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## An Investigation of Potential Marketing Strategies for Entry into the Shiitake Mushroom Industry in Utah

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AN INVESTIGATION OF POTENTIAL MARKETING STRATEGIES FOR ENTRY INTO  
THE SHIITAKE MUSHROOM INDUSTRY IN UTAH.

By

Imran Khan

A paper submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

In

Applied Economics

Approved:

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UTAH STATE UNIVERSITY  
Logan, Utah

2011



## **ABSTRACT**

This study provides an analysis of the mushroom industry in the Utah with a focus on identifying opportunities for entry into the specialty mushroom market. Determining the strategic position of the mushroom industry requires the use of local information. In this study, a local survey of consumers in Northern Utah was used to generate specific information about consumer preferences and attitudes about mushrooms and how a new entrant might be positioned to address consumers' wants and needs related to mushrooms, and specifically specialty mushrooms. Regression analysis and trend analysis were also performed using data obtained either from the survey or secondary sources. This information is then used to base conclusions about the competitive position of potential entrants for specialty mushrooms into this market.

The results of the survey depicted that respondents have a favorable attitude towards locally-produced commodities, are highly price conscious, and were mostly unaware of some of the most important attributes of mushrooms such as their nutritional and potential health values. Results of price and production trends of shiitake mushrooms indicated that this industry is still in the development stage, but characterized by intense rivalry among firms. The results of the logit analysis provided some insights about the ability to develop marketing strategies for mushrooms based on where they are produced. These results simply indicate that most respondents look favorably on locally-grown produce but that demographic characteristics can't be used to identify groups that are the most likely to want locally-grown produce. More respondents indicated a willingness to pay a premium for products containing the "Utah's Own" brand than simply "locally-grown".



Potential new entrants into the shiitake mushroom industry may capture existing market share and expand their market base by differentiating their product along the lines of versatility of use, health and nutritional benefits, and local production.



## **ACKNOWLEDGEMENTS**

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# CHAPTER 1

## RESEARCH CONTEXT

### 1.1. Justification

Mushrooms are a valuable part of the human diet and are an important food in the United States and worldwide. Their production plays a significant role in the national economy of the United States as they are produced by hundreds of producers in addition to a vast distribution network of wholesalers and retailers. The culinary, nutritional and health benefits offered by shiitake mushrooms, ensure the market for this commodity continues to grow. These attributes make shiitake mushrooms an excellent candidate for production and marketing for potential and existing mushroom enterprises. While one major mushroom producer exists in Utah, that producer focuses production primarily on common (*Agaricus*) mushrooms. Utah is a good case study because it is a relatively isolated market away from major specialty mushroom production areas. Consequently, the primary interest of this study is to examine the potential for expanding the market for specialty mushrooms in Utah from the perspective of potential new market entrants. While other studies cite the expected growth of the mushroom industry in the US and others speak of the potential marketing advantages of mushrooms (e.g., health characteristics and nutrition characteristics), there is limited research into strategies for potential entry into the specialty mushroom market.

The medicinal benefits of mushrooms uncovered by research have not been highly publicized and this provides an opportunity to market this commodity more effectively in the United States. Additional incentives for mushroom cultivation are their ability to utilize



industrial waste and the spent substrate may be used as fertilizer due to its high mineral content, phosphate content and porosity.

This study seeks to perform a strategic analysis of the mushroom industry in the United State (US). Various techniques such as a survey, regression analysis and trend analysis were used to gather information related to consumer preferences, segmentation analysis, and movement in price and production in the mushroom industry. A local case study of consumers in the state of Utah was used to obtain information on consumer attitudes and preferences. Regression analysis was used to determine what differentiable characteristics of consumers in the survey could be used to develop marketing strategies for mushrooms. Trend analysis was used in this paper to describe the movements of American mushroom markets in terms of prices and quantities sold. Information provided by these analyses provided a basis for a strategic analysis of the mushroom industry. As a result, this study examines mushroom markets and strategy at a very local level and at an industry level. The results are used to identify opportunities and threats and make recommendations for the development of successful entry strategies.



## **1.2.Goals and Objectives**

The study seeks to address strategies for potential entry into the mushroom market, with special focus on shiitake mushrooms.

## **1.3.Hypothesis:**

The production and marketing of shiitake mushroom in Utah is a viable economic option.

## **1.4.Specific Objectives:**

- To determine consumer preferences in Utah based on whether produce was locally-grown
- To assess consumers' attitudes, knowledge and usage of information about food in general and mushrooms in particular.
- To examine trends in production and prices of shiitake mushrooms and make predictions based on these trends as to future market potential of this commodity.
- To identify opportunities for marketing strategies based on segmentation analysis.
- To identify opportunities for a marketing strategy for a locally-based mushroom enterprise based on the overall industry analysis.



## **CHAPTER 2**

### **MUSHROOM PRODUCTION AND MARKETING IN THE UNITED STATES**

Mushrooms are a valuable part of the human diet and are an important food in the US and worldwide. Mushrooms are produced by hundreds of producers in addition to a vast distribution network of wholesalers and retailers. Production of mushrooms benefits the environment by efficiently using agricultural byproducts to produce a product that possesses high nutritive value. Mushrooms must be of high quality, readily available, handled properly, and marketed efficiently to ensure that the benefits of this commodity are available to consumers. The maintenance and expansion of existing markets and the development of new markets for mushrooms are vital to the welfare of producers and those concerned with marketing and using mushrooms. According to the studies conducted so far, medicinal mushrooms have a very long tradition in Asian countries, whereas their use in the Western hemisphere has only been slightly increasing during the last few decades (Lindequist *et al.*, 2005).

Edible mushrooms have been consumed by humans, not only as part of the normal diet but also to maintain health and increase longevity. For centuries, the Chinese have understood that foods have both preventive and therapeutic effects and are an essential part of good health. This view is now being increasingly adopted around the world. In addition, mushroom extracts were found to have profound health promoting benefits and, as a result, became essential components in many traditional Chinese medicines.

In general, Asian countries are known to be rich sources of medicinal mushrooms. As a result of large numbers of scientific studies on medicinal mushrooms over the past three decades, especially in Japan, China and Korea, many of the traditional uses of mushrooms have been



confirmed and new applications developed (Wasser and Weis, 1999). Shiitake and other edible mushrooms may have important salutary effects on health or in treating disease (Chang 1996).

## **2.1. History of mushroom cultivation**

Ancient Egyptians believed mushrooms to be the plant of immortality according to the hieroglyphics of 4600 years ago. In order to assure themselves of the entire supply of mushrooms, the pharaohs of Egypt declared mushrooms were food for royalty and that no commoner could ever touch them (<http://mushroominfo.com>). Other civilizations throughout history, including Russia, China, Greece, Mexico and Latin America, practiced mushroom rituals and it was believed that mushrooms had properties that could produce super-human strength(<http://mushroominfo.com>).

During the 1800s France emerged as the leader in the formal cultivation of mushrooms, due to the domestication of the common mushroom (*Agaricus Bisporus*) in sewers and cellars (Flaminni, 1999). Later, special caves near Paris were utilized especially for mushroom cultivation, as they provided the necessary conditions for growth. The process of producing spawn was later adopted by growers in England (Flaminni, 1999). Mushrooms were prized for their ease of cultivation and limited space and capital requirements. They gained popularity in England, primarily due to experimentation with spawn and publicity in journals and magazines. The art of mushroom cultivation was introduced to the United States in the 1890s when Quaker farmers like Jacob Steyer and William Swayne imported spawn from Europe and experimented with mushroom cultivation (Flaminni, 1999). Swayne, who grew carnations in his greenhouse at Kenneth Square in Pennsylvania, utilized available space under benches upon which the flowers were kept (Flaminni, 1999). Swayne's efforts were sufficiently successful and this led him to



construct the world's first mushroom house. The mushroom industry in Kenneth Square began to take shape as other farmers followed suit. However, despite the rapid growth and success of the mushroom industry early on, little was known about the factors that influence success or failure in the cultivation of mushrooms. In 1891, William Falconer published the first book on mushroom growing, *Mushrooms: How to Grow Them; A Practical Treatise on Mushroom Culture for Profit and Pleasure* (<http://mushroominfo.com>). This book helped improve the cultivation practices used by American producers. However, poor quality spawn, which was imported from England and consequently deteriorated in quality due to the long journey, was a major obstacle facing American growers (<http://mushroominfo.com>). This problem was addressed by the American Spawn Company of St. Paul Minnesota, headed by Louis F. Lambert, a French mycologist, who was the first producer of pure culture virgin spawn (<http://mushroominfo.com>). Later, as the American mushroom industry developed; two USDA scientists produced the perfect pure-culture virgin spawn after much experimentation (<http://mushroominfo.com>). This, in addition to new markets opening up due to the public's increased consumption, facilitated the rapid growth of the mushroom industry.

The transition to large-scale production in the US ensuing this period of time was concentrated in certain regions and states including Long Island, Central Massachusetts, Chicago, Michigan, California and Southeastern Pennsylvania. In 1924, 85% of US mushrooms were grown in Pennsylvania according to the Pennsylvania Department of Agriculture. By 1930, there were 516 growers in the U.S. of which 350 were in Chester County, Pennsylvania, according to the US Census Bureau. After 1930, the industry in America continued to grow rapidly due to improvements in mushroom growing houses resulting in the production of healthier crops, better spawn production, and the development of synthetic manure



(<http://mushroominfo.com>). In addition, canning of mushrooms enabled producers to ship mushrooms to more distant parts of the country where the fresh product would not survive intact to the market (Flaminni, 1999). During that period, organizations such as the Mushroom Growers' Cooperative Association were developed to assist and protect growers.

The cultivation of shiitake mushrooms took off in the US only around 1986 after the lifting of a ban on importing live cultures of this species by the USDA in 1972 (Royse, 2001). *Lentinus edodes*, commonly called shiitake, originated in China where it was cultivated on natural logs as early as A.D. 1100 (Royse, 2001). This species of mushroom which is native to Asia was later introduced to Japan by Chinese growers. Japanese growers utilized the shii tree for its cultivation from which the name shiitake was derived. The Japanese were responsible for the spread of shiitake mushroom eastward (Royse, 2001). Shiitake mushrooms have since become the leading specialty mushroom cultivated in the US (Stamets, 2000).



## **2.2. Mushroom marketing in the US**

The problems associated with growing mushrooms were resolved by technological advancements in the mushroom industry. These advances led to production levels soaring in the United States. The problem that then faced the industry was how to sell more mushrooms, rather than how to grow more. Due to the increasing scale of US production and economic benefits derived from mushrooms, by 1914 marketing of this commodity began to take on a greater role (<http://mushroominfo.com>). Packaging and product quality enabled producers to increase sales and differentiate their products.

In order to find better marketing techniques for mushrooms, several organizations were established such as; the American Mushroom Institute (AMI), the National Mushroom Growers' Association and later the Mushroom Council. The Farm Credit Administration also became involved in the mushroom industry. The American Mushroom Institute (AMI) was initiated by the Chester County, Pennsylvania, growers to coordinate their activities and act on behalf of the American mushroom industry as a whole. Their first meeting was held on December 4, 1941; however, their activities were brought to a halt due to World War II (<http://mushroominfo.com>). After the War, the Institute was reorganized with approximately 275 growers. On January 14, 1955, AMI was legally incorporated as a non-profit organization (<http://mushroominfo.com>). Due to heavy competition from Europe and Asia in the canned mushroom industry, marketing efforts shifted to the fresh market. The objectives of AMI were to promote the consumption of mushrooms through research, advertising, publicity, merchandising, consumer education and government relations. The AMI also assisted the industry in developing better methods for growing and handling mushrooms. The American population was exposed to various methods of mushroom preparation using several marketing communication methods including radio,



television, magazines, newspapers and posters displayed in produce stores and supermarket chains (<http://mushroominfo.com>). This drive to educate the American public about the use of mushrooms in casseroles, appetizers, salads, and other recipes was the first organized marketing efforts of the AMI. The campaign was successful and United States mushroom consumption increased at a rate of 15% a year from 1960 to 1973 (Flaminni, 1999).

The National Mushroom Growers' Association was established in 1985 in Illinois to promote the sale of fresh mushrooms nationally. This association targeted newspaper and magazines to promote the use of mushrooms. Success is credited to coverage in national women's magazines and newspapers. In 1990, the Mushroom Promotion, Research and Consumer Information Act (Mushroom Act) was passed by Congress (<http://mushroominfo.com>). The passage of this Act was based on the key findings that mushroom promotion, research, and consumer information are necessary to maintain and expand existing markets for mushrooms through the cooperative development, financing, and implementation of a coordinated program. This Act served to strengthen the mushroom industry's position in the marketplace, maintain and expand existing markets and uses for mushrooms, and develop new markets and uses for mushrooms. In 1993, the Mushroom Council was established to carry out the direction of this act. The Council focused its research on defining the mushroom user which became the foundation for their communication efforts and ultimately a successful promotion program. Marketing communications were directed towards the food editors of newspapers and magazines, TV and radio personalities, chefs and cookbook writers. In addition, mushroom recipes were distributed to hundreds of venues yearly in an effort to increase consumer awareness and the demand for mushrooms. In 1996, notable publications



that featured information from the Mushroom Council included *Family Circle*, *Women's Day* and *Good Housekeeping* (<http://mushroominfo.com>).

As the mushroom industry continues to evolve, the efforts of the Mushroom Council also change to meet the requirements of the market. However, the Mushroom Council continues to play an important role in the promotion of fresh mushrooms nationally through consumer public relations, foodservice communications, and retail communications. This is achieved by the promotion of fresh mushrooms to consumers through development and promotion of new recipes and working with professional chefs, maintenance of the high quality mushroom products for customers by development of standards for store department managers, and distribution of information to consumers (<http://mushroominfo.com>). Due to the efforts of the Mushroom Council, September is celebrated as National Mushroom Month.



## CHAPTER 3

### LITERATURE REVIEW

The vast majority of production and sale of mushrooms in the US is of the *Agaricus* species commonly referred to as button, portobellas, and criminis. The latter two are a brown strain of *Agaricus bisporus*. However, there is an increasing demand for other varieties of mushrooms collectively referred to as specialty mushrooms. As the United States mushroom industry continues to grow and diversify, *Lentinus edodes*, commonly referred to as shiitake, has emerged as one of the most popular cultivated varieties of specialty mushrooms. Shiitake mushrooms are native to Asia and have been a popular food source for hundreds of years. There are two basic methods for Shiitake cultivation: outdoor cultivation on natural hardwood logs and indoor cultivation on sawdust blocks (also known as synthetic log cultivation).

A study conducted by Royse (2001) gave a brief outline of the history of shiitake cultivation and described the production on natural and synthetic logs, emphasizing the salient features within each production step. Royse traced the origin of shiitake cultivation back as early as A.D. 1100 in China. According to this study, it is believed that Chinese growers introduced shiitake cultivation techniques to Japanese farmers, who named the mushroom and were later responsible for its spread eastward. Centuries later, in 1972, the U.S. Department of Agriculture lifted a ban on importing live shiitake cultures, and the American shiitake industry began to take shape.

Since then, the United States mushroom industry continues to grow at a considerable rate. According to the study, most natural log production of shiitake in the United States utilizes various species of hardwood including oak (*Quercus*), chinkapin (*Castanopsis*), tan oak



(*Lithocarpus*) and hornbeam (*Carpinus*). Sawdust was identified as the preferable ingredient used in synthetic formulations of substrate for producing shiitake in the United States. However, straw, corncobs, or both may also be used as the basal ingredient. According to the study, the major advantages of producing shiitake on synthetic logs rather than natural logs are a consistent market supply through year-round production, increased yields, and decreased time required to complete a crop cycle.

According to Royse, Synthetic logs may produce higher yields (three to four times higher) than natural logs and a shorter crop cycle (one-tenth of the time). On the other hand, there is a relatively high initial investment cost. This study also touched on the marketing aspect of shiitake mushrooms and concluded that as more consumers become aware of the special culinary and nutritional characteristics offered by shiitake and other specialty mushrooms, demand in the US is likely to increase. In addition, aggressive marketing is necessary to educate consumers about these attributes and to find new markets for this relatively new product.

Advances in cultivation technology resulted in a constant increase in synthetic log production and a decline in outdoor log cultivation. In terms of economies of scale; large firms that utilize sawdust logs produce mushrooms with higher production efficiency than small firms. Chen (2001) provides a more in depth description of the shiitake synthetic log cultivation process in North America. According to Chen (2001), indoor cultivation allows for the control of temperature, humidity and light thereby providing the optimal conditions for maximum yield. Chen (2001) explained that existing firms already have production facilities and distribution channels in place, making the production and marketing process much easier, creating an advantage over small firms. Another advantage for existing firms is the knowledge about production and marketing acquired through practical experience (i.e., the learning curve) because



mushroom cultivation demands a level of care and attention to detail higher than ordinary gardening and agriculture.

A financial analysis of a potential shiitake mushroom enterprise is an integral part of marketing research aimed at determining the feasibility of such an enterprise. One such study was undertaken by Adam and Bailey (1998), which explored the possibility of shiitake mushroom production as an alternative to burning wheat straw in Box Elder County, Utah. The study examined the impact of burning wheat straw on local residents and the possibility of developing a mushroom industry as a method of utilizing wheat straw thus reducing the need to burn it. A detailed financial analysis was conducted on the production of shiitake mushrooms which analyzed the economies of four different facility sizes ranging from 2 to 8 growing rooms, each 64 feet long by 40 feet wide. The results showed that only the six and eight unit facilities were expected to yield a positive internal rate of return with the eight unit facility yielding more than 20% return on investment. However, in order to operate a facility of this size, the incumbent company would be required to command about 5.5% of the national market for shiitake mushrooms. In the final analysis it was concluded that a shiitake mushroom industry in Box Elder County would provide a modest return on investment.

Beetz and Kustudia (2004) discussed the opportunity for farmers without much land to diversify their operation using small-scale shiitake mushroom production as an additional enterprise. This study focused on the cultivation and marketing of oyster and shiitake mushrooms, particularly for novices, due to their ease of cultivation and the existing markets for these species. One reason given as to why they are relatively easy to grow is their ability to quickly and rapidly colonize a wide variety of substrate material. According to Beetz and



Kustudia, many large white button mushroom firms diversified their production to include different kinds of specialty mushrooms, including shiitake mushrooms.

According to USDA data (2009), between 1986 and 2009, total U.S. production of shiitake increased from 1.2 to 9.6 million pounds, while the price dropped from \$4.30 to \$3.29 per pound. Due to the culinary advantages offered by specialty mushrooms, the industry is expected to experience continued growth and development worldwide according to a report by Burden (2009). Production and consumption of specialty mushrooms in the United States and other western countries is expected to increase at an accelerated rate in the future. In addition, the retail price for specialty mushrooms should decrease due to improved production technology arising from interdisciplinary efforts.

In February 2002, a survey was conducted by The North Carolina Dept. of Agriculture and Consumer Services, Division of Marketing, to identify trends in mushroom demand expected to occur over the period 2002 to 2007. The information collected helped to identify specialty mushrooms, based on market demand, suitable for further development through the Specialty Crops Program. The goal of this program was to develop new horticultural crops for farm diversification in North Carolina.

The survey targeted produce buyers and merchandisers with retail grocery chains and produce buyers with larger wholesale dealers in North Carolina, South Carolina and Virginia. Sixty questionnaires were sent out, of which there were 27 respondents, 17 representing retail grocery chains and 10 representing produce wholesale dealers. The study revealed that 71% of respondents described the demand for specialty mushrooms as growing, 19% saw demand remaining the same and the remainder as decreasing. When asked what varieties of mushrooms they believed would increase in demand over the next 5 years, 38% of the respondents thought



that the portabella will increase in demand, followed by 22% for white mushrooms, 21% for shiitake, 12% for oyster, and 7% for maitake. None of the respondents believed that there would be any increase in demand for the Hemimatsutake or Monkey's Head mushroom. The next question asked what varieties of mushrooms the respondent believed would decrease in demand over the next 5 years. Twenty eight percent of those responding thought that the white, mushroom will decrease in demand over the next 5 years, followed by 24% thinking Monkey's Head will decrease, 14% thought that the portabella and hemimatsutake will decrease, and 10% thought the oyster and maitake will decrease in demand. The survey concluded that interest in specialty mushrooms should continue to drive demand for new varieties. According to Augostini (2002) the current strong demand for specialty mushrooms such as shiitake and portabella mushrooms should continue.

