

Sensory study and trends of the purified water market UTCGG Petatlán, GRO.

Estudio sensorial y tendencias de mercado del agua purificada UTCGG Petatlán, GRO.

SANTIAGO-SALAS, Luz Elizabeth*†, RUIZ-VÁZQUEZ, Diana, GÓMEZ-PEÑALOZA, Claudia Leticia, and AVIÑA-BARRETO, Lizbeth Magdalena

Universidad Tecnológica de la Costa Grande de Guerrero. Coordinación General de Universidades Tecnológicas y Politécnicas (UTyP)

ID 1st Author: *Luz Elizabeth, Santiago-Salas* / ORC ID: 0000-0001-9968-397X, Researcher ID Thomson: X-3146-2018, CVU CONACYT ID: 265244

ID 1st Coauthor: *Diana, Ruiz-Vázquez* / ORC ID: 0000-0001-7105-301X, Researcher ID Thomson: X-3145-2018, CVU CONACYT ID: 470839

ID 2nd Coauthor: *Claudia Leticia, Gómez-Peñaloza* / ORC ID: 0000-0002-9080-2204, Researcher ID Thomson: X-3148-2018, CVU CONACYT ID: 834102

ID 3rd Coauthor: *Lizbeth Magdalena, Aviña-Barreto* / ORC ID: 0000-0002-0770-2430, Researcher ID Thomson: X-3935-2018, CVU CONACYT ID: 953417

DOI: 10.35429/JGE.2019.4.3.26.33

Received March 01, 2019; Accepted June 15, 2019

Abstract

Objectives: To evaluate the sensory characteristics (taste, smell, clarity and brilliance) of UT Purified Water, and identify new products with the possibility that in the future they will be commercialized in the potential consumer and business markets of Petatlán and Zihuatanejo de Azueta, Gro., as well as its area of influence. Methodology: Quantitative Research, Descriptive type and stratified sampling. The population corresponds to 2,132 students from 7 different educational programs; 60 are professors of the teaching staff of the UTCGG, 45 administrative and service staff of the UTCGG. So the population size is (N) = 2237, it is for that reason that the author's formula Díaz, 2011 was used. Contribution: The Academic Logistics and International Businesses in coordination with the Academic Science and Technology of Foods in the Costa Grande of the state of Guerrero of the Technological University of the Costa Grande de Guerrero (UTC GG) headquarters in the city of Petatlán, is of interest to know the possibility of launching to the market the packaged product of purified water that is processed in the plant of the aforementioned educational program. This is a study of the sensory characteristics of purified water currently produced by the UTCGG purification plant, as well as market trends, a survey was applied to 185 people among students, administrative staff and teachers of the University, with the purpose of knowing if UT purified water turns out to be competitive to market it in the not distant future.

Purified Water, Petatlan, Market

Resumen

Objetivos: Evaluar las características sensoriales (sabor, olor, claridad y brillantez) del Agua Purificada UTCGG, e identificar nuevos productos con la posibilidad que en un futuro sean comercializados en los mercados potenciales de consumo y de negocios de Petatlán y Zihuatanejo de Azueta, Gro., así como su área de influencia. Metodología: Investigación Cuantitativa, tipo Descriptiva, población finita y muestreo estratificado. La población corresponde a 2,132 estudiantes de 7 diferentes programas educativos; 60 son profesores de la planta docente de la UTCGG, 45 personal administrativo y de servicios de la UTCGG. Por lo que el tamaño de la población es (N)=2237, es por esa razón que se usó la fórmula del autor Díaz, 2011. Contribución: El Cuerpo Académico de Logística y Negocios Internacionales en coordinación con el Cuerpo Académico Ciencia y Tecnología de Alimentos en la Costa Grande del estado de Guerrero de la Universidad Tecnológica de la Costa Grande de Guerrero (UTC GG) sede ciudad Petatlán, es de su interés conocer la posibilidad de lanzar al mercado el producto envasado del agua purificada que se procesa en la planta del referido programa educativo. Este es un estudio de las características sensoriales del agua purificada que en la actualidad produce la planta purificadora de la UTCGG, así como de las tendencias del mercado, se aplicó una encuesta a 185 personas entre estudiantes, personal administrativo y docentes de la Universidad, con el propósito de conocer si el agua purificada UTCGG resulta ser competitiva para comercializarla en un futuro no muy lejano.

