time in completing this survey.

need RIT Letterhead

Date

Company's Name
Contact Person
Street Name
City, State Zip Code

Dear: Sir/Madam,

In the process of doing packaging research on specialty chocolate products for my thesis, I sent your company a survey package dated September XX, 2006.

As the deadline is fast approaching, I'd like to ensure that you received it and to encourage your participation. If for some reason you did not receive the package but would still like to take part, please let me know and I'd be happy to send you a replacement by mail or email.

Sincerely,

Jillian Sinclair
Masters of Science Candidate
(585) 797-0228
jlsnca@yahoo.com

Basic Schemata of Chocolate Company's Timeline Process

PLEASE ADD ANY ADDITIONAL STEPS THAT ARE NOT INCLUDED IN THE LIST

1st Step

- Production of Chocolate: Adding ingredients, conching and tempering
- Molds and Decorations: cool and harden
- Amount of time for this process—approximate days _____

2nd Step

- Packaging and Distribution
- Storage in cool temperature
- Amount of time for this process—approximate days _____

3rd Step

- Displaying and Marketing
- Amount of time for this process—approximate days _____

4th Step

- Discount sale
- Amount of time for this process—approximate days _____

Sample of Email Notification for Consumer Participation through E-blast

Specialty Chocolate Survey

PERSONAL INFORMATION (Please check one for each question)

GENDER Male ❑
Female ❑

AGE 18-28 ❑ 29-39 ❑ 40-50 ❑ 51-61 ❑ 62-72 ❑

HIGHEST LEVEL OF EDUCATION
Diploma ❑ Associates ❑ Bachelors ❑ Masters ❑ Ph.D ❑

INCOME LEVEL
$20,000-$30,000 ❑
$31,000-$40,000 ❑
$41,000-$50,000 ❑
$51,000-$60,000 ❑
$61,000-$70,000 ❑
$71,000 + ❑

MARTIAL STATUS
Single ❑ Divorced ❑ Cohabiting ❑
Married ❑ Widowed ❑

PRODUCT PREFERENCE

1. Have you recently or in the past purchased seasonal chocolates? Please check one:
YES ❑ NO ❑

2. Which chocolate products are you **MORE** likely to purchase?
Please check each of the following categories:

PRODUCT	YES	NO
Solid Chocolates	❑	❑
Hollow Chocolates	❑	❑

3. For what do you **MOSTLY** purchase specialty chocolates?
Please check each of the following categories:

REASON	YES	NO
Self-consumption	❑	❑
Gifts for special occasions	❑	❑

4. For which holiday do you purchase specialty chocolate products?
Please check all that apply:

❑ Valentine's Day
❑ Easter
❑ Mother's Day
❑ Graduation
❑ Father's Day
❑ Halloween
❑ Thanksgiving
❑ Christmas
❑ Wedding
❑ Birth Announcement
❑ Other: Please identify: _____

5. What is your priority when purchasing specialty chocolate products?

CHARACTERISTICS	RANK 1 'LOWEST' TO 5 'HIGHEST'
Flavor	____
Quality	____
Cost	____
Visual appeal of packaging	____
Appearance of chocolate	____

SHELF-LIFE

6. When specialty chocolate products are being marketed, how many days in advance do you purchase them for certain holidays? _____Days.

7. Would you purchase specialty chocolates marked down in price after the holiday?
Please check one: YES ❑ NO ❑

Why or why not?

_____

_____

QUALITY

8. Are you willing to pay more to purchase premium quality chocolates?
Please check one:
YES ❑ NO ❑

Please explain:

_____

_____

_____

PACKAGING

9. Have you purchased specialty chocolate in the following packaged material?
Please check each of the following categories:

MATERIAL	YES	NO
Aluminum Foil Wrap	❑	❑
Clear Cellophane Bag	❑	❑
Other	❑	❑

10. Which stimulates you the MOST when purchasing premium chocolates? Please check one for each category.

CHARACTERISTICS	Aluminum Foil	Clear Cellophane Bag
Packaging material	❑	❑
Color of the packaging material	❑	❑
Graphics	❑	❑
Surface Embellishment (mold details vs icing)	❑	❑
Not a concern	❑	❑

11. How do you store your chocolate at home? Please check one.
    - ❑ Cupboard
    - ❑ Refrigerator
    - ❑ Not a concern

12. From your perspective, please identify any improvements or suggestions about the quality of specialty chocolate today.

_____

_____

_____

Additional comments

_____

_____

_____

Thank you for your time in completing this survey.