Research conducted by the USDA's Economic Research Service revealed that consumption of fresh and processed mushrooms in the United States have been on the increase for the past several decades. From 1969 to 2007, per capita consumption of fresh mushrooms increased from 0.31 lbs. to 2.6 lbs. in the US while canned mushroom consumption increased from 0.89 lbs. to 1.4 lbs. over the same period. Per capita consumption of fresh and processed mushrooms increased from 1.2 lbs. to 4lbs. during the same period.

This trend of increasing per capita consumption of fresh mushrooms is expected to continue according to a mushroom forecasting model developed by Arizona State University for the Mushroom Council in June, 2003. The model was used to develop forecasts on annual US mushroom area, yield, production, allocation (fresh vs. processed), utilization, grower price, imports, and exports. The analysis was limited to *Agaricus* mushrooms, including both white and brown; however specialty mushrooms were not included due to lack of time series data, which



was required for estimation of the model parameters. The model incorporates economic relationships that are observed in the marketplace and specified by economic theory, by a system of equations. Parameters for the model were estimated econometrically and the data used for variables in the model were from July 1 to June 30 marketing year, beginning 1981/82 to 2001/02. A recursive system of equations produces one-step ahead forecasts, while maintaining market equilibrium, through a stepwise fashion. Forecasts were prepared for marketing years 2002/03 through 2012/13. Three production areas in the United States (California, Pennsylvania, and Other States) were incorporated into the model.

The model forecasted US per capita consumption of fresh mushrooms to reach 3.21 lbs. in 2012, increasing at a rate of 1.9% per year, while consumption of canned mushrooms was expected to remain the same at 1.7 lbs. per capita. The increasing fresh mushroom consumption is expected to be served by imports as US production is expected to remain stable due to the slow growth in fresh grower prices domestically at 0.5% per year. US exports of mushrooms were also expected to remain stable during the forecasted period.

In 2003, Lucier et al. conducted a study to examine the factors that affect American mushroom consumption using the 1994- 1996 and 1998 continuing survey of food intakes by individuals (CSFII) surveys, conducted by USDA's Agricultural Research Service (ARS). The CSFII is a nationally representative sample of food consumption surveys that measures foods actually eaten by individuals. Two nonconsecutive days of dietary data for individuals of all ages were collected 3 to 10 days apart through in-person interviews using 24-hour recalls. Information regarding food descriptions and amount eaten in addition to where the food was purchased, and an array of economic, social and demographic characteristics of the respondents were collected.



The 1998 CSFII data set includes 5,559 children who were up to 9 years of age, while the 1994-96 CSFII dataset includes information on the food and nutrient intakes of 15,303 individuals. Immigration trends, changing family sizes, rising disposable incomes, and shifts in America's tastes and preferences are all factors that influence changes in per capita consumption of mushrooms.

According to the results of the study, full service restaurants constituted the majority of the “away-from-home” market, while more than half of fresh-market mushrooms were purchased at the retail level and consumed at home. The study also found that mushroom consumption was strongest in the West and Midwest, and Asian and non-Hispanic White consumers ranked highest in mushroom consumption. The study also found a positive correlation between per capita mushroom consumption and income, while men and women between ages 29 and 39 have the highest per capita use.

These findings were supported in a later study by Arizona State University in a report prepared for the Mushroom Council in July 2003. The analysis in that study was divided into three phases; firstly, it assessed factors influencing fresh mushroom usage by dividing households into buying and non-buying households, secondly, it evaluated how these characteristics influence the volume of mushrooms purchased, and finally, it analyzed buying volume directly by segmenting households on usage rate by defining a category of heavy users. In addition tests were carried out for difference in responses to changes in price and promotions according to usage rate. Data from ACNielsen’s Homescan was used in the survey in which a panel of 8,574 households scans their grocery purchases at home after each shopping trip. A sample of consumers consisting of 3,788 households, which represented mushroom buying households, was obtained for the period December 2001 through November 2002 and used for



the analysis. The results of the study show that households that purchase mushrooms generally have higher income and education level. Occupation does not play a significant role in predicting whether someone buys mushrooms, while households with families are more likely to purchase mushrooms than individuals living alone or with unrelated persons. In addition, households located in the Southeast and Southwest are less likely to be mushroom buyers. Higher income professionals living in families constitute heavy mushroom users and are most likely to be White or Asian.

Rose Research conducted 500 interviews via the internet among male and female primary household grocery shoppers in May 2008. The attitude and usage survey evaluated the factors influencing mushroom purchases. That study indicated potential to increase the marketability of fresh mushrooms by highlighting its health benefits. For example, 24% of respondents indicated that they would be more motivated to purchase mushrooms if they knew more about their health benefits. In addition, mushrooms as a food source, contain all of the attributes for a healthy diet as indicated by respondents. Such attributes include low fat, low cholesterol, high variety, low calorie, low sugar, high fiber, low carbohydrates, and low sodium. The report concluded that fresh mushrooms are becoming more of a main stream commodity and that there is room for additional growth, however, the main challenge is to convert medium and light purchasers to heavy purchasers.

The Mushroom Council has undertaken numerous studies at the retail and consumer levels to improve on marketing practices. A comprehensive assessment of fresh mushrooms in the food service channel was conducted in a study sponsored by the Mushroom Council in 2005 and a follow up study was conducted in 2009 (Technomic, 2005, 2009). The objectives of the study were to understand operator usage dynamics relating to different mushroom varieties and



fresh mushrooms, and to develop market size and segmentation data on fresh mushrooms in the food service marketplace. The studies were conducted using structured interviews and targeted restaurant operators countrywide which were segmented into quick service (pizza) restaurants, other quick service (fast food) restaurants, full service restaurants, travel and leisure, healthcare, colleges, and business and industry. According to the 2005 study shiitake had the third highest usage penetration among operators at 21%, while white and portabella had 67% and 39% penetration, respectively. This represented a net increase of 17%, 22% and 21% respectively from the previous two years. In 2009, the usage penetration for shiitake increased to 36%, while white decreased to 64% and portabella increased to 70%. According to the 2005 study, the rationale for increased mushroom usage is the addition of menu items containing mushrooms, growth in overall business, and consumer demand.

This growth is further attributed to the addition of specialty mushrooms into recipes to add variety and uniqueness by operators and increasingly adventurous customers demanding unique flavors and textures provided by specialty mushrooms. Overall mushroom penetration increased from 72% to 81% from 2005 to 2009. This is due to an increase in fresh (the dominant format) mushroom penetration, as the canned and frozen formats experienced a decline in penetration over this period. The 2009 study also indicated a high level consumer awareness of shiitake mushrooms, second only to portabella. In 2005, 48% of operators indicated seasonal variation in the volume of shiitake usage while in 2009, 35% indicated seasonal variation in volume of usage.

Earlier studies relating to the marketing of shiitake mushrooms were conducted by Degner and Williams, (1991) and Onianwaet et al., (2000). The former investigated marketing alternatives for North Florida shiitake mushroom producers. The study explored the market



potential for direct sales of shiitake mushrooms by producers to ethnic restaurants and produce wholesalers in the North Florida area. The specific objectives were to determine the quantities of exotic mushrooms handled by each major type of buyer, to determine the marketing channels for shiitake mushrooms and identify major handlers and finally to determine prevailing prices for shiitake mushrooms and estimate potential direct sales at selected price levels. Surveys were conducted using telephone interviews which targeted produce wholesalers, Asian grocery stores and oriental, Italian and mixed menu high volume independent restaurants. The results of the study indicated that market development opportunities were limited due to low expected volumes. The highest potential for direct sales resided with the 10 produce wholesalers selling shiitake mushrooms. Weekly volume averaged just over 100 pounds and ranging from 35 pounds to 200 pounds.

The latter study analyzed the market potential for locally grown shiitake mushrooms at the retail level in North Alabama. A survey of 79 stores in four cities was conducted between 1997 and 1998. The cities included were Huntsville, Decatur, Athens and Florence. The survey was designed to collect information on product attributes that affected purchase decision such as form, quality and volume. Further, a logit model was used to examine the relationship between store types, locations and the stores' interest in retailing shiitake mushrooms. The survey results revealed that 32 stores carried locally grown shiitake mushrooms and that this was the third most popular mushroom in North Alabama, behind button and portabella. In addition, shiitake was most common in the fresh format, followed by packaged and dried forms respectively and quality, freshness and price were the most important attributes considered by produce managers when sourcing shiitake mushrooms. Results of the logit model indicated that special stores,



supermarkets and the city population were among the most important predictors of shiitake mushroom retailing.

A nationwide study of shiitake producers was conducted by the University of Missouri Center for Agroforestry in 2006. The objective of this study was to analyze the US shiitake mushroom industry using Porter's Five Forces model. The study identified the top three outlets for fresh shiitake mushrooms were restaurants followed by farmer's markets and on farm marketing. The study indicated that 58% of respondents recognized the importance of developing a brand name. Reasons given were; increased awareness of their products, encouraged repeat purchase and it stimulated word of mouth advertising. The proportion of respondents that sell under a brand is higher (75%) for producers that grow shiitake mushrooms on sawdust compared with 54% that grow on natural logs. The study also identified four marketing communication methods used by participants to increase awareness of their products and services which included direct marketing, advertising, publicity and websites. Thirty six percent used websites while 57% used advertising and 83% used publicity. Publicity, which involved activities such as festivals and fairs, free samples and collaboration with charities, was preferred to advertising since it utilized non paid media coverage of the firm and its products and therefore was more cost efficient.

Marketing strategy and communication is important for incumbent firms to secure a position in the market. According to Darby (2006), communicating a local region-of-origin, small-scale production method or health benefits are important marketing strategies. In this study, payment card and conjoint analysis were used to evaluate willingness to pay (WTP) for characteristics related to locally grown fresh strawberries. Darby hypothesized that consumers were willing to pay a premium for locally grown produce, and further, the magnitude of the premium is dependent on socioeconomic variables such as income and age. Data was collected



from random shoppers at 17 different locations including; six farm markets, four farmer's markets, and seven retail grocery stores. The results of the study supported Darby's hypothesis and provided a basis for local producers to differentiate their product. Further, reasons for consumer preference of locally produced commodities include, but are not limited to, freshness, taste and support for local business or home-bias. The study also indicated that the magnitude of premiums vary according to socioeconomic factors.

No publicly available study was found that had considered the overall strategic position of the mushroom industry in terms of opportunities for new entrants into this market. While other studies cite the expected growth of the mushroom industry in the US and others speak of the potential marketing advantages of mushrooms (e.g., health characteristics, and nutrition characteristics), these analyses have not addressed strategies for potential entry into the mushroom market, especially for specialty mushrooms.

This study seeks to perform a strategic analysis of the mushroom industry in the Utah and uses a local case study of consumers in the state of Utah to obtain information on consumer attitudes that can feed information into the strategic analysis as well as provide an initial test of specific hypotheses regarding markets, especially local markets. For example, this analysis will examine why local consumers in Utah buy mushrooms and whether the reasons they buy mushrooms fits into the broader marketing efforts of the mushroom industry related to health and nutrition. This analysis will also examine where locally-based marketing efforts such as the "Utah's Own" program provide perceived value to local consumers. As a result, this study will examine mushroom markets and strategy at a very local level. The result will be a better understanding of how consumers acknowledge or do not acknowledge the broad market themes of the industry. The analysis will also help to inform potential market entrants about barriers to success in this industry.



## **CHAPTER 4**

### **METHODOLOGY**



Determining the strategic position of the mushroom industry from a micro perspective requires local information. A local survey of consumers in northern Utah is also used to generate specific information about consumer attitudes about mushrooms and how a new entrant might be positioned to address consumers' wants and needs related to mushrooms, and specifically specialty mushrooms. Regression analysis is used to determine what differentiable characteristics of consumers in the survey could be used to develop marketing strategies for mushrooms. The characteristics considered are the demographics of survey participants. The regression analysis focuses on the WTP of consumers for locally-produced mushrooms, including those branded using Utah's Own. The Utah's Own brand is a marketing strategy developed by the state of Utah to promote the purchase of food products produced primarily in the state of Utah.

Utah is a good case study because it is a relatively isolated market away from major specialty mushroom production areas. While one major mushroom producer exists in Utah, that producer focuses production primarily on common mushrooms. Consequently, the primary interest of this study is to examine the potential for expanding the market for specialty mushrooms in Utah from the perspective of potential new market entrants.

#### **4.1. Survey**



A consumer survey was administered to supermarket shoppers in the fresh produce department of Lee's supermarket, Logan, on an opportunistic basis. The survey used for the supermarket consumer analysis portion of this paper is found in Appendix A. the survey was administered to 41 shoppers on February 22, 2010 between 10:00 am and 3:00 pm. The respondents were offered a \$5 gift card at the end of the survey.

The survey consisted of three main components designed to collect information on shoppers' preferences based on: 1) whether produce was locally grown; 2) the consumer's attitude, knowledge and usage of information about food in general and mushrooms in particular; and finally 3) general demographic information about the individual participants. The first section of the survey addressed: 1) whether participants purchased locally grown food when available, 2) what drives their decisions to purchase locally grown food, and 3) their willingness-to-pay for locally grown food. The second section of the survey addressed the participants' attitudes towards various characteristics of food in general and their knowledge, usage and attitudes towards mushrooms specifically. The final section of the survey consisted of questions regarding personal and household information of the participants.

The questions used in the survey gathered information that may be used to better understand the decision-making process of shoppers, identify knowledge gaps in relation to mushrooms, and to draw conclusions between mushroom preferences and demographic characteristics of the participants. For this study, regression analysis was used to analyze the data collected in the survey when questions involved multivariate analysis. The information obtained through statistical techniques was used with other information obtained from surveying experts and the literature to analyze the mushroom industry. This information may be used by mushroom



producers, marketers, retailers, and researchers to analyze the mushroom industry, identify consumer needs and increase sales by meeting such needs.

#### **4.2. Trend Analysis**

Analyzing industry trends provides a graphical representation of data which enables us to make predictions about what may happen in the future based on historical data. Various methods are used to analyze trends in the mushroom industry and are largely based on the nature of the data presented. For example, a linear trend may indicate the direction of movement in a commodity's price, as increasing. The simple linear trend is represented by the regression equation:

$$P_t = \alpha + \beta t + \varepsilon$$

Where P is the price of the commodity, t is time (t=1, 2, 3...n), and  $\varepsilon$  is the random error term.

However, if the price is increasing at an increasing or decreasing rate, a logarithmic trend will be more appropriate since it improves the predictive power of the model (Hudson, 2007). Logarithmic trend represented by regression equation:

$$P_t = \alpha + \beta \ln t + \varepsilon$$

Trend analysis is used in this paper to describe the movements of American mushroom markets in terms of prices and quantities sold. These trends are extrapolated as a means to predict future market opportunities and risks associated with mushroom consumption and mushroom prices.



### 4.3. The Logit Method Analysis

When the dependent variable is qualitative in nature, it is set up as a 0-1 binary variable and regressed on the explanatory variables (Kennedy, 1998). One drawback to this approach is that it is possible to have estimated probabilities outside the 0-1 range. Various methods have been devised to deal with this problem, for example, the linear probability method works by converting estimated probabilities lying outside the 0-1 range to either 0 or 1 as appropriate (Kennedy, 1998). With this method, however, arises a further problem because outcomes are sometimes predicted with certainty when it is possible that they may not occur. To avert this problem the logistical function is used to estimate probabilities inside the 0-1 interval without actually creating probability estimates of 0 or 1 (Kennedy, 1998). Using the logistical function creates a logit model. Logit regression models are used for dichotomous data, that is, when the response takes one of only two possible values representing success or failure. Such data is also regarded as binary data. In such cases, it is expected that the values of the dependent variable will fall between 0 and 1, and can therefore be interpreted as a probability (Kennedy, 1998). Using the logit model, estimation is undertaken by maximum likelihood, that is, the logit function provides the probability that the event will occur and one minus this function provides the probability that it will not occur. The likelihood is thus the product of logit functions for all observations for which the event occurred multiplied by the product of one-minus-the-logit-functions for all observations for which the event did not occur (Kennedy, 1998).



#### 4.4. Model Specification

The logistic function is given as

$$P_i = \frac{e^{\theta}}{1 + e^{\theta}}$$

Given that  $P_i$  represents the probability of buying, and replacing  $\theta$  with an index  $\beta X$  (for example, a linear function of several characteristics of a buyer), the function may be written as:

$$P_i = \frac{e^{\beta X_i}}{1 + e^{\beta X_i}}$$

This implies that the probability of not buying represented as  $P_j$  is:

$$P_j = 1 - P_i = \frac{1}{1 + e^{\beta X_i}}$$

The maximum likelihood function is formed as ( $i$  refers to those who bought and  $j$  refers to those who did not buy):

$$L = \prod_{i=1}^n P_i^{y_i} (1 - P_i)^{1 - y_i}$$

Maximizing the likelihood function with respect to the vector  $x$  produces the MLE of  $x$ . therefore for the  $n$ th individual, the probability of buying is estimated as:

$$\hat{P}_i = \frac{e^{\beta' X_i}}{1 + e^{\beta' X_i}}$$

The formula given for the logit model implies:

$$\ln \left( \frac{P_i}{1 - P_i} \right) = \beta' X_i$$

The log-odds ratio is:

$$\ln \left( \frac{P_i}{1 - P_i} \right) = \beta' X_i$$

In cases where only action or inaction are observable, an index function model such as the logit may be the best method to describe the probability of an action being carried out or not. In this study, the action or inaction is the statement by the survey respondent that he or she is WTP more for either locally-



grown mushrooms or Utah's Own mushroom. Greene (2003) suggests that survey participants will base their response on a "marginal benefit-marginal cost calculation" which evaluates the perceived benefit from purchasing locally-grown mushrooms. For example, in this study we wish to model whether respondents are willing to pay a 5% or higher premium for locally-grown food compared to non-locally-grown food when available, or not, based on: gender, age, income, and other demographic characteristics.

$$\ln \left( \frac{P_i}{1-P_i} \right) = B_1 + B_2 X_i + u_i$$

$P_i$  is the probability that the food item is purchased,  $(1 - P_i)$  is the probability that the item is not purchased,  $P_i / (1 - P_i)$  is known as the odds ratio. "u" is the error term. This is the odds in favor of the respondent purchasing locally-grown food. The natural log of the odds ratio is called the logit, hence the name the logit model (Gujarati, 1999). The explanatory variables and parameter estimates are represented in this model by X and B, respectively.

The logit analysis for this study focuses on the preferences (willingness to pay or WTP) of survey respondents for locally-grown mushrooms and mushrooms labeled as "Utah's Own." The purpose for this is to examine the viability of strategies aimed at obtaining a premium for local mushrooms. Utah's Own is slightly different than stating that produce is locally-grown. The state of Utah has spent significant amounts of resources to promote the Utah's Own brand as a method to support local farmers' incomes. Consequently, consumers may view Utah's Own more favorably than a product marketed simply as locally-grown. The analysis also includes a logit model that attempts to identify the demographic characteristics of survey respondents who identified themselves as making frequent purchases of mushrooms. Consequently, the logit analysis examines the demographics of the respondents with regard to their WTP for local



mushrooms and the characteristics of consumers with higher than average consumption of mushrooms. Separate logit equations are used to examine the characteristics of respondents WTP at least a 5% premium for locally-grown mushrooms and those respondents WTP at least a 5% premium for mushrooms labeled at Utah's Own. An additional logit equation is used to identify the characteristics of respondents with high levels of mushroom consumption in general without regard for where mushrooms are produced. The variables explaining WTP premiums for locally-grown and Utah's Own mushrooms as well as those explaining high levels of mushroom consumption are given by *HIGHINC*, *Q6SPEND*, *COLLEGE*, *SMALLCH*, *HH*, *Q8AGE*, and *Q1SEX*. (Table 1 summarizes and catalogues the survey questions used to obtain responses, frequency of responses, mean responses, and the code and value for the explanatory variables).



