



Diagnosis of the Potential Market for Amaranth Soup in the Municipality of Apizaco, Tlaxcala

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Abstract: The production of amaranth in the municipality of Hueyotlipan, Tlaxcala is in danger of disappearing because it has very low utility per hectare. To increase this utility, we intend to create a company that transforms the amaranth seed into pasta for soup. With this objective, a quantitative, descriptive and transversal research was developed through the application of a survey in the municipality of Apizaco (the nearest municipality with the largest number of inhabitants).

A study of secondary sources is also carried out to know the tendencies of the supply and demand of similar products. From this study it was found that the product has good acceptance and that women in the age range of 30 to 49 years are the most interested in this type of product, in addition to the future projections indicate growth of the unsatisfied potential demand, concluding that there is a potential market for the product.

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1. Introduction:

The amaranth, for the pre-Hispanic peoples had the same importance as corn and beans. In 1519, Hernán Cortés prohibited the cultivation of amaranth because it was associated with pagan religious ceremonies; due to this its production declined between 1577 and 1890, after this date there are few records of its production (Amaranto, 2017).

In 1975 a study was published by the National Academy of Sciences of the United States titled "Undeveloped Tropical Plants with Promising Economic Value" in which amaranth was included as one of the 36 plants with potential. This has led to the resurgence of interest in this crop both at the food and agronomic level, due to the fact that it thrives under adverse agroclimatic conditions: droughts, high temperatures and saline soils. Many nutritionists consider amaranth as one of the most nutritious plants because it has a high content of proteins, calcium, folic acid and vitamin C (Suárez et al., 2013)

However, it can be highlighted that the integration of the amaranth value chain in Mexico is deficient due to the presence of intermediaries that decide the price, competition with crops that can be mechanized more easily and the scarce transformation of this into products. more profitable, this causes the low profit of the producers. Therefore, it is necessary to develop processes that increase

the profits of the amaranth production and, in this way, avoid the abandonment of the crop that has so many advantages. The objective of this work is to present a market study that allows us to identify the potential market for pasta soups made from amaranth seed.

2. Methodology:

This research presents a quantitative approach since the data collected is analyzed by statistical means, it is also descriptive, because information is collected that allows us to identify a possible unsatisfied market niche, as well as supply and demand trends that are analyzed to verify the viability of the project. A correlation is made by means of square chi to identify the variables that define the possible niche market. The research is non-experimental since the variables are not manipulated, they are only observed within their context and later analyzed. And transversal because the information is collected in a single moment.

For the application of the survey probabilistic sampling was used applying the formula for infinite populations because the population is greater than 10,000 (Hernández et al., 2010). The reliability of the survey was verified through the Cronbach's Alpha and its validation was through experts.

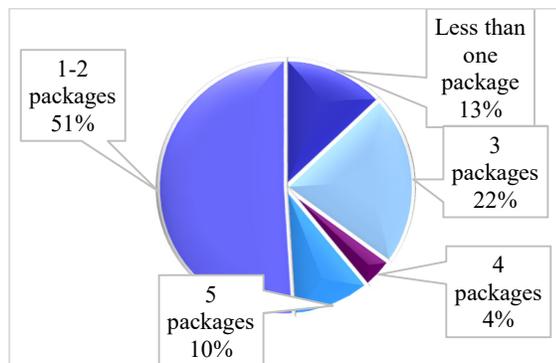


3. Results

In order to know the potential market for amaranth soups in the municipality of Apizaco, a structured survey was applied to 137 women between 15 and 70 years old, who make their purchases in the municipality.

It was applied only to women since as a result of the pilot survey it was found that they are the ones who, for the most part, make the decision to buy food within the family.

Graph 1 shows how important pasta for soup is in people's daily diet, since we can see that only 13% of respondents consume less than one pack a week, 87% consume at least one package per week, the vast majority (51%) consume 1 to 2 packages, 33% consume an average of 3 packages a week, reaching 10% of people who consume 5 packages a week.