Agua Purificada, Petatlán, Mercado

Citation: SANTIAGO-SALAS, Luz Elizabeth, RUIZ-VÁZQUEZ, Diana, GÓMEZ-PEÑALOZA, Claudia Leticia, and AVIÑA-BARRETO, Lizbeth Magdalena. Sensory study and trends of the purified water market UTCGG Petatlán, GRO. RINOE Journal-General Economics. 2019. 3-4: 26-33.

* Correspondence to Author (email: l_santiago@utcgg.edu.mx)

† Researcher contributing first author.

Introduction

In 2003, the Technological University of the Costa Grande de Guerrero, acquired the equipment for the Potable Water Purification Plant, with reverse osmosis technology. The reference team was requested by the race at that time T.S.U. in Food Technology (today Food Process Engineering), this plant being used for students' school practices, applied to the educational model of 30% and 70% practice.

The creation of the UT's as decentralized public bodies of the governments of the states with their own autonomy and assets, are subsidized with contributions from the federal and state government, and this educational institution will also generate its own income.

Given this dilemma, the Technological University of the Costa Grande de Guerrero, sought to launch purified water in the presentation of garrafones to the geographic market of Petatlán and Zihuatanejo de Azueta, Gro.

During the four-month period of May-August 2003, the T.S.U career was requested. In Marketing, as school practices of the subject of Market Research, by Professor Luz Elizabeth Santiago Salas, carry out an organoleptic study, the results were unfavorable, since the evaluation of the taste of purified water UTCGG was low, finding predominant flavor chlorine, acidity, hardness, salinity, compared to 3 purifiers of its competition: Pacific, Tropical and Odalis.

The low evaluation of the organoleptic characteristics was due to its source of supply. The company best evaluated in flavor was the company Purified Water of the Pacific, following Tropical Purified Water, Odalis and 2 Rivers.

The study was conducted in the cd. From Petatlán, and the communities of Juluchuca and San Jeronimoto, to the segments of housewives, sports, public and private offices and businesses. In the same way, a second study was carried out in the four-month period May-August 2004, only for the housewives segment and again the evaluation of regularity in flavor prevailed, being again the leading company Agua Pacífico.

Currently, the project is intended to resume the drinking water purification plant, generating its own income that allows to solve the material requirements that students need to carry out their practices in the laboratories of dairy, meat, cereals, sweets, preserves and jellies, as well as that of wines and spirits, so a third Sensory Study has been requested to evaluate the degree of satisfaction of the taste characteristics of UTCGG purified water and identify market trends.

It is considered to be a business opportunity, to sell purified water in reusable presentations by consumers in containers of 500, 1,000 and 1,500 milliliters, to the retail and wholesale business market, as well as in 20-liter containers, for the consumer market , housewives segment, in Petatlán and Zihuatanejo de Azueta, Gro., as well as the communities of influence, when the product approves the sensory study. This last presentation of garrafones of 20 lts. It can be traded directly at the plant to water distributors on their own.

Justification

This study is carried out, because it is very important to evaluate the sensory characteristics of UTCGG purified water. Once the UTCGG purified water product is accepted, Petatlán, Gro., Among the student and labor consumer community, other feasibility studies may be carried out. Once approved, it will be able to be marketed to other market segments, such as housewives of the populations in the area of influence (Petatlán, Juluchuca, Coyuquilla, San Jeronimoto, Los Achotes and Los Almendros, Gro.), As well as in the business market of retail stores and service providers in the municipalities of Petatlán and Zihuatanejo de Azueta, Gro. The product would be sold directly from the UTCGG Water purification plant to resellers who own their own transportation for direct distribution to the consumer and business markets described.

Spatial and Temporary Delimitation.

The UTCGG sensory water study was carried out at the facilities of the Technological University of the Costa Grande de Guerrero in Petatlán, from May 20 to 22, 2019.