**Table 1: Showing survey questions, responses code, and variable names and values.**

Question	Responses=Code	Frequency	Variable name and value
Estimate of Household Income	Less than \$10,000=1	5	If code>6 then <i>HIGHINC</i> =1 else=0
	\$10,000-\$14,999=2	6	
	\$15,000-\$24,999=3	10	
	\$25,000-\$34,999=4	1	
	\$35,000-\$49,999=5	1	
	\$50,000-\$74,999=6	7	
	\$75,000-\$99,999=7	5	
	\$100,000-\$124,999=8	1	
	\$125,000-\$149,999=9	0	
	\$150,000-\$174,999=10	1	
	\$175,000-\$199,999=11	0	
	\$200,000-\$224,999=12	0	
	\$225,000-\$249,999=13	0	
	More than \$250,000=14	1	
Weekly amount spent on vegetables on	Continuous variable		<i>Q6SPEND</i> =response
Highest level of education achieved	Less than 9 <sup>th</sup> grade =1	0	If code>5 then <i>COLLEGE</i> =1 else=0
	9 <sup>th</sup> to 12 <sup>th</sup> grade, no diploma=2	1	
	High school graduate =3	4	
	Some college, no degree =4	14	
	Associate degree=5	5	
	Bachelor's degree=6	12	
	Graduate/Professional degree=7	5	



**Table 1continued: Showing survey questions, responses code, and variable names and values.**

Question	Responses=Code	Frequency	Variable name and variable
How many People in Age groups?	Under 5 years =number 5 to 9 years =number 10 to 14 years =number 15 to 19 years=number 20 to 24 years=number 25 to 34 years=number 35 to 44 years=number 45 to 54 years=number 55 to 59 years=number 60 to 64 years=number 65 to 69 years=number 70 to 79 years=number 80 years and more=number	10 13 11 8 16 15 11 8 10 4 1 8 1	If under 10 years > 0 then <i>SMALLCH</i> =1 else=0
Household size	Continuous variable		<i>HH</i> =sum (# of persons in each age group)
What is your age?	Continuous variable		<i>Q8AGE</i> =response
Top 5 favorite Vegetable	Yes=1 No=2	19 22	If code=1 then <i>Q2</i> =1 Else=0
Male or Female	Male=1 Female=2	7 32	If code=1 then <i>Q1SEX</i> =1 else=0



The logit model states that the log of the odds ratio is a linear function of explanatory variables (the demographic characteristics of respondents in this study). In this model, the slope coefficient, for example,  $B_2$ , gives the change in the log of the odds ratio per unit change in age, income, and other characteristics of respondents,  $X_i$  (Gujarati, 1999). This model guarantees that the probabilities estimated from the logit model will always lie within the logical bounds of 0 and 1 (Gujarati, 1999). Secondly, the probability of WTP a premium for locally-grown food does not increase linearly with a unit change in the value of the explanatory variables. The probability approaches zero asymptotically as the value of the explanatory variables get smaller and the probability approaches in the same manner as the value of the explanatory variables gets larger (Gujarati, 1999). The software used to estimate this model for this study was LIMDEP.

Demographic variables are often used to explain variations in the probability of shopping decisions. The economic foundation for this is tied to the theory of demand which suggests that demand for food products is based on the good's own price, the price of complements and substitutes, consumer income, and consumer tastes and preferences (Penson et al., 2010). In this case, where a qualitative and indirect measure of demand is being examined (e.g., categorical level of purchases, WTP for locally-produced mushrooms, and WTP for Utah's Own branded mushrooms), consumer demographics are expected to play a role in these decisions primarily through their effect on consumer tastes and preferences. Because purchases are not measured over time at different price levels, respondents are simply asked how important prices are in their purchasing decisions.

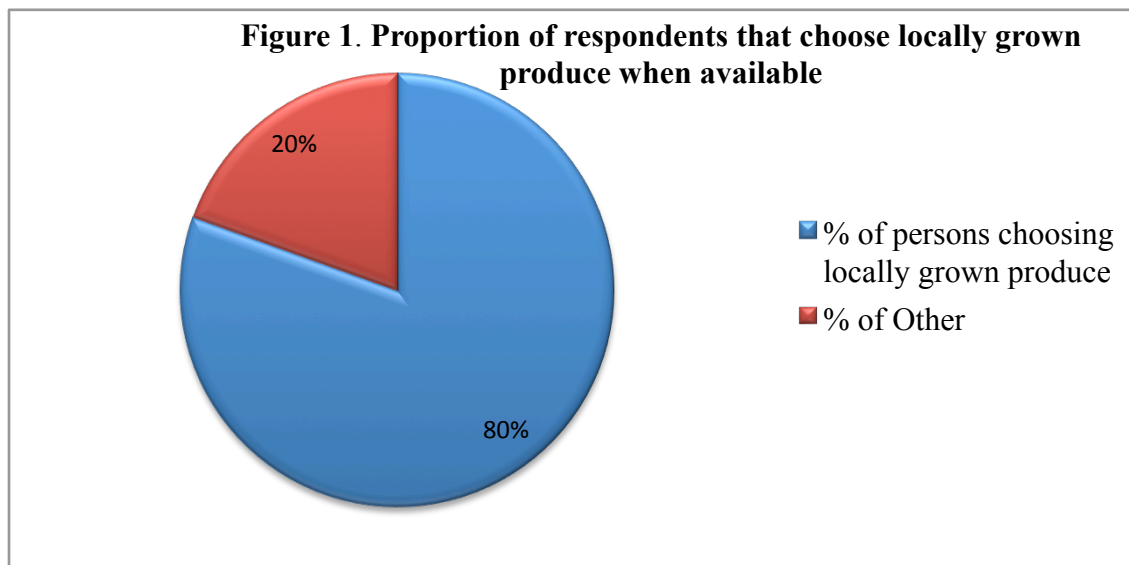


## CHAPTER 5

### RESULTS AND DISCUSSION

In this chapter, the results of the consumer survey, logit analysis, and trend analysis are presented. These analyses are then used to base conclusions about the competitive position of potential entrants into the specialty mushroom market in Utah.

#### 5.1. Results of Survey

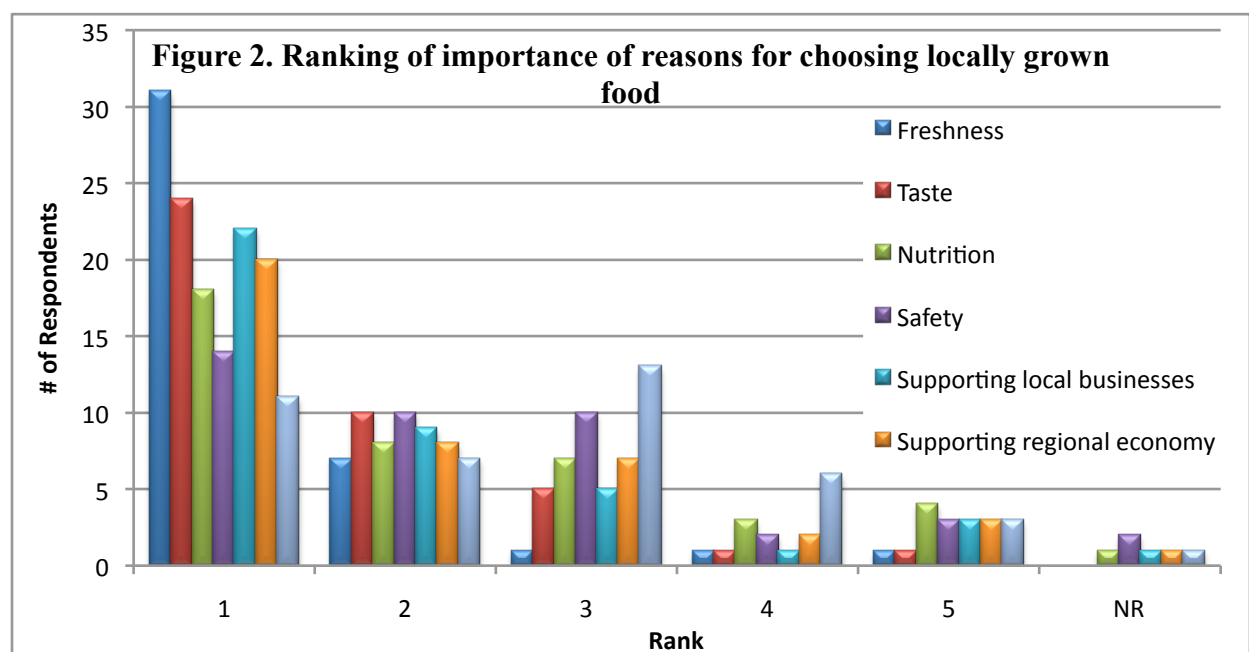


*Question: If available, do you consciously choose locally-grown produce when you shop at local supermarkets?*

Figure 1 is a model for how the summary of responses to the survey will be reported in this paper. Figure 1 provides a title for the figure at its top and reiterates the question at the bottom (in italics) from the survey which generated the response. Figure 1 shows that 80% of respondents would choose locally-grown produce when it is available as opposed to 20% that



would not. This suggests that local food companies potentially possess a competitive advantage. However, information regarding the origin of the food product must be conveyed to potential consumers for local companies to benefit from local support. This may be achieved through various public relations means such as advertising and labeling. The responses presented in Figure 1 also do not take into account purchase decisions that would be made if the price for locally-grown mushrooms was higher than for other mushrooms.



*Question: Following are some reasons that you might purchase locally grown foods. Please rate the importance of each reason on a scale from 1 (very important) to 5(not important).*

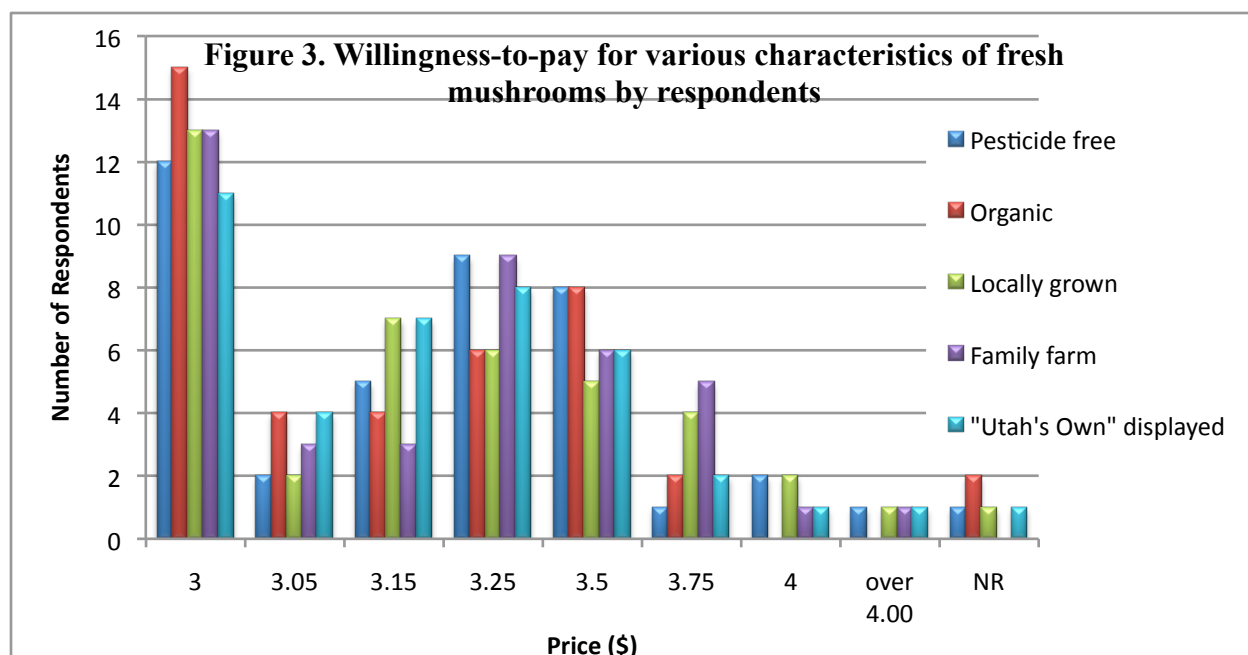
The responses to the question represented in Figure 2 provided a basis to ascertain the underlying reasons that influence the respondents' decision to purchase locally-grown food. The figure reports a list of food attributes that may be associated with locally-grown food that was presented to participants with the participants being asked to rank each of the characteristics according to its importance in the respondent's purchasing decisions. Each food attribute was ranked on a scale from 1 to 5 as being "very important" (1) and "not important" (5), respectively.



Figure 2 provides the frequencies recorded for each food attribute. For example, it shows the number of respondents (y-axis) who ranked freshness as being “1” or very important in the first bar. Directly next to that is shown the number of respondents who ranked taste as being “1”, followed by the number of respondents that ranked nutrition as 1, and so on. Further along on the x-axis shows the number of respondents that ranked freshness as “2”, directly followed by the number of respondents that ranked taste as 2, followed by the number of respondents that ranked nutrition as 2, and so on. All of the attributes listed were regarded as very important by most of the respondents. However, of those attributes, freshness was regarded as being the most important, followed by taste, support for local business, and support for regional economy respectively.

A direct connection with the food source was cited as very important the least number of times, followed by safety and nutrition, respectively. Given that the survey was conducted in the fresh produce department of a retail supermarket, it is intuitive that freshness is an important attribute to the customers that participated in the survey, due to the perishable nature of fresh produce. Taste is believed to be associated with freshness as it is counter intuitive to assume that the same kind of food grown in different locations may taste differently. It is also apparent that participants demonstrated a connection with local business as support for local business and economy were cited as important attributes of locally grown food.



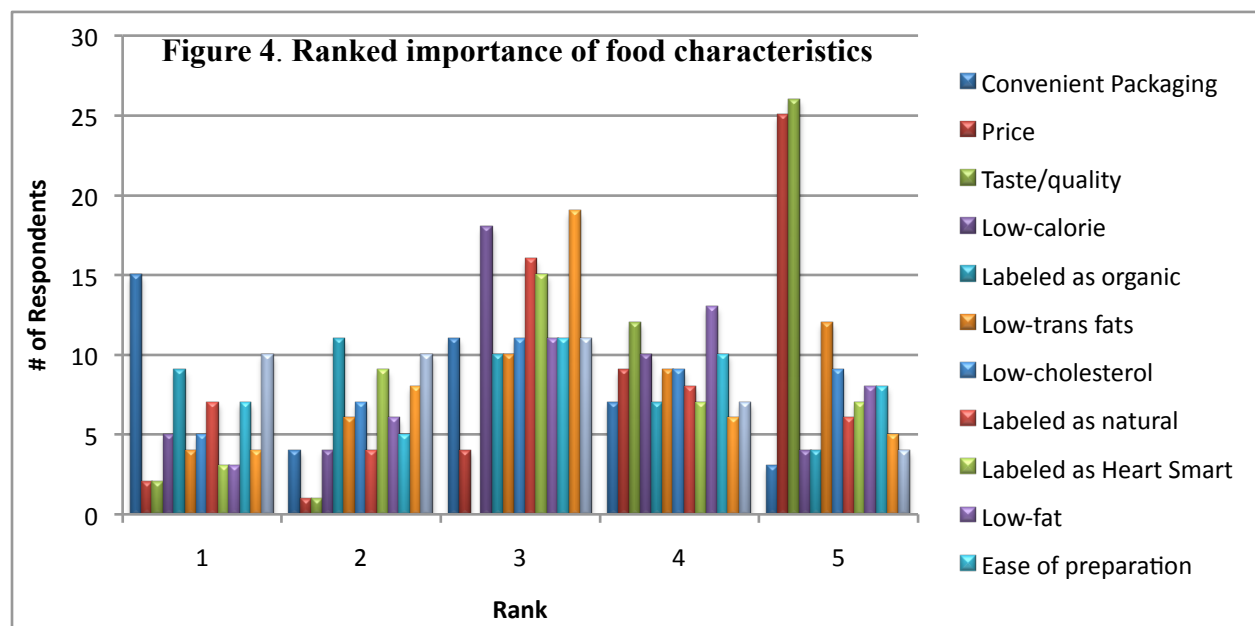


*Question: Assuming Mushrooms are priced at \$3.00 per pound at your local grocery store, how much more (if any) would you be willing to pay if the mushrooms had one of the following characteristics (Please check one box in each row)?*

Figure 3 depicts the respondents' willingness-to-pay for various characteristics in one pound of fresh mushrooms. The list of characteristics included; pesticide-free, organic, locally-grown, family farm, and displayed the "Utah's Own" label. Respondents were asked to indicate how much more they were willing to pay, for each of these characteristics above a base price of \$3.00 for one pound of mushrooms (which contained none of the characteristic listed). The price intervals considered were; 5 cents, 15cents, 25cents, 50cents, 75 cents, and \$1, respectively. Figure 3 combines the respondents' responses about willingness-to-pay for each of the characteristics listed for each price premium. Firstly, it shows the number of respondents (frequency) who were unwilling to pay a premium above the base price for each of the characteristics listed. It then shows the number of respondents that were willing to pay 5 cents additional for each of the various characteristics, 15 cents additional, and so on. For example, of the respondents that were willing to pay 75 cents additional, most of them based this on family



farm, followed by locally-grown. This was followed by an equal number of respondents who based their decision on Utah's Own brand and organically-grown. Finally, the least number of respondents based their willingness to pay 75 cents additional for one pound of mushrooms on the pesticide-free characteristic. The reason for respondents' willingness-to-pay in each price category varied, and provided no clear direction as to which characteristics were most valued. Most of the respondents were just willing to pay the base price of \$ 3.00 regardless of whether the product contained the characteristics listed or not. However, a substantial number of respondents did indicate a willingness to pay more for the listed characteristics suggesting that these characteristics are valued by many consumers.



*Question: In general, when you purchase food of any type at the grocery store, how would you rate the importance of the following characteristics on a scale from 1 (very important) to 5(not important)?*

Figure 4 examines the reasons that influence the respondents' preferences when generally purchasing food. A list of food attributes was presented and participants were asked to rank each of the attributes according to its importance. Each food attribute was ranked on a scale from 1 to

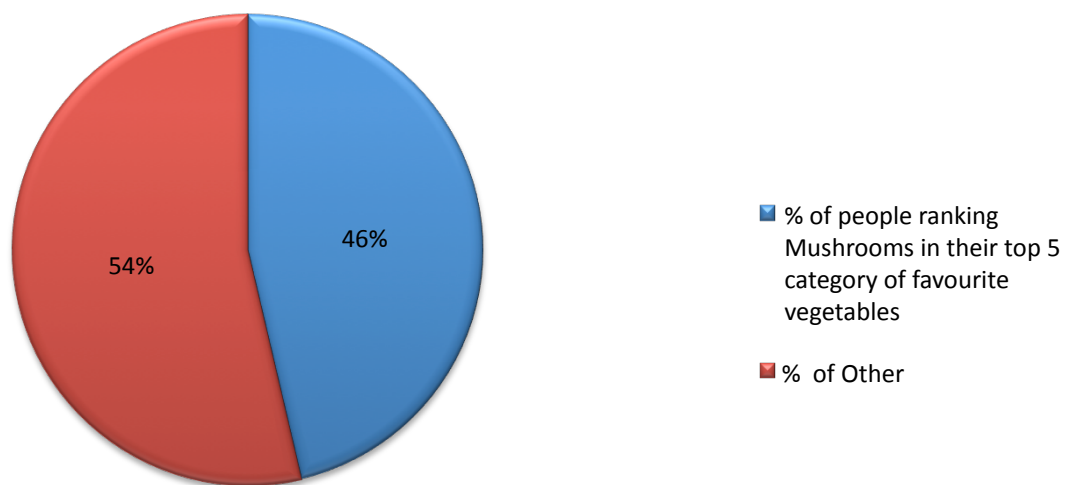


5 as being “not important” and “very important,” respectively. Figure 4 combines the ranking of each food attribute; for example, it shows the number of respondents (y-axis) that ranked convenient packaging as “1” in the first bar. Directly next to that shows the number of respondents that ranked price as 1, followed by the number of respondents that ranked taste as 1, and so on. Further down along the x-axis shows the number of respondents that ranked convenient packaging as “2”, directly followed by the number of respondents that ranked price as 2, followed by the number of respondents that ranked taste as 2, and so on.

From the Figure 4 it can clearly be seen that the majority of respondents ranked taste/quality, followed closely by price, as the most important factors influencing purchasing preferences for food. This was followed by low trans-fat and low cholesterol respectively. These were followed by an equal number of respondents indicating that low fat and ease of preparation were the most important factors influencing purchasing preferences. Relatively few respondents identified the other factors as being most important when making purchasing decisions. These findings are important in molding a strategy for the marketing of mushrooms as marketers must connect with the needs of consumers for such strategies to be successful. For example, particular attention should be paid to providing mushrooms of high quality (size, color, texture, freshness) to consumers. This requires proper pre- and post-harvest handling, strict adherence cold chain requirements, packaging and other characteristics associated with high quality standards. In addition, recipes that highlight the various ways that mushrooms can be prepared may influence consumers’ perception of the tastiness of the product. While price is largely a product of cost of production, other characteristics of mushrooms that are consistent with consumers’ needs can be highlighted. Such characteristics include; low-trans fat, low-cholesterol and low-fat relative to its protein content.



**Figure 5. Mushrooms as one of the top 5 favorite vegetables of respondents**



*Question: Would you consider mushrooms to be in your top 5 favorite vegetables?*

As shown in Figure 5, 46 percent of respondents identified mushrooms as being in their top 5 favorite vegetables. This percent seems particularly high given the responses to some of the following questions such as the frequency of purchase and the knowledge of mushrooms. Therefore, these responses should be judged in conjunction with responses to other more indirect questions.