Graph 1. How much pasta soup is consumed in your house per week? (packages of 200 gr). Own elaboration, 2017. Based on survey data.

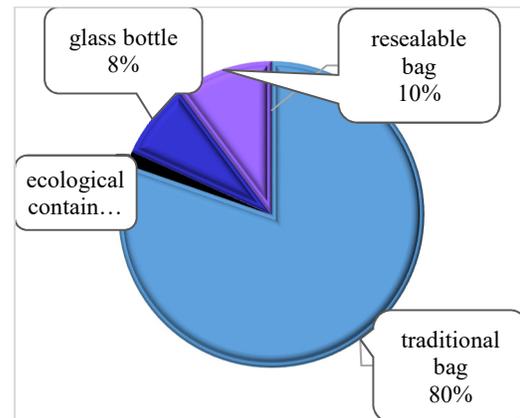
Among the brands that are used to consume in the municipality of Apizaco is a marked preference for Modern with 67%, followed by Barilla away with 17%, Italpasta with 10%, it should be noted that 2% answered that always choose the most economical.

The characteristics they considered to choose the previous brands were varied, 45% preferred them for their flavor, 18% chose them because of the quality image they have of them, a significant percentage (16%) considered that they chose them because they find them everywhere, only 9% said that they usually look for brands for the price and lastly, 3% keep the brand by tradition, that is, because it is the one that the family has always used.

Among the varieties that the people surveyed prefer are: the long ones like spaghetti and noodles with a percentage of 67%, 18% are inclined for the little ones like the one of letters or stars, 11% look for the hollow ones like the soup of coditos or snails and only 4% usually buy soup with figures that are mostly used for infant feeding.

It will be increasingly important that the containers are recyclable. What was not essential before now will become increasingly necessary from an ecological and rational point of view.

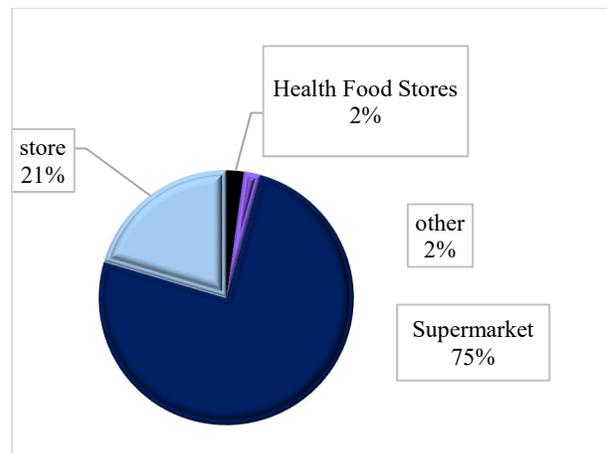
That is why the respondents were questioned about the possibility of changing the traditional packaging for an ecological one that would be a cardboard package, a glass bottle or maybe they would prefer a resealable bag and, as we can see in graph 2 to 80 % did not like the idea of changing and prefer to keep the traditional bag, therefore it is seen that it is not necessary to innovate the packaging.



Graph 2. What type of packaging do you prefer? Own elaboration, 2017. Based on survey data.

They were also asked about the presentation they tend to consume, with small packages being the most sought after (of 200 and 250gr) with 97%.

The place where the people of the municipality usually buy is supermarket with a percentage of 75%, this can be seen in graph 3, followed by consumption in stores with 21%; only 2% usually buy soup in health food stores and the other 2% buy by other means such as internet, catalogs, etc



Graph 3. Where do you usually buy the soup? Own elaboration, 2017. Based on survey data.

When asked about how they got to know the brands they used to consume, it is draw attention that 63% choose the brand when it is in the supermarket, that is, most people



decide which soup brand they will buy when they are in front of the product, this gives an idea of the importance of an attractive packaging, that draws attention for people to try the product. 20% said they chose it because they recommended it.