Developing**Research questions**

The present investigation is for the purpose of measuring the sensory acceptance of UTCGG purified water from Petatlán, Gro., And market trends, so it is required to obtain information regarding the following research questions:

Q1.- Age

Q2.- Name of the educational program

Q3.- Sex

Q4.- How many liters of water do you consume per day during your stay in the UTCGG?

Q5.- Evaluate the taste of purified UT water from 5 to 10

Q6.- Evaluate the smell of purified UT water from 5 to 10

Q7.- Evaluate the clarity of purified water UT from 5 to 10

Q8.- Evaluate the brilliance of purified water UT from 5 to 10

Q9.- What size of containers do you need for the consumption of purified water? UT?

Q10.- What is the most pleasing logo?

Q11.- What name do you choose for UT purified water?

Q12.- What price do you suggest for each of the presentations?

P13.- Which of these fruit flavors do you want to find in purified water? UT

P14.- Which of the new presentations do you need and consider more Practice?

Q15.- In what kind of stores do you require the water product to be within your reach? UT purified?

Q16.- What media do you see or hear most frequently?

Q17.- What is the degree of correlation between the taste of the water and the smell of it?

Q18.- Does the degree of satisfaction in the clarity of the water determine the degree of satisfaction in the brilliance of the water?

Hypothesis

Hypothesis 1.- The age of the respondents most frequently will be 21 years

Hypothesis 2.- The educational program with the greatest number of participants in the studies is from the degree in Business Development and Innovation.

Hypothesis 3.- Sex with the highest frequency of respondents will be 60% female

Hypothesis 4.- The liters of water consumed per day during your stay at the UTCGG is 1.5 liters.

Hypothesis 5.- The taste of purified UT water will be evaluated in 8.

Hypothesis 6.- The smell of purified UT water will be evaluated in 9.

Hypothesis 7.- The clarity of purified water UT will be evaluated in 10.

Hypothesis 8.- The brilliance of purified water UT will be evaluated in 9.

Hypothesis 9.- The size of the container most needed for the consumption of purified water UT will be 1 liter.

Hypothesis 10.- The logo most liked in 65% will be No. 1.

Hypothesis 11.- The name chosen in 70% will be UT Purity, followed by Refresh-UT, Vitaliq UT, Manantial UT.

Hypothesis 12.- The suggested prices will be the same as the competition 500ml \$ 50.00 1 lt. \$ 8.00 and 1.5 lts. \$ 10.00.

Hypothesis 13.- The 5 fruit flavors of greatest pleasure will be: Jamaica, passion fruit, tamarind, apple and strawberry.

Hypothesis 14.- The most practical presentation of greater choice will be the button presentation (pulled up).

Hypothesis 15.- UT purified water will be required in miscellaneous and gyms.

Hypothesis 16.- The means of greatest communication will be social networks Facebook.

Hypothesis 17.- The greater the degree of satisfaction in the smell of water, the greater the degree of satisfaction for the taste of water.

Hypothesis 18.- The clarity of the water depends on the brilliance of it.

Population and Sample

To know the degree of sensory acceptance of purified water from the Technological University of Petatlán Gro., The population corresponds to 2,132 students 7 different educational programs; 60 are professors of the teaching staff of the UTCGG, 45 administrative and service staff of the UTCGG. So the population size that is (N) = 2237, is for that reason that the formula was used (Díaz, 2011), same as described below:

$$n = \frac{N Z^2 \sigma^2}{Z^2 \sigma^2 + d^2 (N - 1)} \quad (1)$$

$$N = 2,237$$

$$Z = 99\% = 2.58$$

$$d = 5\%$$

$$\sigma = 0.87$$

$$n = \frac{2237 (2.58)^2 (0.87)^2}{(2.58)^2 (0.87)^2 + 0.05^2 (2237-1)}$$

$$n = \frac{2237 (6.6564)(0.7569)}{(6.6564)(0.7569) + 0.025 (2236)}$$

$$n = \frac{11270.5186}{60.2382} = 184.9498 = 185$$

Type of Sampling

Stratified sampling, consists of dividing the population into subgroups or strata and selecting a simple random sample within each stratum. (Díaz, 2011).