**Table 2. Number of respondents that ranked each vegetable in a scale of 1 to 5 based on their perceptions of health benefits.**

	Rank (1 being most beneficial and 5, least beneficial)
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List of vegetables	1	%	2	%	3	%	4	%	5	%
<b>Mushroom</b>	<b>3</b>	<b>30</b>	<b>4</b>	<b>40</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>10</b>
Corn	0	0	0	0	1	10	2	20	7	70
Cucumber	2	20	2	20	4	40	2	20	0	0
Radish	1	10	0	0	2	20	5	50	2	20
Pepper	4	40	4	40	2	20	0	0	0	0
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>18</b>	<b>6</b>	<b>55</b>	<b>3</b>	<b>27</b>	<b>0</b>	<b>0</b>
Lettuce	1	9	2	18	0	0	3	27	5	45
Spinach	10	91	1	9	0	0	0	0	0	0
Cauliflower	0	0	4	36	4	36	2	18	1	9
Onion	0	0	2	18	2	18	3	27	4	36
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>30</b>	<b>3</b>	<b>30</b>	<b>2</b>	<b>20</b>	<b>2</b>	<b>20</b>
Carrot	4	40	1	10	2	20	2	20	1	10
Cabbage	1	10	0	0	3	30	1	10	5	50
Asparagus	4	40	1	10	1	10	2	20	2	20
Goya Bean	1	10	5	50	1	10	3	30	0	0
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>33</b>	<b>1</b>	<b>11</b>	<b>3</b>	<b>33</b>	<b>2</b>	<b>22</b>
Broccoli	7	78	0	0	1	11	1	11	0	0
Tomato	0	0	3	33	1	11	3	33	2	22
Squash	2	22	1	11	4	44	1	11	1	11
Celery	0	0	2	22	3	33	1	11	4	44

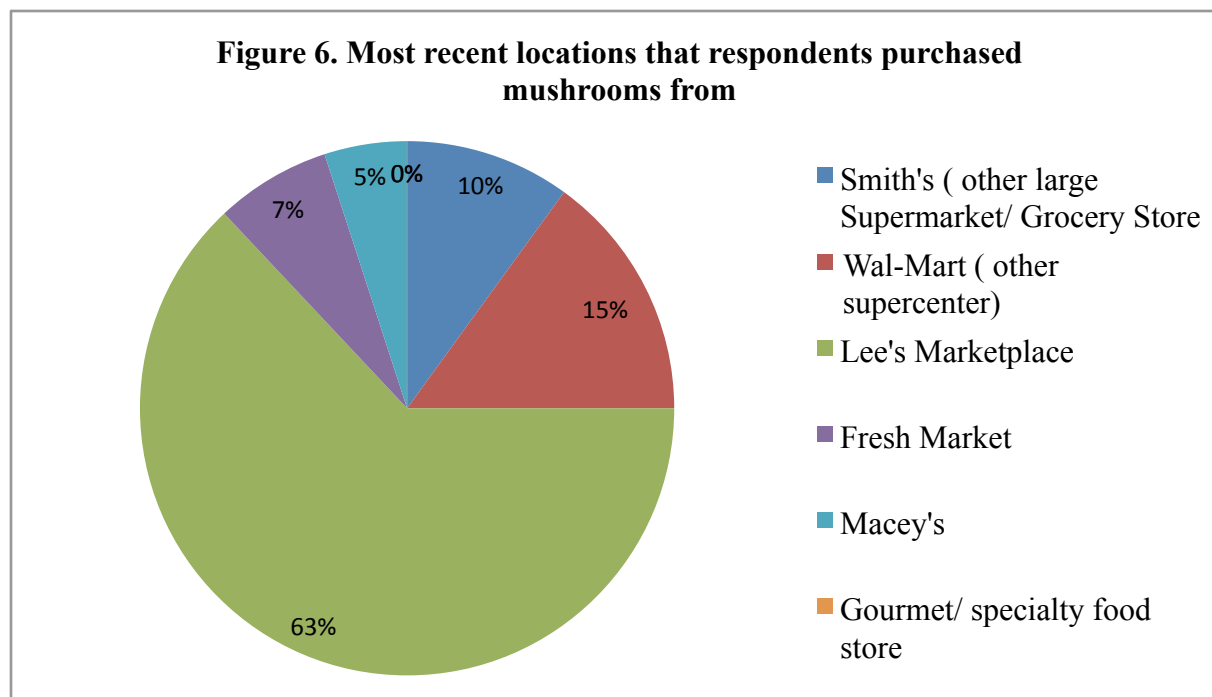
*Question: Please rate the following vegetables from 1-5 in terms of how healthy you believe they are (mark the vegetable to you consider the healthiest as “1”, the next healthiest as “2” and so on.*

In the next question respondents were asked to rate groups of vegetables from 1 to 5, with 1 being the healthiest and five the least healthy (Table 2). The first group consisted of corn, cucumbers, radish and peppers. The second consisted of lettuce, spinach, cauliflower, and onions. The third group consisted of carrots, cabbage, asparagus and Goya beans. The fourth group consisted of broccoli, tomato, squash, and celery. Mushrooms were included in each group so as to understand the respondents’ perception of its health benefits relative to other vegetables. The reason for including mushrooms in each group was to aid in the respondents being able to rank preferences in a small rather than an exhaustive and long list. Respondents were assigned a group to rank at random. In the first group, thirty percent of respondents rated mushrooms as number one, 40 % as number two, 10 % as number three, 10 % as number four, and 10 % as



number five. In the second group, 0 % rated mushrooms as the number one healthiest vegetable, 18 % as the number two, 55 % as the number three, 27 % as the number four, and 0 % as the number five. In the third group, 0 % rated mushrooms as the number one healthiest vegetable, 30 % as the number two, 30 % as the number three, 20 % as the number four, and 20 % as the number five. In the final group, 0 % rated mushrooms as the number one healthiest vegetable, 33 % as the number two, 11 % as the number three, 33 % as the number four, and 22 % as the number five. From the results of this table, mushrooms compared favorably in the first group of vegetables, however, in groups 2, 3, and 4, mushrooms were not ranked as number one by any of the respondents. This suggests that the health benefits of mushrooms, when compared to other vegetables, are poorly understood. Marketers can use this information to educate and raise awareness of the health and nutritional benefits of mushrooms.



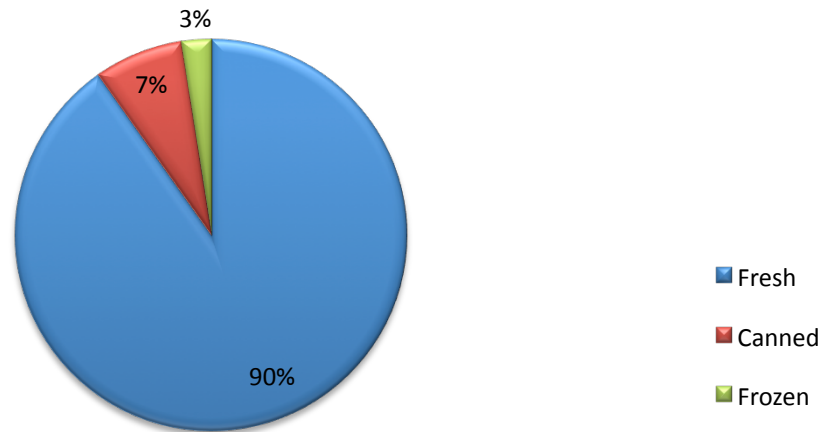


*Question: Where did you last purchase mushrooms?*

This pie chart in Figure 6 represents the locations where mushrooms were most recently purchased by respondents. The vast majority of respondents, 63 percent, cited Lee's supermarket, followed by Wal-Mart and Smith's with 15 % and 10 %, respectively. Due to the fact that the survey was conducted in Lee's supermarket, this may account for the high percentage of respondents that selected this supermarket as the most recent location from which mushrooms were purchased. These responses suggest that in order to effectively market their product, mushroom producers may target large supermarkets as their primary means of distribution. However, this may place producers at a disadvantage in terms of their bargaining power as large supermarket chains are relatively concentrated and therefore command greater bargaining power.



**Figure 7. Form of mushrooms most recently purchased by respondents**

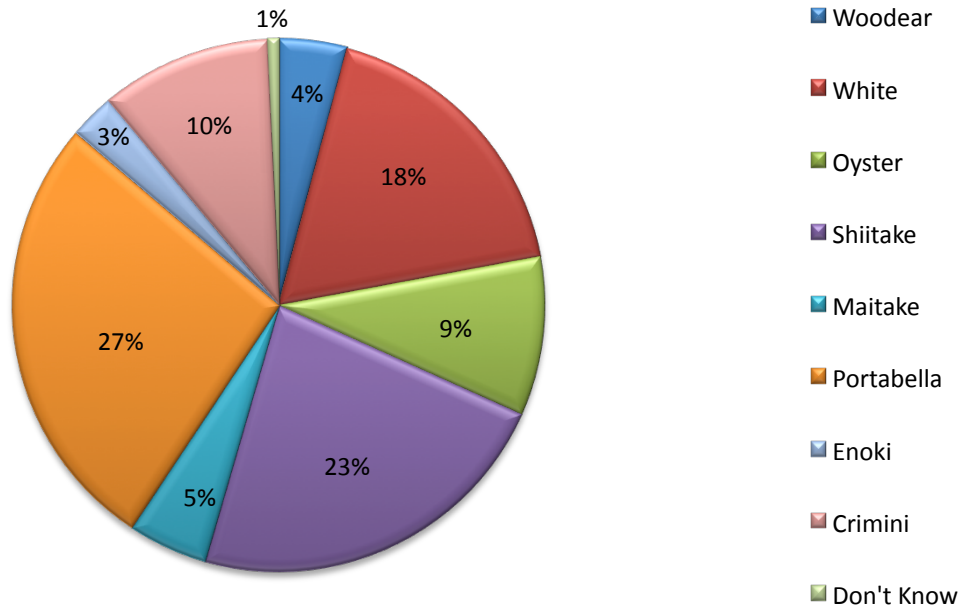


*Question: When you last purchased mushrooms, what form were they in?*

The overwhelming majority (90 %) of respondents' most recent purchase of mushrooms were in the fresh form, followed by canned, 7 %, and frozen, 3 % (Figure 7). Producers that are interested in processing this highly perishable product (canning and freezing) may consider the export market for this form of mushrooms; however, it is apparent that the demand locally is strongly in favor of the fresh form.



**Figure 8. Varieties of mushrooms heard of by respondents**

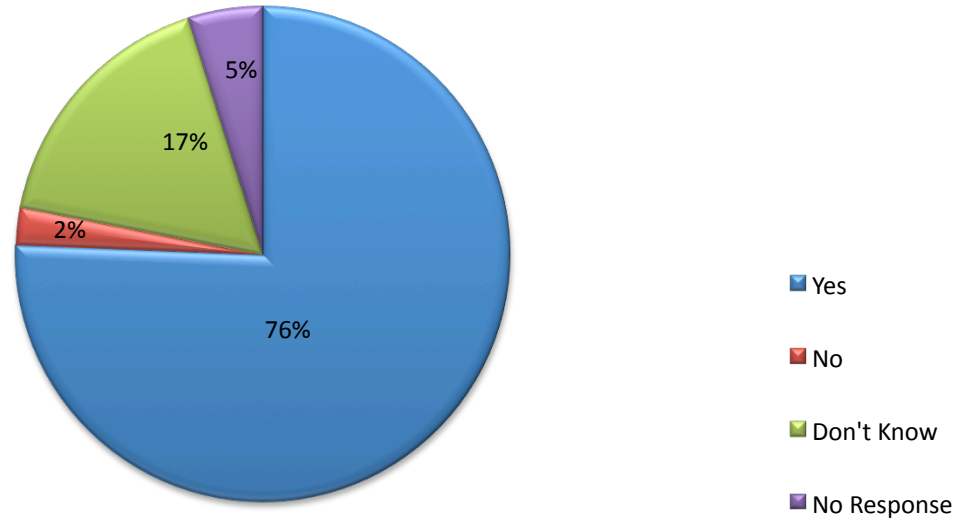


*Question: Please indicate which of the following mushroom varieties you are familiar with.*

The pie chart in Figure 8 depicts the percent of respondents who are familiar with the various species of mushrooms available locally. As expected, the *Agaricus* species which are comprised of portabella (27%), crimini (10%), and white (18%) accounted for a total of 55% of responses. Of the respondents, 23 % were familiar with shiitake, followed by oyster, woodear, and enoki at 9%, 4%, and 3%, respectively. Among the specialty group of mushrooms (all species except *Agaricus*), respondents are most familiar with shiitake and oyster. This information reflects the national situation in which the greatest demand for specialty mushrooms are of the shiitake and oyster species. However there remains much room for increasing the awareness of specialty mushrooms by mushroom producers and marketers.



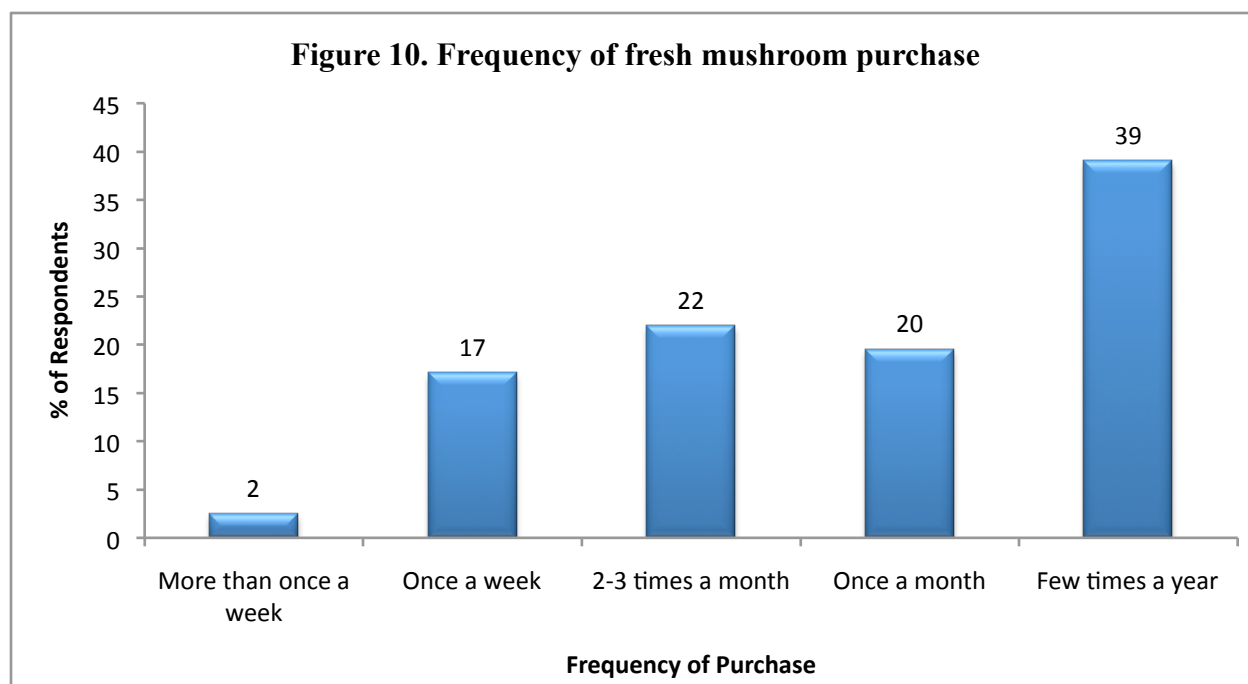
**Figure 9. Satisfaction of respondents with the quality of mushrooms available in Logan**



*Question: Are you satisfied with the quality of fresh mushrooms available in Logan?*

As shown in the pie chart in Figure 9, 76% of respondents are satisfied with the quality of mushrooms available in Logan. Two percent were not satisfied with the quality of mushrooms available, while 17% did not know whether they were satisfied or not. This suggests that quality is not a basis for local companies in Utah to gain a competitive advantage as the majority of mushrooms available originate from companies outside of Utah but appear to be perceived by a large majority of the respondents as being adequately fresh.

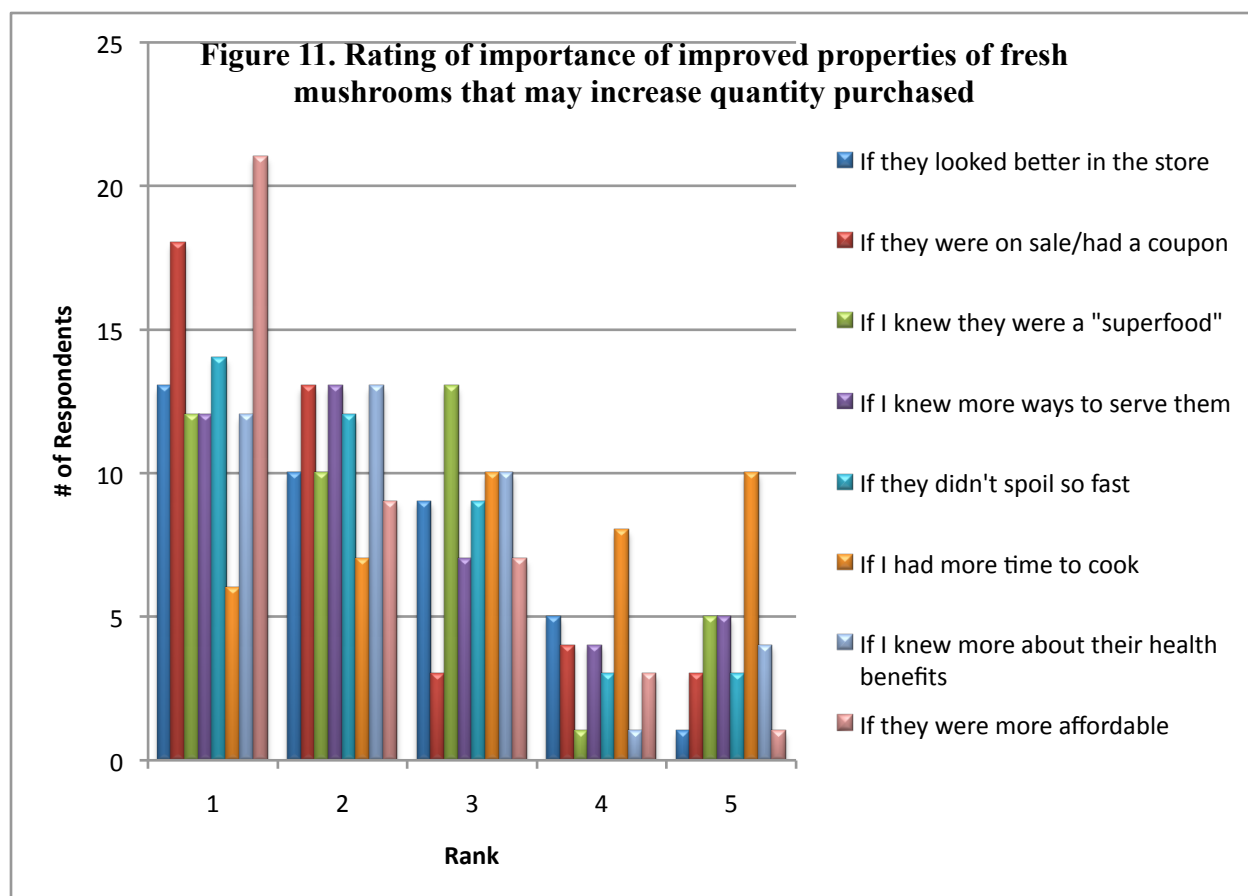




*Question: How often do you purchase fresh mushrooms?*

Figure 10 shows the frequency of mushroom purchase by the respondents. Thirty nine percent of respondents purchase mushrooms a few times per year, 20% once per month, 22% two to three times per month, 17% once per week, and 2% more than once per week. This suggests that in order to sustain a local mushroom industry in Utah, producers and marketers need to formulate and implement strategies to increase the consumption of mushrooms in Utah. To do this, of course, requires one to know the reason that most consumers purchase mushrooms relatively infrequently. There appears to be room to increase the consumption of mushrooms if the right strategies are pursued. These strategies must be informed by knowing why consumers purchase mushrooms or don't purchase mushrooms in the first place.