It is interesting to know if people recognize what an elaborate amaranth pasta can benefit them so they were asked: Did you know that amaranth can reduce blood pressure, cholesterol, blood sugar and weight; also, increases immunity, treats anemia, disorders of the gastrointestinal tract and is known for its antioxidant, anti-inflammatory and skin and hair benefits? Only 6% said they definitely knew, 10% said they knew most of them, 28% answered that they did, 29% accepted that they knew only some of their properties and 27% said that they did

recommend the product to the rest of the people and would be an effective way of promotion.

After letting them know the benefits they would get from a soup made with amaranth, they were asked if they would change the soup they used to amaranth soup. 14% said it would be extremely likely, 44% said it would be quite probable, 36% said that it would be likely to do so; only 7% said that it would be little or not at all likely to change the soup that is customary.

3.1. Relations between the variables by means of chi-squared.

With degrees of freedom = 16 and confidence level 0.05 it has a value of 26,296. Values that are higher than this will indicate that there is a relationship between the

Table 1. Relationship between weekly consumption and income.

| Income | Weekly Consumption | | | | | |
|---------------------|-----------------------|-----------------|------------|------------|------------|------|
| | less than one package | 1 to 2 packages | 3 packages | 4 packages | 5 packages | |
| less than \$6,000 | 10% | 25% | 8% | 2% | 4% | 0.49 |
| \$6,000 - \$8,499 | 1% | 17% | 14% | 0% | 4% | 0.36 |
| \$8,500 - \$12,499 | 1% | 6% | 0% | 2% | 1% | 0.11 |
| \$12,500 - \$16,499 | 0% | 2% | 0% | 0% | 0% | 0.02 |
| more than \$16,500 | 0% | 1% | 0% | 0% | 0% | 0.01 |
| | 0.13 | 0.51 | 0.22 | 0.04 | 0.09 | 1.00 |

Own elaboration, 2017. Based on data from the survey (the data is in MXN)

not know them. The interpretation of the measures of central tendency of this question indicate that there is a lack of knowledge about the nutritional properties of amaranth. The category that was most repeated was "knew some of its properties", the median is also in this value, that is, half of the opinions are concentrated in the "did not know" or only "knew any of the properties". The values tend to be biased towards the ignorance of the properties of the amaranth.

The maximum acceptable price refers to the maximum price that people are willing to pay for amaranth soup. 48% would agree to pay up to \$ 15, 20% would pay only \$ 10, 18% accepted that they would pay up to \$ 20, 6% would pay \$ 25, the same for \$ 30, only 2% would agree to pay \$ 35 for the amaranth soup.

The following inquiry basically questions the respondents' habit of recommending the products they considered satisfactory. In general, 84% of people fall in the range of extremely probable to very probable, and only 16% expressed that they are little or not at all likely to recommend the product. Once again, we see the importance of focusing on convincing those who look for new products through tastings, in this way they would

variables.

$$x^2 = 32.83$$

There is a relationship between the respondents' income and the amount they consume weekly (table 1).

Likewise, with a result of $x^2 = 56.19$ there is a strong relationship between age and the amount consumed on a weekly basis, being the range of 30 to 49 years the most consumed. This same age stratum is the one that would most accept to change their soup consumption habits with a $x^2 = 30.55$.

3.2. Potential market for the project.

Mexico has a per capita consumption of 2.8 kilograms of pasta (data of 2015), being the soup of noodles in the presentation of 200 grams the one preferred by the Mexicans. This consumption is low compared to other countries, such as Italy, which represents a window of growth for this industry.

Since pasta soups are widely consumed by the entire population and taking into account that this type of pasta will be prepared initially only for the local market, we consider that the potential market will be only the State of Tlaxcala, which has a total of 1 272 847 inhabitants (INEGI, 2017).



Taking into account the specific characteristics of our product that is prepared with amaranth, which can be a healthy ingredient for not having gluten and having a small container to wheat, you can focus on a market that has an interest in a healthy diet and that help the prevention or control of diabetes and cardiovascular diseases that appear as the main causes of death in the state, as shown in figure 1.