The participating segments are: Students, Teachers, Administrative and Services of the Technological University of the Costa Grande de Gro., For which the following sample fraction was calculated.

Sample Fraction

$$F = \frac{n}{N} = \frac{185}{2,237} = 0.082 = 8.2\% \quad (2)$$

Information gathering process

Two sources were used to collect the information, the UTCGG database of the Costa Grande de Guerrero and a questionnaire was applied to the students of the 7 different educational programs, as well as to the teaching and administrative staff of the University to know its acceptance or rejection of the sensory characteristics of UTCGG water.

Confidence Intervals

To determine the Confidence Intervals of the variables of interest for the present investigation, the following formulas were used:

A).- Reliability Level estimator formula

$$\sigma_{\bar{x}} = \sqrt{\frac{\sigma}{\sqrt{n}}} \sqrt{\frac{N-n}{N-1}} \quad (3)$$

B).- Confidence Interval Formula

$$\bar{X} \pm Z\sigma_{\bar{x}} \text{ al NC} \quad (4)$$

Data that served as the basis for the calculations:

$$\bar{X} \pm Z\sigma_{\bar{x}} \text{ al 99\%}$$

$$N = 2237$$

$$n = 185$$

$$Z = 99\%$$

Results

Variable: degree of satisfaction in the UT water FLAVOR

It was determined from a population of 2,237 people members of the UTCGG community, a sample of 185 people is stratified by careers and teaching and administrative staff, where the sample mean in terms of satisfaction with the taste of UTCGG water was 8.81 and a standard deviation of 1.00. The following confidence interval was determined with a 99% reliability level.

(5)

$$\mu: 8.81 \pm 0.18 \text{ al 99% Tolerance}$$

$$\mu \varepsilon (8.63, 8.99) \text{ al 99% Interval}$$

$$8.63 \leq \mu \leq 8.99 \text{ al 99% Inequality}$$

Interpretation.

- a. to. The degree of satisfaction for the UTCGG water FLAVOR was rated with an average of 8.81 and a tolerance of ± 0.1831 , with a confidence level of 99%.
- b. b. The degree of satisfaction for the UTCGG purified water FLAVOR was evaluated between 8.63 and 8.99 with a 99% confidence level.
- c. c. 1% of the people surveyed said they had an average satisfaction regarding the UTCGG water FLAVOR less than 8.63 and greater than 8.99.

Variable: UTCGG water container size.

It was determined from a population of 2,237 members of the UT community, a sample of 185 people is stratified by careers and teaching and administrative staff, where the sample average in terms of the level of satisfaction with the taste of UTCGG water was 1.83 and a standard deviation of 0.62. The following confidence interval was determined with a 99% reliability level.

(6)

$$\mu: 1.83 \pm 0.044 \text{ al 99% Tolerance}$$

$$\mu \varepsilon (1.87, 1.78) \text{ al 99% Interval}$$

$$1.87 \leq \mu \leq 1.78 \text{ al 99% Inequality}$$

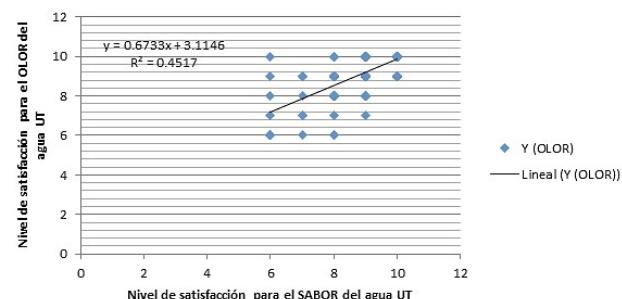
Interpretation

- a. The water container size of the UTCGG was rated with an average of 1.83 and a tolerance of ± 0.044 , with a confidence level of 99%.
- b. The container size of the purified water UT was evaluated between 1.87 and 1.78 with a 99% confidence level.
- c. 29% of respondents said they had an average acceptance of the package less than 1.78 and greater than 1.87.