*Question: Please rate the following improved characteristics about fresh mushrooms, that might entice you to purchase more of them, on a scale from 1 (most important) to 5 (least important).*

Figure 11 shows a rating for the importance of a list of properties for potentially improving mushrooms that could entice consumers to increase the quantity/frequency of mushrooms purchased. A list of improved properties of mushrooms was presented and participants were asked to rank each of them according to importance. Each improved property was ranked on a scale from 1 to 5 as being “very important” and “not important,” respectively. Figure 12 combines the ranking of each of the improved properties; for example, it shows the number of respondents (y-axis) that ranked “appearance in store” as “1” in the first bar. The next bar shows the number of respondents that ranked “on sale/coupon” as 1, and so on. Further



down on the x-axis shows the number of respondents that ranked “appearance in store” as “2”, directly followed by the number of respondents that ranked “on sale/coupon” as 2, and so on.

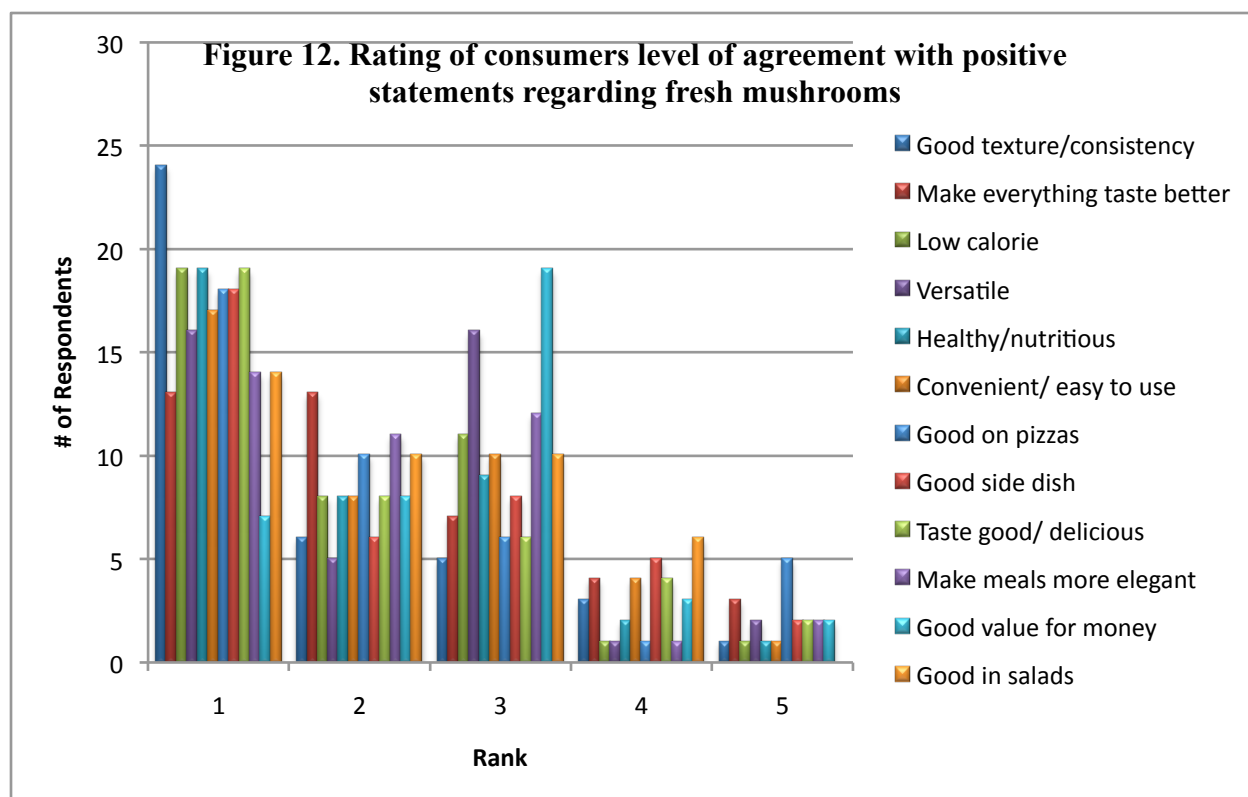
Among the list of improved properties, “if they were more affordable” was cited most frequently by respondents as being very important. Fifty one percent of respondents ranked “if they were more affordable” as 1 (most important), 24% ranked this improved property as two, 22% as three, 12% as four, and 2% as five (least important). The second most frequently cited improved property was “if they were on sale/had a coupon”. Forty four percent of respondents ranked “if they were on sale/had a coupon” as 1 (most important), 32% ranked this improved property as two, 7% as three, 10% as four, and 7% as five (least important).

The third most frequently cited improved property was “if they didn’t spoil so fast”. Thirty four percent of respondents ranked “if they didn’t spoil so fast” as 1 (most important), 29% ranked this improved property as two, 22% as three, 7% as four, and 7% as five (least important).

The fourth most frequently cited improved property was “if they looked better in the store”. Thirty two percent of respondents ranked “if they looked better in the store” as 1 (most important), 24% ranked this improved property as two, 22% as three, 12% as four, and 2% as five (least important).

The fifth most frequently cited improved property was “if I knew more ways to serve them”, followed by; “if I knew about their health benefits”, “if I knew they were a super-food”, and “if I had more time to cook” respectively (see appendix 1, Table 12 for percentages).





*Question: Rate the following statements about fresh mushrooms, 1 being that you strongly agree with the statement to 5, meaning you strongly disagree with the statement.*

Figure 12 shows a rating of the respondents' level of agreement with a list of positive statements regarding fresh mushrooms. Participants were asked to rate each positive statement from a list provided, according to their level of agreement, on a scale from 1 (strongly agree) to 5 (strongly disagree). Figure 12 combines the rating of each of the positive statements about fresh mushrooms. For example, it shows the number of respondents (y-axis) that ranked "good texture/consistency" as "1" in the first bar. The next bar shows the number of respondents that ranked "make everything taste better" as 1, and so on. Further down on the x-axis shows the number of respondents that ranked "good texture/consistency" as "2", directly followed by the number of respondents that ranked "make everything taste better" as 2, and so on.

The respondents selected, "good texture/consistency" most frequently as having strongly agreed with this statement. Fifty nine percent of respondents ranked "good texture/consistency"



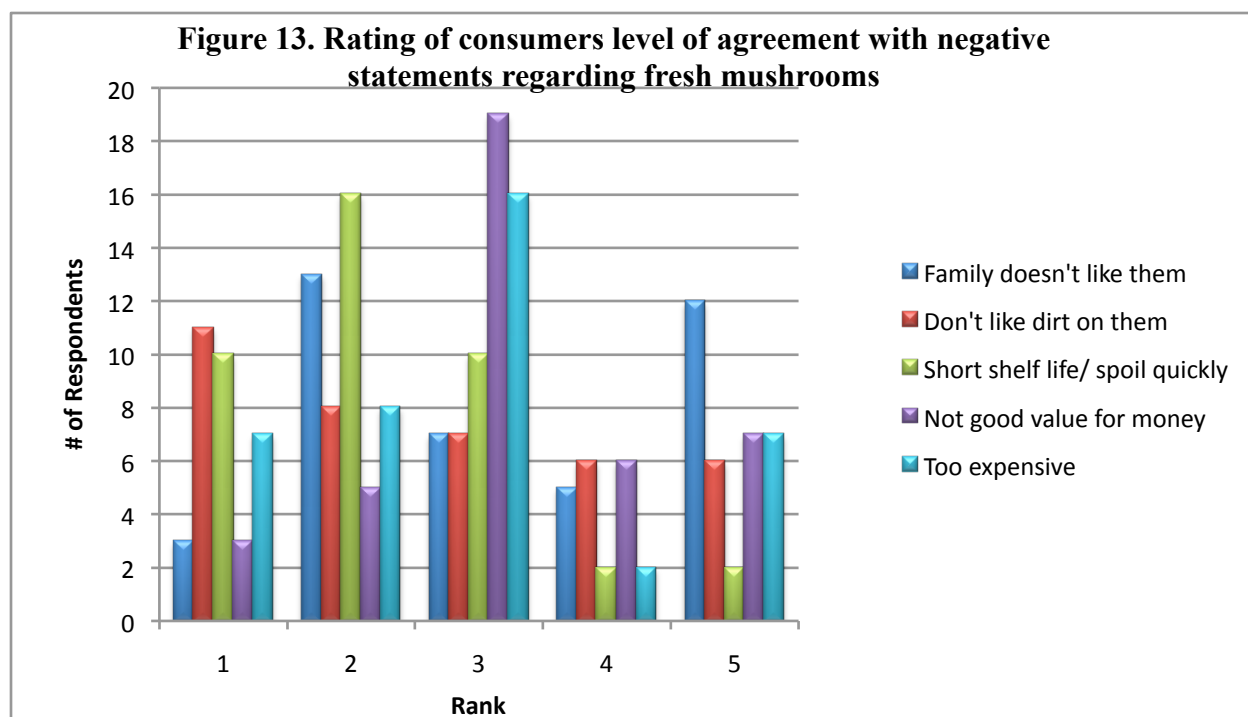
as 1 (strongly agree), 15% ranked this statement as two, 12% as three, 7% as four, and 2% as five (strongly disagree).

The next most frequently selected statements that respondents strongly agreed with were “low calorie”, “healthy/nutritious”, and “taste good/delicious”. These statements were all rated as 1 by 46% of the respondents. In addition, 20% of respondents rated “low calorie” as 2, 27% as 3, 2% as 4, and 2% as 5 (strongly disagree). Twenty percent of respondents rated “healthy/nutritious” as 2, 22% as 3, 5% as 4, and 2% as 5 (strongly disagree). Twenty percent of respondents rated “taste good/delicious” as 2, 15% as 3, 10% as 4, and 5% as 5 (strongly disagree).

The next most frequently selected statements that respondents strongly agreed with were “good on pizzas” and “good side dish”. These statements were both rated as one by 44% of the respondents. In addition, 24% of respondents rated “good on pizzas” as two, 15% as three, 2% as four, and 12% as five (strongly disagree). Fifteen percent of respondents rated “good side dish” as two, 20% as three, 12% as four, and 5% as five (strongly disagree).

The fourth most frequently selected statement that respondent rated as 1 was “convenient/easy to use”, followed by “make meals more elegant”, “good in salads”, “make everything taste better”, and “versatile” respectively. The least frequently selected statement that respondents rated as 1 was “good value for money”.





*Question: Rate the following statements about fresh mushrooms, 1 being that you strongly agree with the statement to 5, meaning you strongly disagree with the statement.*

Figure 13 shows a rating of the respondents' level of agreement with a list of negative statements regarding fresh mushrooms. Participants were asked to rate each negative statement from a list provided, according to their level of agreement, on a scale from 1 (strongly agree) to 5 (strongly disagree).

The respondents selected, "don't like dirt on them" most frequently as having strongly agreed with this statement. Twenty seven percent of respondents ranked "don't like dirt on them" as 1 (strongly agree), 20% ranked this statement as 2, 17% as 3, 15% as 4, and 15% as 5 (strongly disagree). The second most frequently selected statement that respondents strongly agreed with was "short shelf life/spoil quickly". Twenty four percent of respondents ranked "short shelf life/spoil quickly" as 1 (strongly agree), 39% ranked this statement as 2, 24% as 3, 5% as 4, and 5% as 5 (strongly disagree).



The third most frequently selected statement that respondents strongly agreed with was “too expensive”. Seventeen percent of respondents ranked “too expensive” as 1 (strongly agree), 20% ranked this statement as 2, 39% as 3, 5% as 4, and 17% as 5 (strongly disagree). The least frequently selected statements that respondents rated as 1 were “family doesn’t like them” and “not good value for money”. These statements were both rated as 1 by 7% of the respondents. In addition, 32% of respondents rated “family doesn’t like them” as 2, 17% as 3, 12% as 4, and 29% as 5 (strongly disagree). Twelve percent of the respondents rated “not good value for money” as 2, 46% as 3, 15% as 4, and 17% as 5 (strongly disagree).

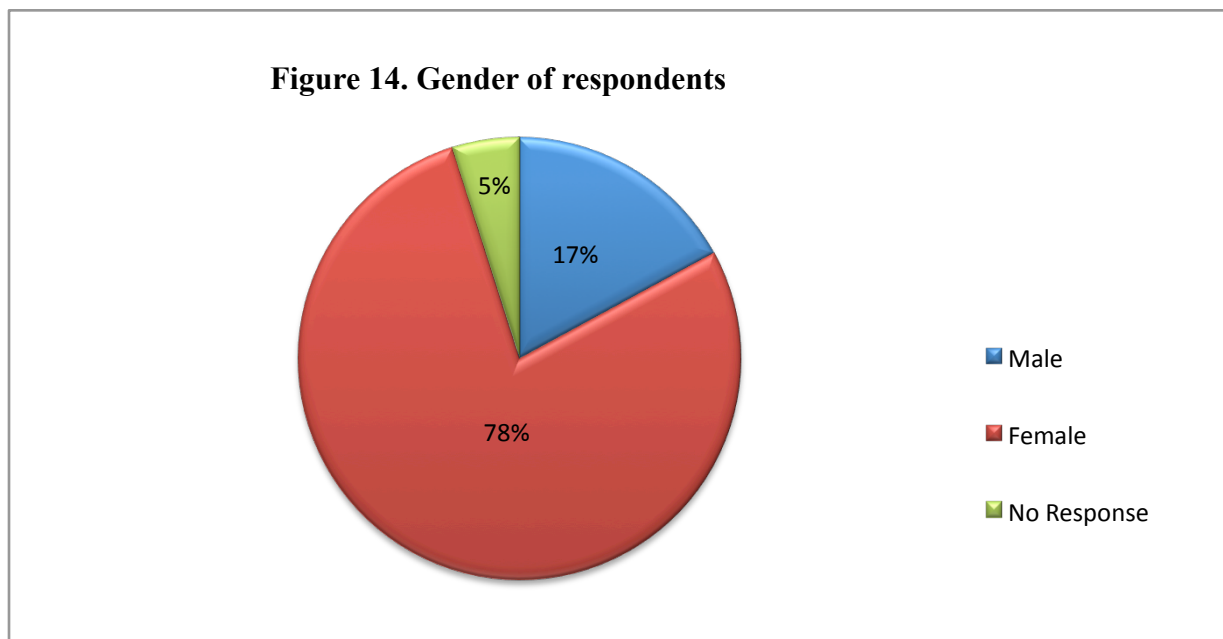


Figure 14 shows that 78% of the respondents were female. This suggests that females are largely responsible for household food purchases.



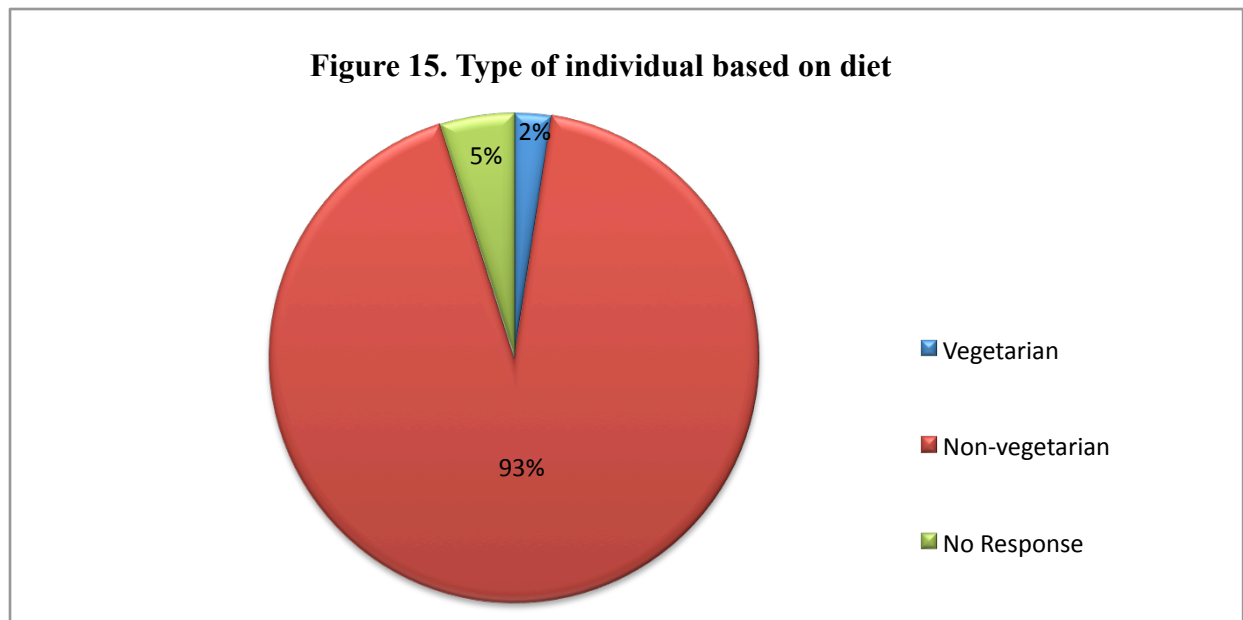
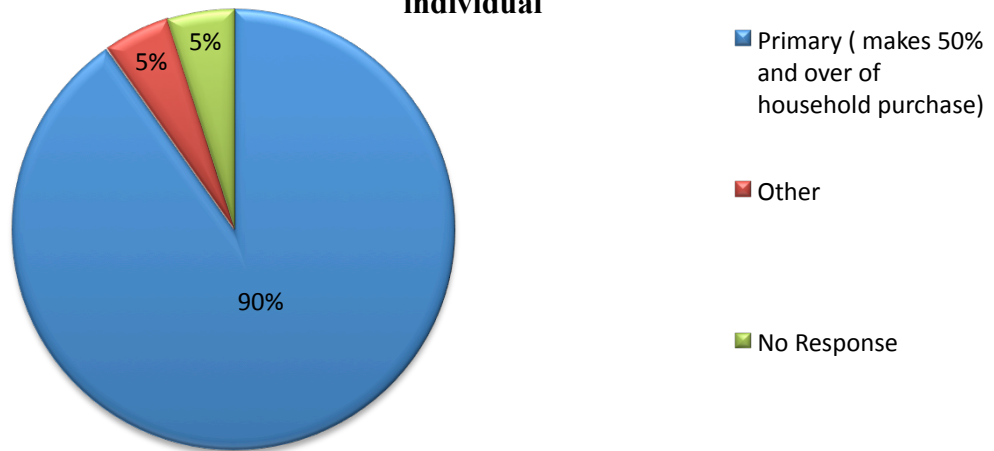


Figure 15 shows that 93% of the respondents were non-vegetarian. Mushrooms have a relatively high protein content compared to other vegetables, and therefore can easily be positioned as a dietary supplement for vegetarians. However, due to the low percent of vegetarians, marketing efforts may be directed to other attributes of mushrooms that will appeal to a larger segment of the population. For example, the fact that mushrooms contain a relatively high protein content compared to vegetables along with lower cholesterol, fat and other negative attributes associated with meat, will have greater mass appeal and therefore prove to be a more lucrative direction for marketers.



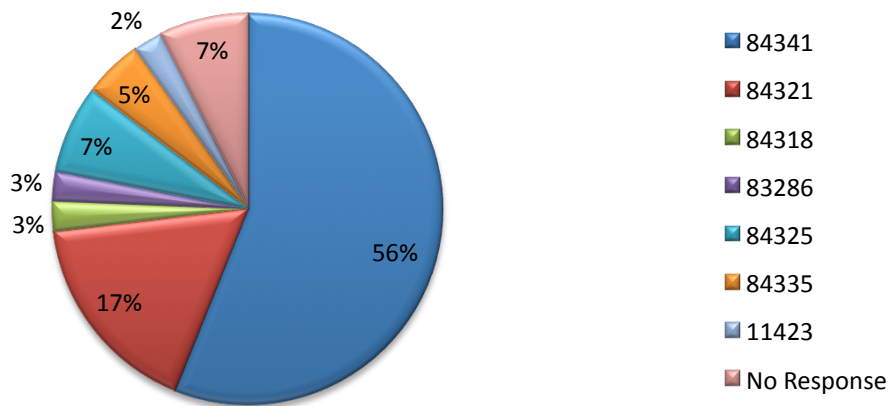
**Figure 16. Type of shopper based on quantity of purchases made by the individual**



*Question: Are you the Primary food shopper in your household? (Make 50% or more of all purchases)*

Ninety percent of the respondents indicated that they were the primary shoppers in their households (made more than 50% of all purchases) (Figure 16). In order to be most effective, marketing efforts must reach their target audience, that is, the individuals that are most responsible for making purchasing decisions. Based on this, the respondents of this survey are representative of the target audience and therefore provide a basis for formulating marketing strategies based on their needs and characteristics.