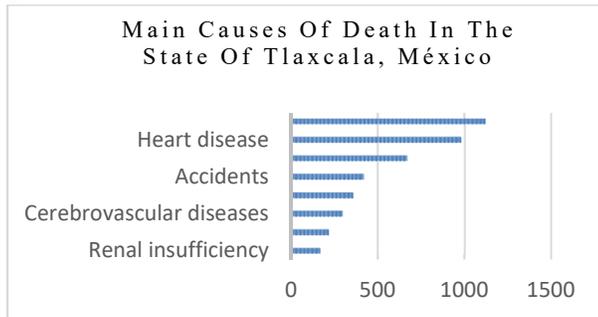


Figure 1. Main causes of death in Tlaxcala. Based on data from the INEGI (2017).

In addition, based on the previous results of the χ^2 calculations, the most significant relationships were between the age/consumption and age/acceptance variables with a marked emphasis on the range of women aged 30-49 years, this age range is where you have to focus advertising campaigns to achieve greater acceptance of the product.

The essential characteristics of women in this age range and that should be taken into account for the marketing approach in this market niche are: Due to age begins an increase in weight and loss of muscle mass which causes problems such as obesity, increased blood cholesterol, arteriosclerosis, etc., This leads them to look for healthier products. Generally, they are the ones that make purchasing decisions regarding the foods that are consumed in the home. Almost all work so their power of decision when choosing products is much greater than that of the other members of the family. They are concerned about the health of all the members of the family. They worry about their appearance and look younger.

3.3. Study of the demand (secondary sources)

Below are global trends and projections that are a reference to understand the behavior of the industry in the future, which can help decision making in companies.

3.4. Global trends in the food sector

According to the study of trends and opportunities for the processed food sector of the State of Mexico carried out by the Mexican Council of Science and Technology in 2009, the "health and wellbeing" category was identified as the mega-trend as the one with the greatest impact, this is

made up of 3 branches: functional foods, organic foods and natural foods.

It is known as functional foods to which they have been added, eliminated, reduced or only one component or key substance in order to improve the physical and mental conditions of people who ingest them as part of their normal diet.

In that same study, reference is made to some international megatrends cited by Jonathan Banks, Director of the Business Perspective in Europe at Nielsen. Among these are:

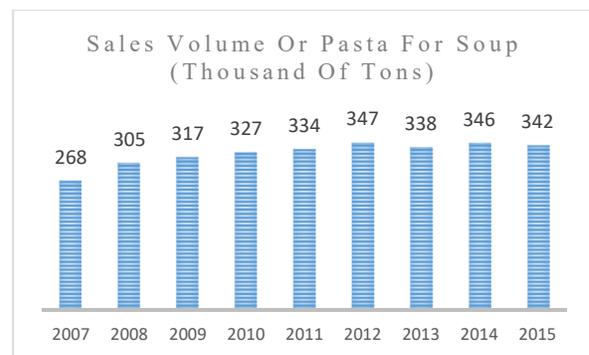
- The consumer tends to get older, obese and rich.
- The internet has changed the way the consumer communicates and obtains information.
- Its main concerns are: economy, health and safety at work.

According to Boston Consulting Group (Study of competitiveness for clusters of the Chilean economy 2005), the branches with the greatest dynamism in exports have been bakery, pasta, confectionery and preserves.

Pasta is a fundamental element of the Mediterranean Diet considered by UNESCO as Intangible Cultural Heritage of Humanity. In Italy 23 kg of pasta per person are consumed, in Venezuela 11 kg and in Argentina 9 kg.

3.5 Market growth

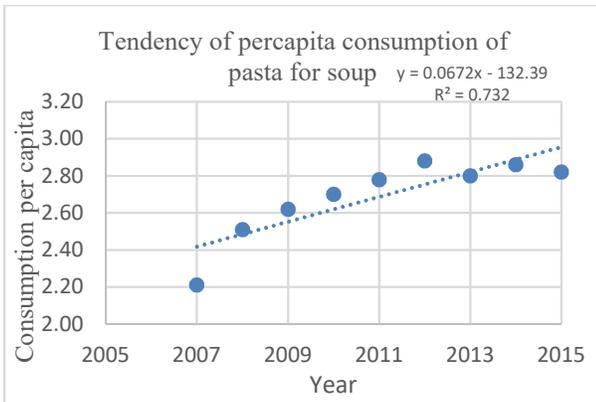
As can be seen in figure 4, the volume of sales has maintained a growing trend. This has led Mexico to be the tenth producer of pasta worldwide.