Correlation and Regression Analysis

To make the correlation and regression analysis, only the numerical variables were considered, since the qualitative variables have been previously analyzed, for the case two correlations of interest were identified for the present investigation, one of them manifests between the level of satisfaction for the FLAVOR of water and its corresponding ODOR; the other that was attractive for the study was the level of satisfaction in terms of BRIGHTNESS and CLARITY.

Hypothesis 17. The greater the degree of satisfaction in the smell of water, the greater the degree of satisfaction for the taste of UTCGG water.



Graphic 1 Odor Satisfaction Satisfaction Level

Source: preparation of the Academic Body Logistics and International Business, (2019)

Correlation Because $r = 0.6721$ the correlation is MODERATED.

Regression: The adjusted regression equation is linear and is as follows:

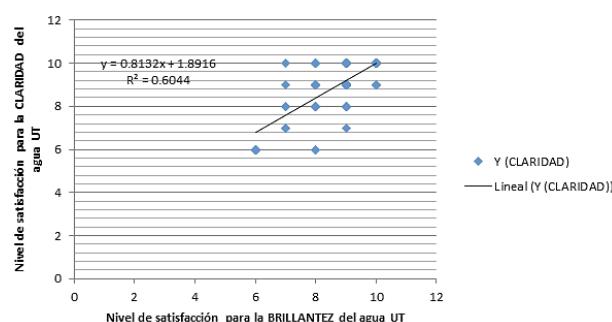
$$y = 0.6733x + 3.14146 \quad R^2 = 0.4517$$

Interpretation:

The level of reliability of the equation is 45.17%, so it can be stated that:

- There is a moderate correlation between the level of satisfaction for the taste of water with respect to the degree of satisfaction for the smell of purified water UTCGG.
- The correlation between the level of satisfaction for the taste of water with respect to the degree of satisfaction for the smell of purified UTCG water is positive, which means that the greater satisfaction in the smell of UTCGG water, the higher the level of satisfaction For the taste of it.
- Using the aforementioned regression equation, predictions can be made with 45.17% reliability.
- However, there is no correlation level strong enough to state that one variable determines the other.

Hypothesis 18. The degree of satisfaction in water clarity depends on the degree of satisfaction in its brilliance.



Graphic 2 Satisfaction Level Clarity-Brilliance
Source: preparation of the Academic Body Logistics and International Business, (2019)

Correlation

Because $r = 0.6721$ the correlation is SIGNIFICANT.

REGRESSION

The adjusted regression equation is linear and is as follows.:

$$y = 0.8132x + 1.8916 \quad R^2 = 0.6044$$

Interpretation:

The level of reliability of the equation is 60.44%, so it can be said that:

- ✓ There is a significant correlation between the level of satisfaction for water brilliance with respect to the degree of satisfaction for the clarity of UTCGG purified water.
- ✓ The correlation between the level of satisfaction for water brilliance with respect to the degree of satisfaction for the clarity of purified water UTCGG is positive, which means that the greater satisfaction in the brilliance of UT water, the higher the level of satisfaction for The clarity of it.
- ✓ Using the aforementioned regression equation, predictions can be made with 60.44% reliability.
- ✓ However, there is no correlation level strong enough to state that one variable determines the other.

Hypothesis Testing and Conclusions

Having statistically analyzed the information collected for the realization of this research work, the following conclusions were reached based on the hypotheses raised.

H1.- The age of the respondents most frequently will be 21 years. The surveys carried out resulted in a participation of 73 respondents, which represent the highest number of participation, which correspond to an age of 19 years, so the hypothesis initially proposed is rejected.

H2.- The educational program with the largest number of participants in the study is from the degree in Business Development and Innovation. According to the results obtained from the surveys, they resulted in the highest number of participation in the survey being the career of Business Development and Innovation, with 26% (49 Respondents), so thanks to In this study, we can mention that the hypothesis proposed in the beginning is accepted.

H3.- Sex with the highest frequency of respondents will be 60% female. The results obtained from the study resulted in the highest number of participation in the study being men with 70% (130 respondents), so the hypothesis is rejected.