**Figure 17. Location of home zip codes of the respondents**

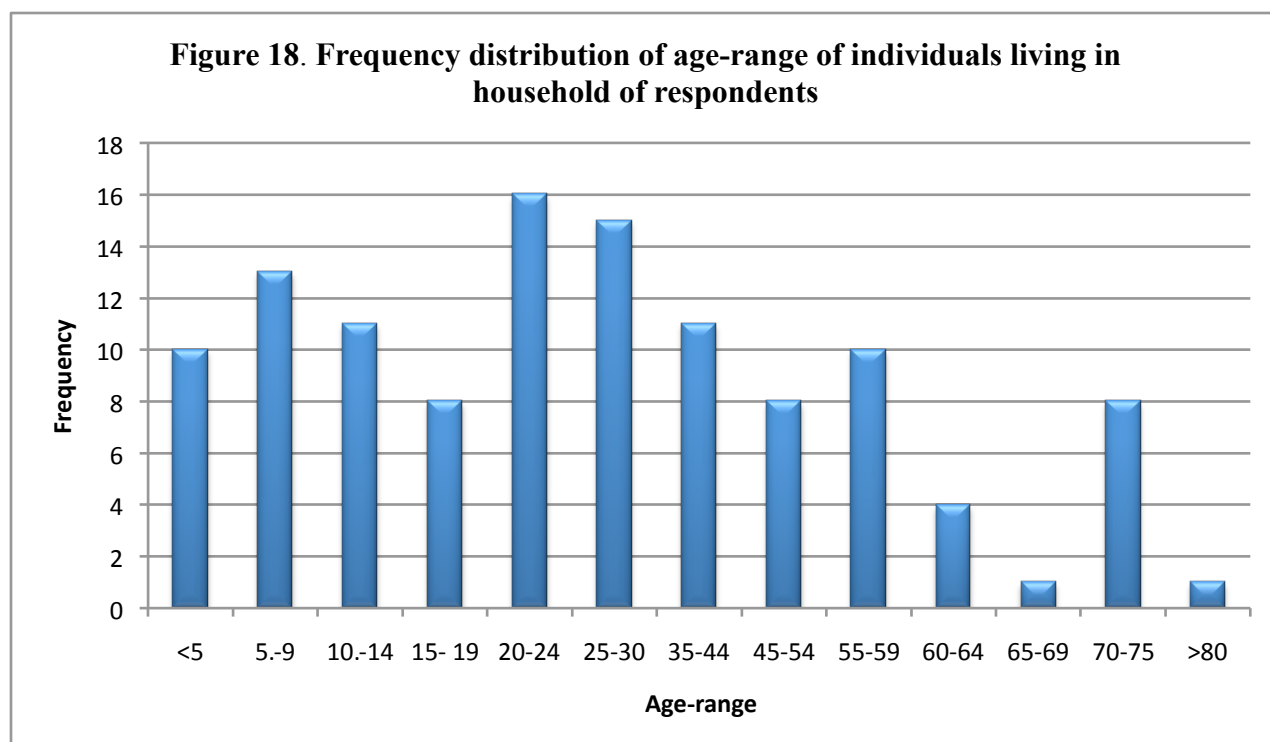




*Question: What is your home zip code?*

Fifty six percent of respondents indicated that their home zip code was 84341, followed by 17% that said their home zip code was 84321 (Figure 17). These zip codes are both found in the city of Logan, which combined for 73% of the respondents. Seven percent of the respondents were from the city of Mendon (zip code 84325), followed by 5% that said they were from the city of Smithfield (zip code 84335), and 3% that said they were from the city of Hyde Park (zip code 84318). Five percent of the respondents were from outside the state of Utah (zip codes 83286 and 11423).





*Question: How many of the people in your household are in the following age groups? (Enter the appropriate number of people in each category)*

Figure 18 shows the frequency distribution of age for the household represented by the individuals that comprised the survey respondents (respondents were asked to indicate how many persons in their household fell into each of the specified age categories). The most frequent age-group of individuals across all households is 20-24 years. This group account for 14% of individuals in all households. This was followed by the 25-30 and 5-9 age-groups which accounted for 13% and 11% of individuals in all households, respectively. Individuals in the under 5 age-group, 10-14 age group, 35-44 age-group, and 55-59 age-group, each accounted for 9% of individuals in all households. Individuals in the 15-19 age-group, 45-54 age-group, and 70-75 age-group each accounted for 7% of individuals in all households. Individuals in the 60-64 age-group accounted for 3%, while those in the 65-69 age-group and over-80 age group accounted for 1% each of individuals in all households.



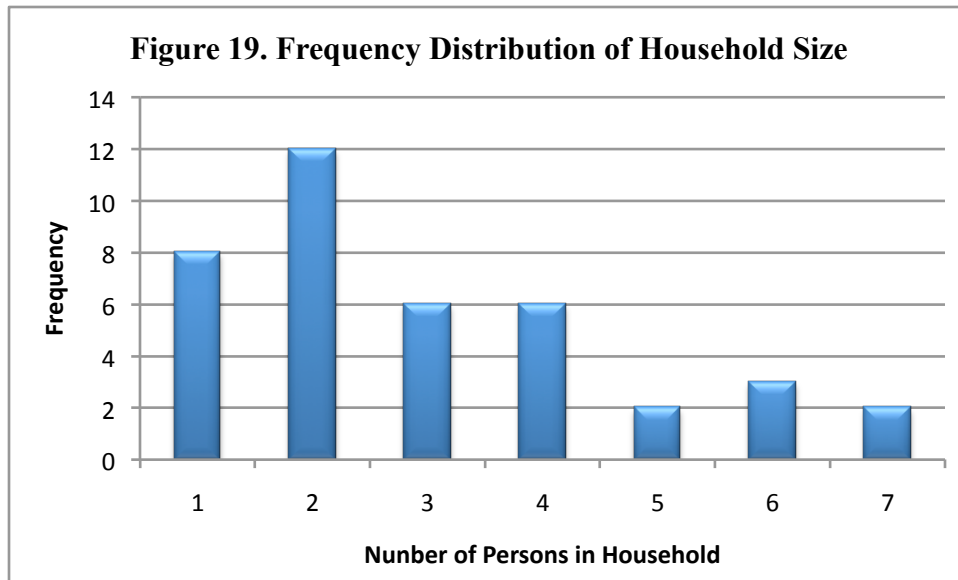
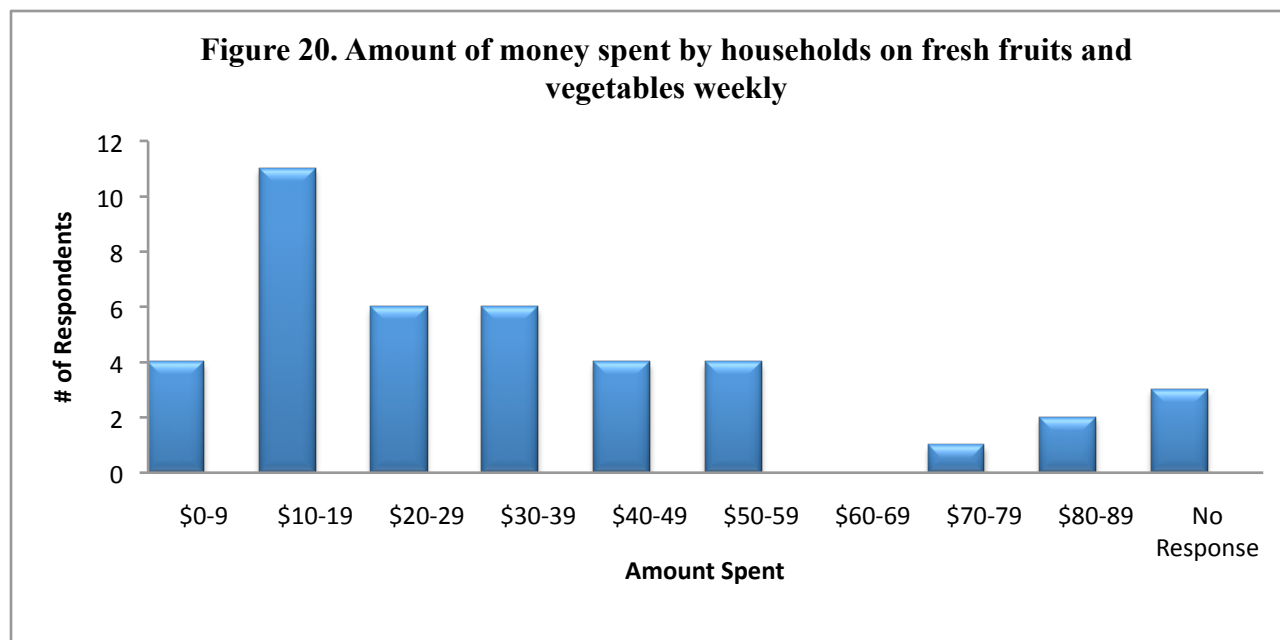


Figure 19 shows the frequency distribution of household size among the respondents. Thirty one percent of households consist of 2 persons followed by single person households at 21%. An equal number of households consist of 3 and 4 persons which accounted for 15% each of the respondents. The next most frequent household size was six-person households which accounted for 8% of the total number of the respondents. And finally, an equal number of households consist of 5 and 7 persons, the least frequent household sizes, and accounted for 5% each of the respondents. Using the weighted average method, the average number of persons in a household is 3.



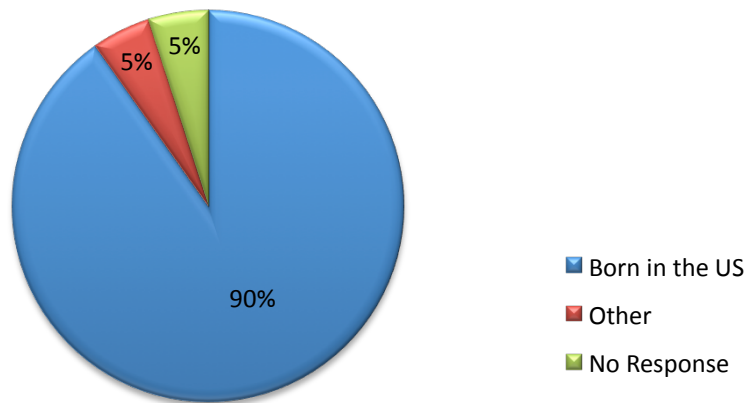


*Question: Approximately how much does your household spend each week to buy fresh produce (fruit and vegetables)?*

Figure 20 shows the amount of money spent on fresh fruits and vegetables per week by the respondents' household. Twenty seven percent of the respondents spend 10-19 dollars. Fifteen percent of the respondents spend 20-29 dollars per week and the same percentage of respondents spends 30-39 dollars per week on fresh fruits and vegetables. Ten percent of the respondents spend 0-9 dollars per week and the same percentage of respondents spends 40-49, and 50-59 dollars per week on fresh fruits and vegetables. This was followed by 5% of respondents spending 80-89 dollars per week and 2% spending 70-79 dollars per week on fresh fruits and vegetables.



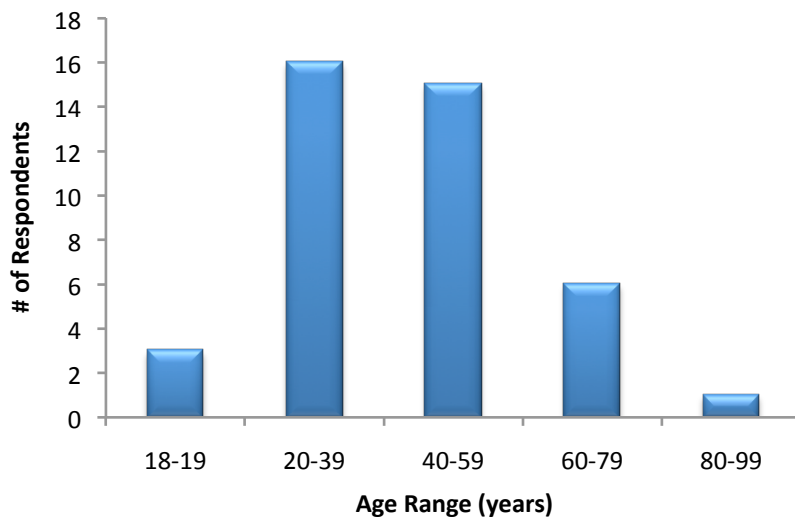
**Figure 21. Place of birth**



*Question: Were you born in the United States?*

Figure 21 shows that 90% of the respondents were born in the United States and 5% were born outside of the US.

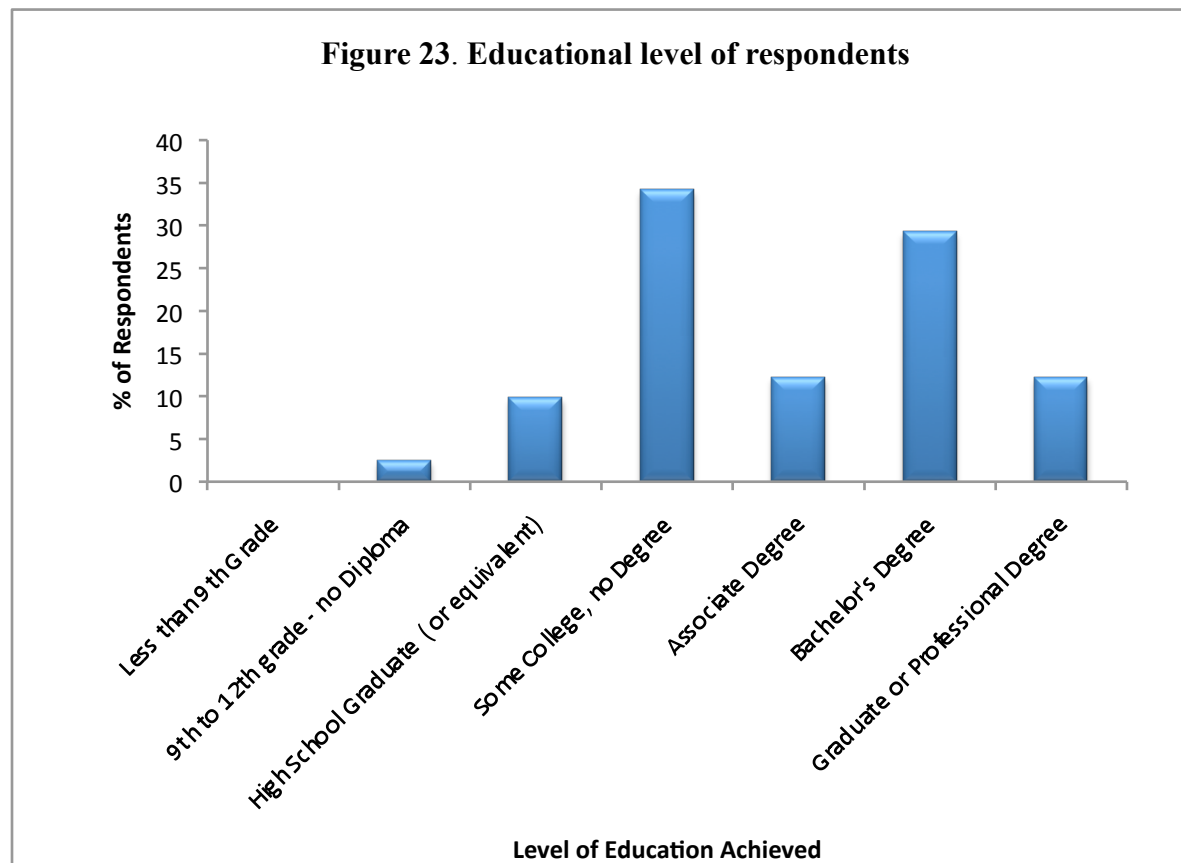
**Figure 22. Age range of respondents**



*Question: What was your age at your last birthday?*



Figure 22 shows the age range of respondents. Thirty nine percent of the respondents are between the ages of 20-39, followed by 37% between the ages of 40-59. Fifteen percent were between the ages of 60-79, followed by 7% between the ages 18-19, and 2% between the ages of 80-99 respectively. This information reflects a relatively young population of consumers with the potential to grow the mushroom market.

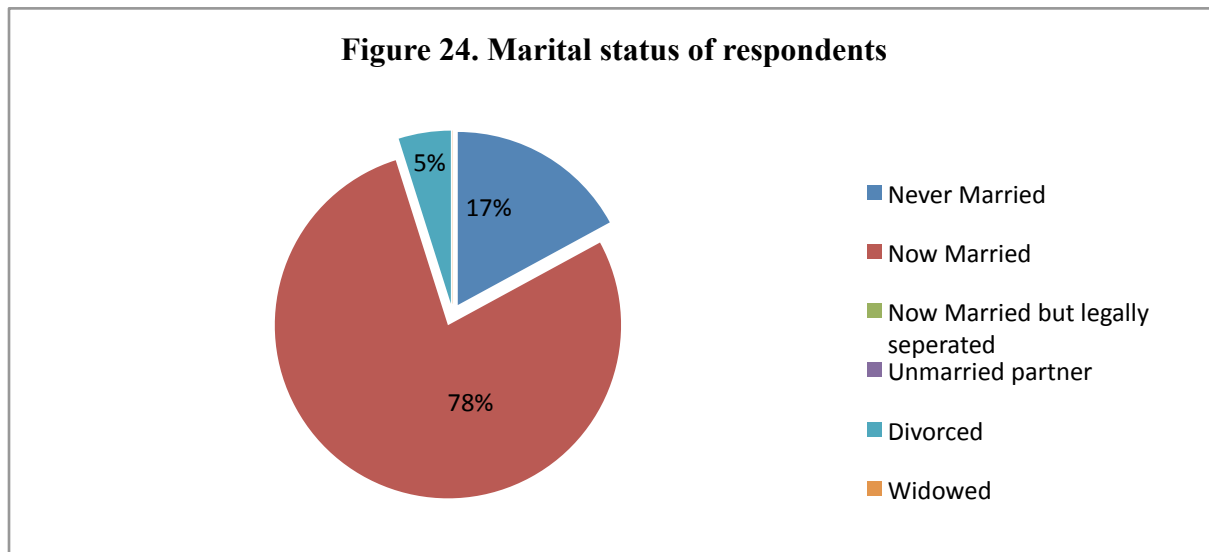


*Question: What level of education have you completed? (Check one)*

Figure 23 shows the education level of the respondents. Thirty four percent of the respondents have completed some college, but have not achieved a degree. Twenty nine percent of respondents completed a Bachelor's degree. Twelve percent of the respondents completed an associate degree and the same percentage of respondents completed a graduate or professional



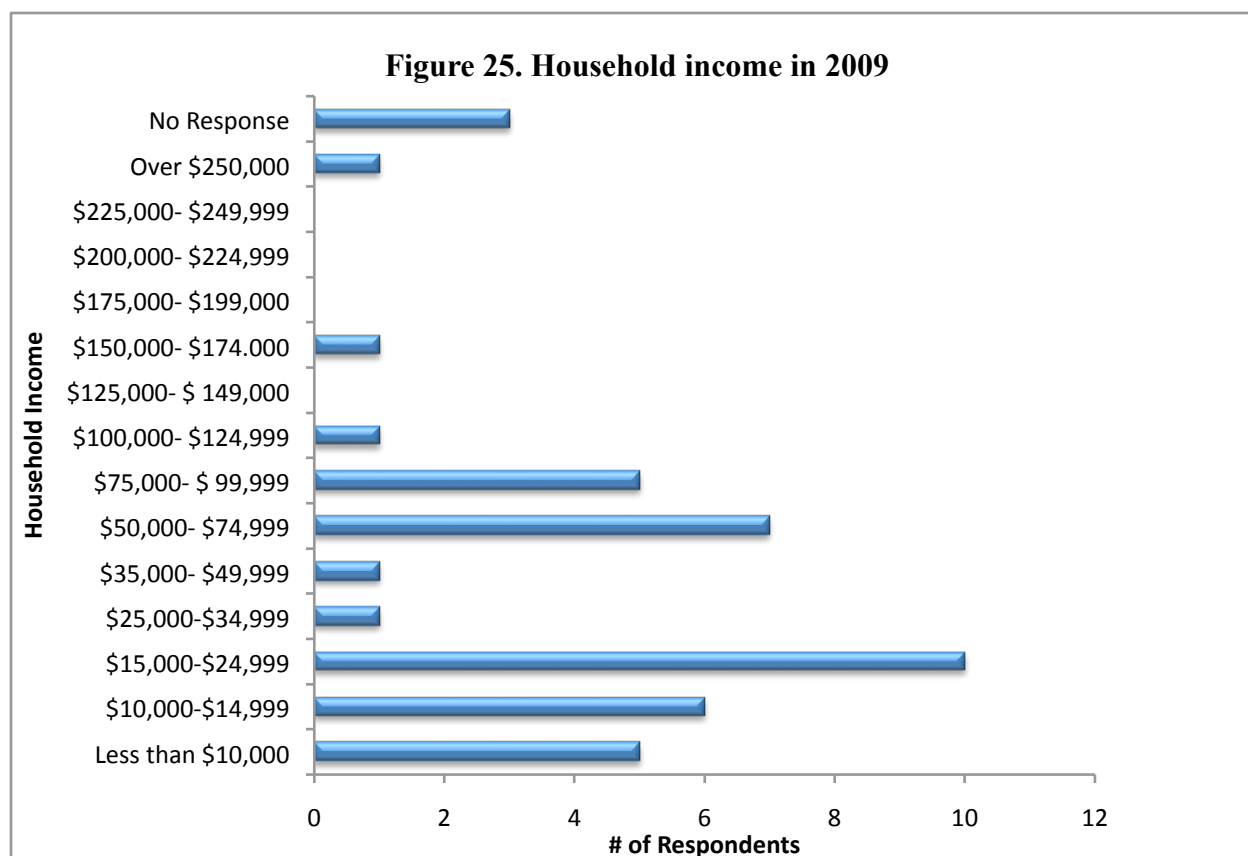
degree. Ten percent of the respondents graduated from high school (or equivalent), followed by 2% that completed 9<sup>th</sup> to 12<sup>th</sup> grade, but no diploma. None of the respondents completed less than 9<sup>th</sup> grade education level.