Graph 4. Volume of pasta sales for soup. Own preparation 2017. Source: INEGI. Monthly survey of the manufacturing industry (Intercensal Survey).

3.6. Demand projections.

The per capita consumption is made by determining the effective consumption or in some cases the apparent consumption, divided by the number of inhabitants. In graph 5, it can be seen that the consumption of pasta per person has increased and will continue to increase in the future.



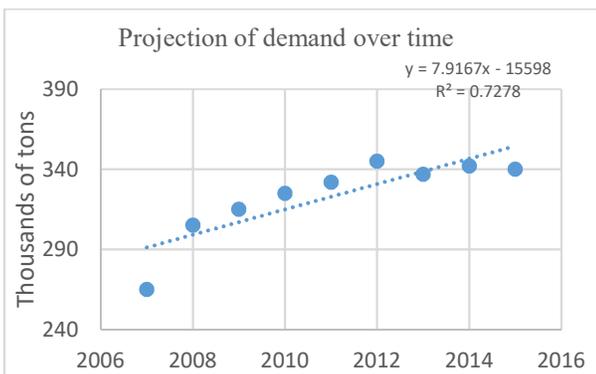
Graph 5. Tendency of per capita consumption of pasta for soup. Own preparation (2017). Source: INEGI. Monthly survey of the manufacturing industry (Intercensal Survey).

Projection of per capita consumption:

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------------------------|------|------|------|------|------|------|
| Consumption per capita | 3.19 | 3.25 | 3.32 | 3.39 | 3.45 | 3.52 |

Although per capita consumption shows growth, it is still considered to be low, since there are countries that exceed 10 kg per year, such as Italy, Venezuela, Tunisia, Greece and Morocco.

Based on the data provided by the INEGI (graph 6) it is observed that the production of pasta will increase in the coming years due to a growing demand.

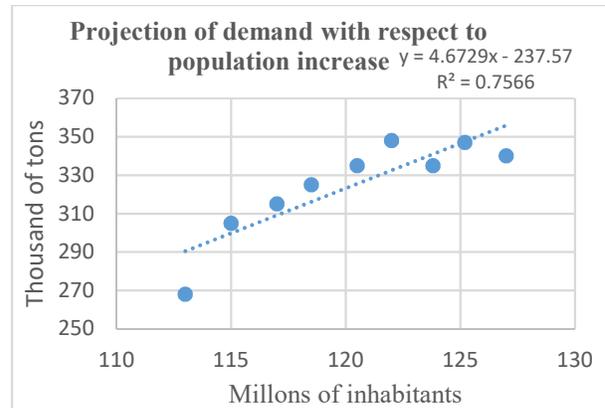


Graph 6. Projection of demand over time. Own preparation (2017). Source: INEGI. Monthly survey of the manufacturing industry. (Intercensal Survey)

Projection of demand in thousands of tons.

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|--------|--------|--------|--------|--------|--------|--------|
| Demand | 372.68 | 380.70 | 388.72 | 396.73 | 404.75 | 412.77 |

As can be seen in graph 7, demand remains stable and grows in proportion to the increase in the population.



Graph 7. Projection of demand with respect to population increase. Own preparation (2017). Source: INEGI. Monthly survey of the manufacturing industry. (Intercensal Survey)

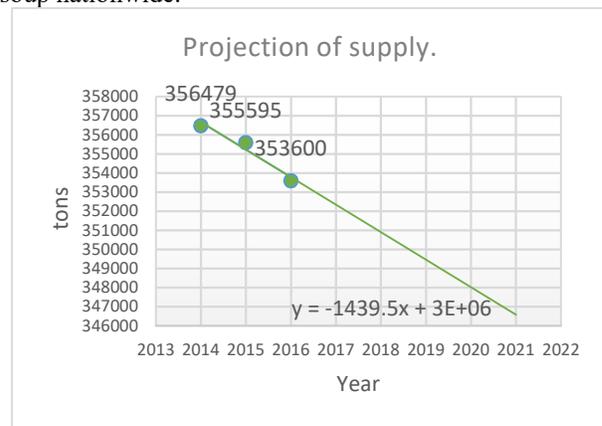
3.7. Total analysis of the supply of pasta for soup

Table 2 presents the historical analysis of the supply of pasta for soup nationwide.

| Year | Total sale (thousands of tons) | Import (tons) | Total supply (tons) |
|------|--------------------------------|---------------|---------------------|
| 2014 | 346 | 10,479 | 356,479 |
| 2015 | 342 | 13,595 | 355,595 |
| 2016 | 342 | 11,600 | 353,600 |

Own preparation (2017). Based on INEGI data.

Graph 8 shows the projection of the pasta supply for soup nationwide.



Graph 8. Projection of the supply. Own preparation (2017). Based on INEGI data.

The data of the offer projected nationally in tons are the following

| Year | 2017 | 2018 | 2019 | 2020 | 2021 |
|--------|--------|--------|--------|--------|--------|
| Supply | 352400 | 350850 | 349400 | 348000 | 346600 |



3.8. Calculation of Unmet Potential Demand

Table 3 shows the calculation of the unsatisfied potential demand, this is obtained from the difference between the projection of the potential demand and the potential supply.

Table 10. *Calculation of unsatisfied potential demand*

| Year | Potential Demand (Tons) | Potential Supply (Tons) | Unsatisfied Potential Demand (Tons) |
|------|-------------------------|-------------------------|-------------------------------------|
| 2017 | 372,680 | 352,400 | 20,280 |
| 2018 | 380,700 | 350,850 | 29,850 |
| 2019 | 388,720 | 349,400 | 39,320 |
| 2020 | 396,730 | 348,000 | 48,730 |
| 2021 | 404,750 | 346,600 | 58,150 |

Own preparation (2017).

4. Summary of Results

First and based on the analysis of the survey, it is found that only 13% of the population consumes less than a packet of pasta soups a week which shows us that it is a product with very good penetration. The calculation of annual consumption of pasta in the municipality is 253,628 kg.

It was found that the brand that is most consumed in the municipality is "La moderna" with 67%, the presentation that is most used to consume is the small one (200 / 250gr) with 97%. 75% of respondents are used to shopping at the supermarket. 63% of people say that the final purchase decision is made in front of the product, this highlights the importance of attractive packaging. 27% of the surveyed population does not know the properties of the amaranth. Most people are inclined towards the cheapest products, in this case, 68% expressed that they would not pay more than \$ 15 for the product. Finally, it was found that 84% of respondents do tend to recommend products that they have liked.

The strongest relationships for acceptance and consumption, found through the application of chi square, are tilted towards the range of 30 to 49 years.

5. Conclusion

From the survey it can be seen that pasta soups have very good penetration since they are consumed by almost

all people. Likewise, the projections of supply and demand indicate that there is a growth of unmet potential demand in the pasta sector. The acceptance of an elaborated product of amaranth is quite acceptable above all for the female population that is in the range of 30 to 49 years, so it can be considered as the product's target market. However, we must bear in mind that very few are those who would accept to pay more than \$ 15 for the product and are not willing to change the traditional packaging, both data are important to consider for the technical study.

It can also be concluded that supermarkets would be the most appropriate distribution channel for the product. The advertising strategy that is proposed to use is that the message should focus on the nutritional properties of the amaranth, which will be present both in the package and in any other type of printed advertising that is required, because the attention of the people must pick up from the shelves because the decision to choose is given in this place.

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