*Question: What is your marital status? (Check one)*

Figure 24 shows the marital status of the respondents. Seventy eight percent of the respondents are currently married, followed by 17% that were never married and 5% divorced.





*Question: What was the total income of all in your household in 2009? (Check one)*

Figure 25 shows the household income for 2009. Twenty four percent of the respondents' household income was 15,000-24,999 dollars; followed by 17% that earned 50,000-74,999 dollars and 15% that earned 10,000-14,999 dollars for that year. Twelve percent of the respondents' households earned less than 10,000 dollars, while the same percentage earned 75,000-99,999 dollars in the same year. Two percent of the respondents' households earned; 25,000-34,999 dollars, 35,000-49,999 dollars, 100,000-124,999 dollars, 150,000-174,999 dollars, and over 250,000 dollars for the year 2009.

The results of the survey depict respondents that are highly price conscious and mostly unaware of some of the most important attributes of mushrooms such as their nutritional and potential health values. Mushroom consumption among the respondents is relatively infrequent



taking the group as a whole. However, the group has a generally favorable attitude about mushrooms. Many of the respondents are in lower income categories and also have relatively large household sizes. This suggests that marketing efforts that take into account the total “value” of mushrooms consumption may be justified. That is, helping consumers to know that they are getting a “good deal” from mushrooms in terms of its nutritional attributes and versatility in everyday dishes would likely be more effective than attempting to market mushrooms as a luxury item that somehow elevates social status.



## 5.2. Results of Trend Analysis

The trend analysis exhibits past trends in production and price for US shiitake mushrooms. This information illustrates growth trends in the market that are useful in determining future growth potential.

**Figure 26. Trend lines for shiitake mushroom production and prices 86/87-09/10**

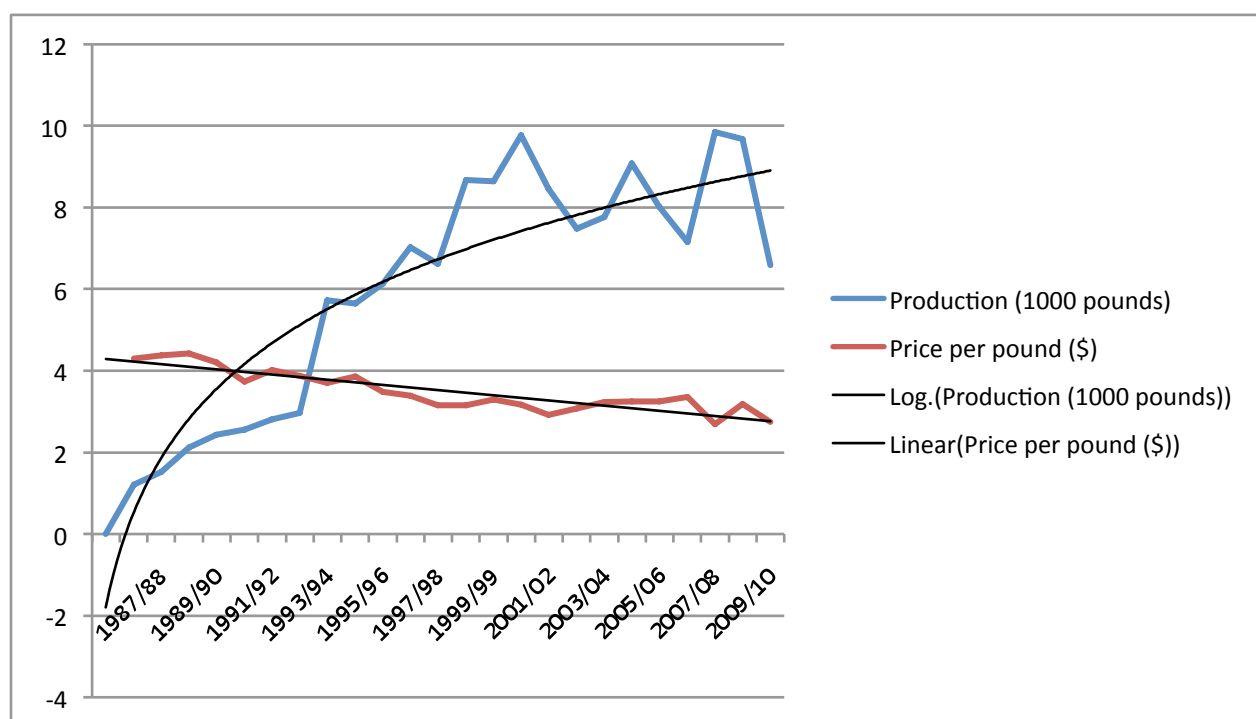


Figure 26 shows the yearly production of shiitake mushrooms and the price per pound of shiitake mushrooms from the year 1986/1987 to 2009/2010. This data was compiled by USDA, ERS from data provided by USDA, NASS: “*Mushrooms*”. Figure 26 also appropriately shows a logarithmic trend line for yearly production and a linear trend line for the yearly price per pound of shiitake mushrooms. The logarithmic trend line was used to highlight that production increased at a decreasing rate, while the linear trend line highlighted the relatively uniform decrease in price over the period. This figure suggests that the shiitake industry, while in the



development stage, is characterized by intense rivalry among firms. This is due to the steady decline in prices over the years, however, production continues to increase, but at a decreasing rate.

This analysis suggests a maturing shiitake mushroom industry with declining growth rates and declining prices. The results indicate that new strategies are likely needed to be successful in entering this market. The reason for this is that with slowing market growth, new entrants will probably need to capture market share from existing firms. This would either need to be done through price-cutting competition or through improved and cost-reducing production techniques.



### 5.3. Results of logit analysis

The results for the logit analysis are presented in the following discussion. The results provide some insights about the ability to develop marketing strategies for mushrooms based on where they are produced.

**Table 3. Logit analysis results determining characteristics of respondents who prefer locally grown and are willing to pay a premium price conditional on paying any.**

Independent Variable	Parameter Estimate <sup>a</sup>	Marginal Effect
Intercept	0.478	0.088
	(-1.719)	-0.316
<i>HIGHINC</i>	-2.644*	-0.563*
	(-1.33)	-0.237
<i>Q6SPEND</i>	-0.04	0.007
	-0.031	-0.005
<i>COLLEGE</i>	-0.126	-0.023
	-0.988	-0.184
<i>SMALLCH</i>	-0.487	-0.094
	-1.655	-0.335
<i>Q8AGE</i>	-0.028	0.005
	-0.043	-0.007
<i>HH</i>	-0.443	-0.082
	-0.515	-0.091
<i>Q2</i>	-0.929	-0.172
	-0.996	-0.181
<i>Q1SEX</i>	1.258	0.272
	-1.304	-0.309

Predictions:

Actual	Predicted		Total
	0	1	
0	5	6	11
1	3	21	24
Total	8	27	35

\* Statistically different than zero at the 10% level of significance for a two-tailed test.

<sup>a</sup> Standard errors are in parentheses.



Table 3 shows the statistical results for the logit analysis for willingness to pay a premium price for locally-grown mushrooms conditional on paying any. It includes the parameter estimates and marginal effects for the logit analysis. Only *HIGHINC* has a statistically significant influence on whether or not the survey respondent was willing to pay a premium price for locally grown mushrooms and it is negative. This suggests that demographic characteristics did not have much of an influence in determining whether or not the respondent would pay a premium for locally grown, unless the respondent was in the high income bracket. The results also show, as indicated by the marginal effect, that respondents that were in the high income group were 56% less likely to pay a premium price for locally grown mushrooms suggesting that high income respondents are not impressed by “benefits” attributable to locally-grown produce. It is important to remember that a large majority of respondents indicated a stated preference for locally-grown produce (Figure 1) and many indicated a willingness to pay more for locally-grown mushrooms. These results simply indicate that most respondents look favorably on locally-grown produce but that demographic characteristics can’t be used to identify groups that are the most likely to want locally-grown produce.



**Table 4. Logit analysis results determining characteristics of respondents who prefer the “Utah’s Own” brand and are willing to pay a premium price conditional on paying any.**

Independent Variable	Parameter Estimate <sup>a</sup>	Marginal Effect
Intercept	-0.741	-0.117
	-1.714	-0.267
<i>HIGHINC</i>	-2.443*	-0.493*
	-1.461	-0.272
<i>Q6SPEND</i>	0.043	0.007
	-1.461	-0.005
<i>COLLEGE</i>	0.411	0.064
	-1.002	-0.153
<i>SMALLCH</i>	2.052	0.26
	-1.704	-0.176
<i>Q8AGE</i>	0.08	0.013
	-0.051	-0.007
<i>HH</i>	-0.935*	-0.082*
	-0.552	-0.081
<i>Q2</i>	0.372	0.058
	-0.983	-0.156
<i>Q1SEX</i>	0.215	0.215
	-1.142	-0.196

Predictions:

Actual	Predicted		Total
	0	1	
0	4	6	10
1	2	23	25
Total	6	29	35

\* Statistically different than zero at the 10% level of significance for a two-tailed test.

<sup>a</sup> Standard errors are in parentheses.



Table 4 shows the statistical results for the logit analysis for willingness to pay a premium price for “Utah’s Own” mushrooms conditional on paying any. It includes the parameter estimates and marginal effects for the logit analysis. Two variables were found to have a statistically significant influence on whether or not the survey respondent was willing to pay a premium price for “Utah’s Own” mushrooms. These include *HIGHINC* and *HH*, that is, respondents in the high income group and had a large household size. Both of these variables had negative effects on the probability of being willing to pay a premium for Utah’s Own mushrooms. The results show, as indicated by the marginal effect, that respondents who were in the high income group were 49% less likely to pay a premium price and those with large households were 8% less likely to pay a premium price for “Utah’s Own” mushrooms. There was also weak evidence that *Q8AGE* or age of the respondents had an influence on the respondents’ decision. Respondents 1.3% more likely to purchase “Utah’s Own” mushrooms as age increased by one year. Other demographic characteristics did not have much of an influence in determining whether or not the respondent would pay a premium for “Utah’s Own” mushrooms. More respondents indicated a willingness to pay a premium for the Utah’s Own brand than for locally-grown (Figure 3). These results suggest a slightly higher preference for Utah’s Own compared to locally-grown suggesting that the state of Utah’s campaign to promote Utah’s Own has had some impact on consumer perceptions and willingness to pay more for Utah’s Own products.<sup>1</sup>

The logit analysis suggests that demographic characteristics are not a driving force for why respondents stated that they were willing to pay a premium for locally-grown or Utah’s

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<sup>1</sup> The same logit analysis was run for the characteristic “family farm” with essentially the same results. That is, that while a characteristic that the mushrooms were grown on a family farm was indicated as an attribute many of the respondents would pay a premium for the only demographic characteristic with a statistically significant impact was *HIGHINC* and it was also negative.



Own mushrooms. The analysis suggests a rather general market appeal for these characteristics. Caution must be exercised when considering this result, however. This was based on stated willingness to pay and not actual purchases. In any case, connections to local production are seen as positive by the respondents and suggest that marketing strategies based on appealing to local conditions and considerations will be viewed favorably by local consumers.



## **CHAPTER 6**

### **CONCLUSIONS AND RECOMMENDATIONS**

Based on the results from this study, expanding the production base of mushrooms in Utah has the potential to be a viable economic venture for new or existing firms, on the condition that appropriate marketing strategies are employed. In addition, potential entrants need to analyze other aspects of mushroom cultivation such as the cost of production, availability of raw materials, technical and financial analyses for this to be a successful venture in Utah.

The objective of marketing strategies must serve to capture market share from existing firms outside of Utah and also enhance consumption in the case of shiitake mushrooms. This study employed various techniques that yielded results that provide valuable insights for formulating such strategies in a manner such that production and marketing is consumer driven. This analysis provides some insights as to opportunities, threats, strengths, weaknesses, and barriers that are likely to be encountered by new and existing firms. Conclusions and recommendations derived from the consumer are first presented, followed by results derived from regression analysis that tested hypothesis formulated from the survey results. Conclusions based on results of trends observed are then reported. And finally conclusions and recommendations based on results and possible strategies for entry into the shiitake mushroom industry by new and existing mushroom firms are presented.

Potential entrants and existing mushroom firms in Utah potentially possess a competitive advantage based on the respondents' preference for food produced locally. Participants demonstrated a connection with local business as support for local business and economy were cited as important reasons for purchasing locally grown food. A substantial number of



respondents indicated a willingness to pay more for characteristics that incorporated the local theme, in addition to pesticide-free and organic. This suggests that these characteristics are valued by many consumers and present opportunities for firms to differentiate their product.

Tracking consumers' attitude towards food in general and their specific knowledge of mushrooms provided some insights into how current mushroom marketing strategies fit into the needs and wants of such consumers. The majority of respondents ranked taste/quality, followed closely by price, as the most important factors influencing purchasing preferences for food. These findings are important in molding a strategy for the marketing of mushrooms as marketers must connect with the needs of consumers for such strategies to be successful. For example, particular attention should be paid to providing mushrooms of high quality (size, color, texture, freshness) to consumers. This requires proper pre- and post-harvest handling, strict adherence to cold chain requirements, packaging and other characteristics associated with high quality standards. In addition, recipes that highlight the various ways that mushrooms can be prepared may influence consumers' perception of the tastiness and versatility of the product. While price is largely a product of cost of production, other characteristics of mushrooms that are consistent with consumers' needs can be highlighted. Such characteristics include; low-trans fat, low-cholesterol and low-fat relative to its protein content.

The health benefits of mushrooms, when compared to other vegetables, are poorly understood by consumers. Marketers can use this information to educate and raise awareness of the health and nutritional benefits of mushrooms. In order to effectively market their product, mushroom producers may target large supermarkets as their primary means of distribution as this is the major source of mushrooms as indicated by consumers. Producers that are interested in



processing this highly perishable product (canning and freezing) may consider the export market for this form of mushrooms; however, it is apparent that the demand locally is strongly in favor of the fresh form. The greatest demand for specialty mushrooms is for the shiitake and oyster species. However there remains much room for increasing the awareness of specialty mushrooms by producers and marketers. Superior quality is not a basis for local companies in Utah to gain a competitive advantage as the majority of mushrooms available originate from companies outside of Utah but appear to be perceived by a large majority of the respondents as being adequately fresh.

In order to sustain and grow the mushroom market in Utah, producers and marketers need to formulate and implement strategies to increase consumption. To do this, of course, requires one to know the reason that most consumers purchase mushrooms relatively infrequently. There appears to be room to increase the consumption of mushrooms if the right strategies are pursued. These strategies must be informed by knowing why consumers purchase mushrooms or don't purchase mushrooms in the first place. The results of the survey depict respondents that are highly price conscious and mostly unaware of some of the most important attributes of mushrooms such as their nutritional and potential health values. Mushroom consumption among the respondents is relatively infrequent taking the group as a whole. However, the group has a generally favorable attitude about mushrooms. Many of the respondents are in lower income categories and also have relatively large household sizes. This suggests that marketing efforts that take into account the total "value" of mushrooms while enhancing consumption may be justified. That is, helping consumers to know that they are getting a "good deal" from mushrooms in terms of its nutritional attributes and versatility in everyday dishes would likely be more effective than attempting to market mushrooms as a luxury item that somehow elevates social status.



Results of price and production trends of the shiitake mushroom industry indicate that it is still in the development stage, but characterized by intense rivalry among firms. This is due to the steady decline in prices over the years, however, production continues to increase, but at a decreasing rate. This analysis suggests a maturing shiitake mushroom industry with declining growth rates and declining prices. The results indicate that new strategies are likely needed to be successful in entering this market. The reason for this is that with slowing market growth, new entrants will probably need to capture market share from existing firms or expand the current market. This would need to be done through price-cutting competition, enhanced advertising, improved and cost-reducing production techniques, or some combination of these factors.

The results of the logit analysis provide some insights about the ability to develop marketing strategies for mushrooms based on where they are produced. These results simply indicate that most respondents look favorably on locally-grown produce but that demographic characteristics can't be used to identify groups that are the most likely to want locally-grown produce. More respondents indicated a willingness to pay a premium for the Utah's Own brand than for locally-grown. The logit analysis suggests that demographic characteristics are not a driving force for why respondents stated that they were willing to pay a premium for locally-grown or Utah's Own mushrooms. The analysis suggests a rather general market appeal for these characteristics. Marketing strategies based on appealing to local conditions and considerations will be viewed favorably by local consumers.

The results indicated that new strategies are likely needed to be successful in entering this market. The reason for this is that with slowing market growth, new entrants will probably need to capture market share from existing firms. This would either need to be done through price-cutting competition or through improved and cost-reducing production techniques.



Helping consumers to know that they are getting a “good deal” from mushrooms in terms of nutritional attributes and versatility in everyday dishes would likely be more effective than attempting to market mushrooms as a luxury item that somehow elevates social status. Potential new entrants into the shiitake mushroom industry may also capture existing market share and expand their market base by differentiating their product along the lines of versatility of use, health and nutritional benefits, and local production. This may be achieved through branding by utilizing Utah’s Own brand, providing recipes, and educational material to consumers.

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## APPENDIX A



## Survey of mushroom consumers by Utah State University

### Section 1: Locally grown produce

1. If available, do you consciously choose locally-grown produce when you shop at local supermarkets?

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No

2. Following are some reasons that you might purchase locally grown foods. Please identify the top three reasons that you purchase locally grown foods.

1. Freshness
2. Taste
3. Nutrition
4. Safety
5. Support local businesses
6. Support regional economy
7. Direct connection with source of food

<input type="checkbox"/>	Most important reason (enter reason number 1-7)
<input type="checkbox"/>	2nd most important (enter reason number 1-7)
<input type="checkbox"/>	3rd most important (enter reason number 1-7)

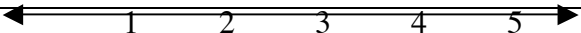
3. Assuming Mushrooms are priced at \$3.00 per pound at your local grocery store, how much more (if any) would you be willing to pay for a one pound package if the mushrooms had one of the following characteristics (Please **check one** box in each row)?

Characteristic that the mushrooms have	Price for a one-pound package of fresh mushrooms							
	\$3.00	\$3.05	\$3.15	\$3.25	\$3.50	\$3.75	\$4.00	Over \$4.00
Pesticide free	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Locally grown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grown on a family farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Displays the "Utah's Own" symbol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Section 2: Attitude and usage information

1. In general, when you purchase food of any type at the grocery store, how would you rate the importance of the following characteristics in your decision (please check one box in each row)?

	Not Important	Very important				
						
1. Price	1	2	3	4	5	
2. Brand	1	2	3	4	5	
3. Low-calorie	1	2	3	4	5	
4. Low-fat	1	2	3	4	5	
5. Low-trans fats	1	2	3	4	5	
6. Low-cholesterol	1	2	3	4	5	
7. Low-sodium	1	2	3	4	5	
8. Labeled as <i>Heart Smart</i>	1	2	3	4	5	
9. Labeled as organic	1	2	3	4	5	
10. Labeled as natural	1	2	3	4	5	
11. Taste/quality	1	2	3	4	5	
12. Ease of preparation	1	2	3	4	5	
13. Convenient Packaging	1	2	3	4	5	

2. Would you consider mushrooms to be in your top 5 favorite vegetables?

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No

3. Which from the following list would you consider the top 5 healthiest vegetables?

<input type="checkbox"/>	Lettuce
<input type="checkbox"/>	Broccoli
<input type="checkbox"/>	Corn
<input type="checkbox"/>	Carrots
<input type="checkbox"/>	Fresh Mushrooms

4. Where did you last purchase mushrooms?

<input type="checkbox"/>	Smith's (other large Supermarket/Grocery Store)
<input type="checkbox"/>	Wal-Mart (other supercenter)
<input type="checkbox"/>	Lee's Marketplace
<input type="checkbox"/>	Fresh Market
<input type="checkbox"/>	Macy's
<input type="checkbox"/>	Gourmet/specialty food store
<input type="checkbox"/>	Club store

5. When you last purchased mushrooms, what form were they in?

<input type="checkbox"/>	Fresh
<input type="checkbox"/>	Canned
<input type="checkbox"/>	Frozen



6. Please indicate which of the following mushroom varieties you have heard of.

<input type="checkbox"/>	Wooden
<input type="checkbox"/>	White
<input type="checkbox"/>	Oyster
<input type="checkbox"/>	Shiitake
<input type="checkbox"/>	Maitake
<input type="checkbox"/>	Portabella
<input type="checkbox"/>	Enoki
<input type="checkbox"/>	Crimini
<input type="checkbox"/>	Don't know

7. Are you satisfied with the quality of fresh mushrooms available in Logan?

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No
<input type="checkbox"/>	Don't Know

8. How often do you purchase fresh mushrooms?

<input type="checkbox"/>	More than once a week
<input type="checkbox"/>	Once a week
<input type="checkbox"/>	2-3 times a month
<input type="checkbox"/>	Once a month
<input type="checkbox"/>	Few times a year

9. What are the top three choices that would entice you to purchase more mushrooms?(Check **3 choices only**)

<input type="checkbox"/>	If they didn't spoil so fast
<input type="checkbox"/>	If they were more affordable
<input type="checkbox"/>	If they were on sale/had a coupon
<input type="checkbox"/>	If I knew more about their health benefits
<input type="checkbox"/>	If I knew more ways to serve them
<input type="checkbox"/>	If I knew they were a "superfood"
<input type="checkbox"/>	If I had more time to cook
<input type="checkbox"/>	If they looked better in the store

10. Rate the following attributes about fresh mushrooms 1 being the most liked and 5 being least liked.

	Most liked ←————→ Least liked				
Taste good/delicious	1	2	3	4	5
Good in salads	1	2	3	4	5
Good on pizzas	1	2	3	4	5
Versatile	1	2	3	4	5
Healthy/nutritious	1	2	3	4	5
Convenient/easy to use	1	2	3	4	5
Low calorie	1	2	3	4	5
Good texture/consistency	1	2	3	4	5
Good side dish	1	2	3	4	5
Make everything taste better	1	2	3	4	5



Make meals more elegant	1	2	3	4	5
Good value for the money	1	2	3	4	5

11. Rate the following attributes of mushrooms. 1 being strongly agrees and 5 strongly disagree.

	Strongly agree ←————→ Strongly disagree				
Short shelf life/spoil quickly	1	2	3	4	5
Too expensive	1	2	3	4	5
Don't like dirt on them	1	2	3	4	5
Family doesn't like them	1	2	3	4	5
Not good value for the money	1	2	3	4	5
Nothing	1	2	3	4	5

### Section 3: About you and your household

This information is required for statistical analysis. All information provided will be anonymous.

1. Are you:

<input type="checkbox"/>	Female
<input type="checkbox"/>	Male

2. Are you a vegetarian or vegan?

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No

3. Are you the **Primary** food shopper in your household?(make 50% or more of all purchases)

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No

4. What is your home zip code?



5. How many of the people in your household are in the following age groups? (Enter the appropriate number of people in each category)

<input type="text"/>	Under 5 years
<input type="text"/>	5 to 9 years
<input type="text"/>	10 to 14 years
<input type="text"/>	15 to 19 years
<input type="text"/>	20 to 24 years
<input type="text"/>	25 to 34 years
<input type="text"/>	35 to 44 years
<input type="text"/>	45 to 54 years
<input type="text"/>	55 to 59 years
<input type="text"/>	60 to 64 years
<input type="text"/>	65 to 69 years
<input type="text"/>	70 to 79 years
<input type="text"/>	80 years and more

6. Approximately how much does your household spend each week to buy produce (fruit and vegetables)? (enter 0 if none)

\$

7. Were you born in the United States?

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No

8. What was your age at your last birthday?

9. What level of education have you completed? (Check **one**)

<input type="checkbox"/>	Less than 9 <sup>th</sup> grade
<input type="checkbox"/>	9 <sup>th</sup> to 12 <sup>th</sup> grade, no diploma
<input type="checkbox"/>	High school graduate (or equivalency)
<input type="checkbox"/>	Some college, no degree
<input type="checkbox"/>	Associate degree
<input type="checkbox"/>	Bachelor's degree
<input type="checkbox"/>	Graduate or Professional degree

10. What is your marital status? (Check **one**):

<input type="checkbox"/>	Never married
<input type="checkbox"/>	Now married
<input type="checkbox"/>	Now married but legally separated
<input type="checkbox"/>	Unmarried partner
<input type="checkbox"/>	Divorced
<input type="checkbox"/>	Widowed

11. What was the total income of all in your household in 2009? (Check **one**)

<input type="checkbox"/>	Less than \$10,000
<input type="checkbox"/>	\$10,000-\$14,999
<input type="checkbox"/>	\$15,000-\$24,999
<input type="checkbox"/>	\$25,000-\$34,999
<input type="checkbox"/>	\$35,000-\$49,999
<input type="checkbox"/>	\$50,000-\$74,999
<input type="checkbox"/>	\$75,000-\$99,999
<input type="checkbox"/>	\$100,000-\$124,999



— \$125,000-\$149,999  
— \$150,000-\$174,999  
— \$175,000-\$199,999  
— \$200,000-\$224,999  
— \$225,000-\$249,999  
— Over \$250,000



## Appendix B

### Summary of results of Survey

#### Section 1: Locally grown produce

**Table 1. Proportion of respondents that choose locally grown produce when available**

Number of respondents that choose locally grown produce when available	%	Other	%
33	80	8	20

**Table 2. Ranking of importance of reasons for respondents choosing locally grown food**

Reasons	Ranking of attributes according to importance for selecting locally grown foods											
	1	%	2	%	3	%	4	%	5	%	NR	%
Freshness	31	76	7	17	1	2	1	2	1	2	0	0
Taste	24	59	10	24	5	12	1	2	1	2	0	0
Nutrition	18	44	8	20	7	17	3	7	4	10	1	2
Safety	14	34	10	24	10	24	2	5	3	7	2	5
Supporting local businesses	22	54	9	22	5	12	1	2	3	7	1	2
supporting regional economy	20	49	8	20	7	17	2	5	3	7	1	2
Direct connection with food source	11	27	7	17	13	32	6	15	3	7	1	2

\* 1- most important, 5- Least Important

\* NR – No Response



**Table 3. Willingness of respondents to pay additional for various characteristics of mushrooms**

Characteristics of mushrooms	Number of respondents willing to pay additional for characteristics described																	
	\$3.00	%	\$3.05	%	\$3.15	%	\$3.25	%	\$3.50	%	\$3.75	%	\$4.00	%	over \$4.00	%	NR	%
Pesticide	12	29	2	5	5	12	9	22	8	20	1	2	2	5	1	2	1	2
Organic	15	37	4	10	4	10	6	15	8	20	2	5	0	0	0	0	2	5
Locally Grown	13	32	2	5	7	17	6	15	5	12	4	10	2	5	1	2	1	2
Family farm	13	32	3	7	3	7	9	22	6	15	5	12	1	2	1	2	0	0
"Utah's Own" displayed	11	27	4	10	7	17	8	20	6	15	2	5	1	2	1	2	1	2

## Section 2: Attitude and usage information

**Table 4. Ranking of importance of various food characteristics by respondents**

Characteristics of food item	Importance											
	1	%	2	%	3	%	4	%	5	%	NR	%
Convenient Packaging	15	37	4	10	11	27	7	17	3	7	1	2
Price	2	5	1	2	4	10	9	22	25	61	0	0
Taste/quality	2	5	1	2	0	0	12	29	26	63	0	0
Low-calorie	5	12	4	10	18	44	10	24	4	10	0	0
Labeled as organic	9	22	11	27	10	24	7	17	4	10	0	0
Low-trans fats	4	10	6	15	10	24	9	22	12	29	0	0
Low-cholesterol	5	12	7	17	11	27	9	22	9	22	0	0
Labeled as natural	7	17	4	10	16	39	8	20	6	15	0	0
Labeled as Heart Smart	3	7	9	22	15	37	7	17	7	17	0	0
Low-fat	3	7	6	15	11	27	13	32	8	20	0	0
Ease of preparation	7	17	5	12	11	27	10	24	8	20	0	0
Low-sodium	4	10	8	20	19	46	6	15	5	12	0	0
Brand	10	24	10	24	11	27	7	17	4	10	0	0



**Table 5. Proportion of respondents that rated mushrooms among their top five favorite vegetables versus those that do not**

Number of respondents that rated mushrooms among their top 5 favorite vegetables	%	Other	%
19	46	22	54

**Table 6. Number of respondents that ranked each vegetable in a scale of 1 to 5 based on their perceptions of health benefits**

List of vegetables	Rank (1 being most beneficial and 5, least beneficial)									
	1	%	2	%	3	%	4	%	5	%
<b>Mushroom</b>	<b>3</b>	<b>30</b>	<b>4</b>	<b>40</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>10</b>
Corn	0	0	0	0	1	10	2	20	7	70
Cucumber	2	20	2	20	4	40	2	20	0	0
Radish	1	10	0	0	2	20	5	50	2	20
Pepper	4	40	4	40	2	20	0	0	0	0
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>18</b>	<b>6</b>	<b>55</b>	<b>3</b>	<b>27</b>	<b>0</b>	<b>0</b>
Lettuce	1	9	2	18	0	0	3	27	5	45
Spinach	10	91	1	9	0	0	0	0	0	0
Cauliflower	0	0	4	36	4	36	2	18	1	9
Onion	0	0	2	18	2	18	3	27	4	36
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>30</b>	<b>3</b>	<b>30</b>	<b>2</b>	<b>20</b>	<b>2</b>	<b>20</b>
Carrot	4	40	1	10	2	20	2	20	1	10
Cabbage	1	10	0	0	3	30	1	10	5	50
Asparagus	4	40	1	10	1	10	2	20	2	20
Goya Bean	1	10	5	50	1	10	3	30	0	0
<b>Mushroom</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>33</b>	<b>1</b>	<b>11</b>	<b>3</b>	<b>33</b>	<b>2</b>	<b>22</b>
Broccoli	7	78	0	0	1	11	1	11	0	0
Tomato	0	0	3	33	1	11	3	33	2	22
Squash	2	22	1	11	4	44	1	11	1	11
Celery	0	0	2	22	3	33	1	11	4	44



**Table 7.**Most recent location that respondents purchased mushrooms from

Store	Number of respondents	%
Smith's ( other large Supermarket/ Grocery Store	4	10
Wal-Mart ( other supercenter)	6	15
Lee's Marketplace	26	63
Fresh Market	3	7
Macy's	2	5
Gourmet/ specialty food store	0	0
Club store	0	0

**Table 8:** Form of mushroom most recently purchased by respondents

Form of mushrooms	Number of respondents	%
Fresh	37	90
Canned	3	7
Frozen	1	3



**Table 9.Varieties of mushrooms heard of by respondents**

Variety	Number of respondents	%	NR	%
Woodear	6	15	2	5
White	26	63	2	5
Oyster	14	34	2	5
Shiitake	33	80	0	0
Maitake	7	17	2	5
Portabella	39	95	0	0
Enoki	4	10	3	7
Crimini	15	37	3	7
Don't Know	1	2	3	7

**Table 10.Satisfaction of respondents with the quality of mushrooms available in Logan**

Satisfaction	Number of respondents	%
Yes	31	76
No	1	2
Don't Know	7	17
No Response	2	5



**Table 11.Frequency of fresh mushrooms purchase by respondents**

<b>Frequency</b>	<b>Number of respondents</b>	<b>%</b>
More than once a week	1	2
Once a week	7	17
2-3 times a month	9	22
Once a month	8	20
Few times a year	16	39

**Table 12.Rating of importance of improved characteristics of mushrooms that may entice consumers to purchase more**

<b>Improvement</b>	<b>Importance</b> (1 being most important improvement, 5 being least important)											
	<b>1</b>	<b>%</b>	<b>2</b>	<b>%</b>	<b>3</b>	<b>%</b>	<b>4</b>	<b>%</b>	<b>5</b>	<b>%</b>	<b>NR</b>	<b>%</b>
If they looked better in the store	13	32	10	24	9	22	5	12	1	2	3	7
If they were on sale/had a coupon	18	44	13	32	3	7	4	10	3	7	0	0
If I knew they were a "superfood"	12	29	10	24	13	32	1	2	5	12	0	0
If I knew more ways to serve them	12	29	13	32	7	17	4	10	5	12	0	0
If they didn't spoil so fast	14	34	12	29	9	22	3	7	3	7	0	0
If I had more time to cook	6	15	7	17	10	24	8	20	10	24	0	0
If I knew more about their health benefits	12	29	13	32	10	24	1	2	4	10	1	2
If they were more affordable	21	51	9	22	7	17	3	7	1	2	0	0



**Table 13. Rating of consumers level of agreement with various positive statements regarding fresh mushrooms**

Positive statements about fresh mushrooms	Consumers' agreement with statement											
	1	%	2	%	3	%	4	%	5	%	NR	%
Good texture/consistency	24	59	6	15	5	12	3	7	1	2	2	5
Make everything taste better	13	32	13	32	7	17	4	10	3	7	1	2
Low calorie	19	46	8	20	11	27	1	2	1	2	1	2
Versatile	16	39	5	12	16	39	1	2	2	5	1	2
Healthy/nutritious	19	46	8	20	9	22	2	5	1	2	2	5
Convenient/ easy to use	17	41	8	20	10	24	4	10	1	2	1	2
Good on pizzas	18	44	10	24	6	15	1	2	5	12	1	2
Good side dish	18	44	6	15	8	20	5	12	2	5	2	5
Taste good/ delicious	19	46	8	20	6	15	4	10	2	5	2	5
Make meals more elegant	14	34	11	27	12	29	1	2	2	5	1	2
Good value for money	7	17	8	20	19	46	3	7	2	5	2	5
Good in salads	14	34	10	24	10	24	6	15	0	0	1	2

**Table 14. Rating of consumers level of agreement with various negative statements regarding fresh mushrooms**

Negative statements about fresh mushrooms	Consumers agreement with statements											
	1	%	2	%	3	%	4	%	5	%	NR	%
Family doesn't like them	3	7	13	32	7	17	5	12	12	29	1	2
Don't like dirt on them	11	27	8	20	7	17	6	15	6	15	3	7
Short shelf life/ spoil quickly	10	24	16	39	10	24	2	5	2	5	1	2
Not good value for money	3	7	5	12	19	46	6	15	7	17	1	2
Too expensive	7	17	8	20	16	39	2	5	7	17	1	2



### Section 3: Personal and Household Information

**Table 15. Gender of respondents**

<b>Gender</b>	<b>Number of respondents</b>	<b>%</b>
Male	7	17
Female	32	78
No Response	2	5

**Table 16. Type of individual based on diet**

<b>Type of individual</b>	<b>Number of respondents</b>	<b>%</b>
Vegetarian	1	2
non-Vegetarian	38	93
No Response	2	5

**Table 17. Type of shopper based on quantity of household purchases made by the individual**

<b>Type of shopper</b>	<b>Number of respondents</b>	<b>%</b>
Primary ( makes 50% and over of household purchase)	37	90
Other	2	5
No Response	2	5



**Table 18. Location of residence of respondent based on zip code**

<b>Zip code</b>	<b>Number of respondents</b>	<b>%</b>
84341	23	56
84321	7	17
84318	1	2
83286	1	2
84325	3	7
84335	2	5
11423	1	2
No Response	3	7

**Table 19. Age range of individuals living in household of the respondent**

<b>Age range</b>	<b>Total</b>
Under 5 years	10
5 to 9 years	13
10 to 14 years	11
15 to 19 years	8
20 to 24 years	16
25 to 34 years	15
35 to 44 years	11
45 to 54 years	8
55 to 59 years	10
60 to 64 years	4
65 to 69 years	1
70 to 79 years	8
80 years and over	1



**Table 20.Amount of money spent on fruits and vegetables each week by respondents**

<b>Amount (\$)</b>	<b>Number of respondents</b>	<b>%</b>
0-9	4	10
10-19	11	27
20-29	6	15
30-39	6	15
40-49	4	10
50-59	4	10
60-69	0	0
70-79	1	2
80-89	2	5
No Response	3	7

**Table 21.Place of birth of respondents**

<b>Place of birth</b>	<b>Number of respondents</b>	<b>%</b>
Born in the US	37	90
Other	2	5
No Response	2	5



**Table 22.Age range of respondents**

<b>Age range</b>	<b>Number of respondents</b>	<b>%</b>
0-19	3	7
20-39	16	39
40-59	15	37
60-79	6	15
80-99	1	2

**Table 23.Level of education completed**

<b>Level</b>	<b>Number of respondents</b>	<b>%</b>
Less than 9th Grade	0	0
9th to 12th grade - no Diploma	1	2
High School Graduate ( or equivalent)	4	10
Some College, no Degree	14	34
Associate Degree	5	12
Bachelor's Degree	12	29
Graduate or Professional Degree	5	12



**Table 24.Marital status of respondents**

<b>Marital status</b>	<b>Number of respondents</b>	<b>%</b>
Never Married	7	17
Now Married	32	78
Now Married but legally separated	0	0
Unmarried partner	0	0
Divorced	2	5
Widowed	0	0

**Table 25.Household income in 2009**

<b>Income</b>	<b>Number of respondents</b>	<b>%</b>
Less than \$10,000	5	12
\$10,000-\$14,999	6	15
\$15,000-\$24,999	10	24
\$25,000-\$34,999	1	2
\$35,000- \$49,999	1	2
\$50,000- \$74,999	7	17
\$75,000- \$ 99,999	5	12
\$100,000- \$124,999	1	2
\$125,000- \$ 149,000	0	0
\$150,000- \$174.000	1	2
\$175,000- \$199,000	0	0
\$200,000- \$224,999	0	0
\$225,000- \$249,999	0	0
Over \$250,000	1	2
No Response	3	7



## Data Collected From USDA

**Table 26. Shiitake production, sales and prices, 86/87-08/09 (Source: Compiled by ERS from data of USDA, NASS, "*Mushrooms*".)**

Crop year	Production (1000 lbs.)	Volume of sales (1000 lbs.)	Price per pound
1986/87	1.203	1.144	4.30
1987/88	1.517	1.353	4.37
1988/89	2.112	1.916	4.43
1989/90	2.43	2.209	4.21
1990/91	2.553	2.323	3.73
1991/92	2.802	2.537	4.01
1992/93	2.965	2.752	3.88
1993/94	5.732	5.559	3.70
1994/95	5.649	5.396	3.86
1995/96	6.14	5.665	3.49
1996/97	7.025	6.661	3.39
1997/98	6.624	6.281	3.15
1998/99	8.68	8.254	3.15
1999/99	8.635	8.173	3.29
2000/01	9.778	8.939	3.17
2001/02	8.454	8.024	2.92
2002/03	7.476	7.059	3.08
2003/04	7.762	7.542	3.24
2004/05	9.085	8.616	3.25
2005/06	8.014	7.685	3.25
2006/07	7.155	6.985	3.36
2007/08	9.848	9.673	2.69
2008/09	9.682	9.416	3.19
2009/10	6.591	6.324	2.75



## APPENDIX C:

Pictures of mushroom varieties available in Logan

PLATE 1. Picture of baby bella mushrooms (*Agaricus* species) produced by Fresh Selects



PLATE 2. Picture of shiitake mushrooms (*Lentinus* species) produced by Monterey





**PLATE 3.**Picture of portabella mushrooms (*Agaricus* species) produced by Mountainview Mushrooms



**PLATE 4.**Picture of criminis mushrooms (*Agaricus* species) produced by Mountainview Mushrooms





**PLATE 5.**Picture of oyster mushrooms (*Pleurotus* Species) produced by Highline Mushrooms



**PLATE 6.**Picture of white mushrooms (*Agaricus* species) produced by Highline Mushrooms