H4.- The liters of water consumed per day during your stay at the UTCGG is 1.5 liters. Through the study carried out, results were obtained regarding the number of liters consumed during the day by the personnel surveyed, and the result obtained was that on average the water consumption is 1.5 liters of water per day, which is the same as established in the hypothesis, this is derived from the fact that a percentage of 62% (114) of the respondents replied that they consume 1 liter of water per day, followed by 29% (54), hence the average is what was raised In the beginning raised. Therefore this hypothesis is accepted.

H5 The taste of purified UTCGG water will be evaluated on average of 8. The surveys carried out resulted in an average of 8.81 which is above what is established in this hypothesis, this derived from the fact that a percentage of 21% of the total surveys was for the evaluation of 8, and 46% for 9, the average is above what was raised. Therefore this hypothesis is accepted.

H6. The smell of purified water UT will be evaluated on average of 9. The surveys carried out resulted in an average of 9.04 which is above what is established in this hypothesis. Therefore this hypothesis is accepted.

H7 The clarity of purified water UT will be evaluated in 10. The average of the surveys applied to the UT community resulted in 9.23 which is below what is established in this hypothesis. Therefore this hypothesis is rejected.

H8 The brilliance of purified UT water will be evaluated on average of 9. The surveys carried out resulted in an average of 9.03 which is above what is established in this hypothesis, this derived from the fact that a percentage of 80% of the total surveys was in the range of 9 to 10, hence the average Be above the above. Therefore this hypothesis is accepted.

H9 is accepted because, in fact, the majority of respondents accepted that the consumption of the most common water container is one liter.

H10 It is rejected due to the fact that the most pleasing logo was not the one identified with the number 1 of the questionnaire, since the one with more taste was the one indicated with the number 4.

H11 It is accepted because of the scrutiny of the questionnaire it was known that the name of most taste among respondents is indeed that of "UT Purity".

H12 It is accepted by virtue that the prices for the three presentations that are five pesos for half a liter, eight pesos for a liter and ten pesos for a liter and a half are accepted as value of the product.

H13 The hypothesis is rejected because the most preferred flavors were different from those proposed in this hypothesis.

H14 The hypothesis is accepted since most respondents decided to choose the presentation of the handle.

H15 The hypothesis is accepted since the majority of respondents decided the product in the miscellaneous and less preference in gyms

H16 The hypothesis is already accepted The hypothesis is accepted, since the greatest electronic means to be in communication of the respondents is the social network Facebook.

H17. The greater the degree of satisfaction in the smell of water, the greater the degree of satisfaction for the taste of UTCGG water. The correlation between the level of satisfaction for the taste of water with respect to the degree of satisfaction for the smell of purified UTCGG water is positive, which means that the greater satisfaction in the smell of UTCGG water, the higher the level of satisfaction for The taste of it. However, there is no correlation level strong enough to state that one variable determines the other. Therefore this hypothesis is rejected.

H18 The degree of satisfaction in the clarity of the water depends on the degree of satisfaction in the brilliance of it. The correlation between the level of satisfaction for water brilliance with respect to the degree of satisfaction for the clarity of purified water UT is positive, which means that the greater satisfaction in the brilliance of UTCGG water, the higher the level of satisfaction for The clarity of it. However, there is no correlation level strong enough to state that one variable determines the other. Therefore this hypothesis is rejected.

Decision making

According to the results obtained regarding the sensory characteristics of UT purified water, the following is recommended:

To improve the source of supply of the raw material in this case the water, in order to increase the average degree of satisfaction of the same.

Raise the degree of satisfaction (taste, smell, clarity and brilliance) of internal customers before entering the regional consumer and business market in Petatlán, Guerrero.

The suggested prices for half liter, one liter and one and a half liter presentations should not exceed the price of the leading brands of the purified water market.

The most frequent size is one liter

Establish calls, with the purpose of the UTCGG community propose the name and logo for purified water.

The most reusable container is the loop.

The flavors that are most frequently required for flavored water are: lemon, jamaica, apple, coconut, pineapple and grape.

References

BD de la Universidad Tecnológica de la Costa Grande de Guerrero, 2019.

BD de la Dirección de la carrera de Ingeniería en Procesos Alimentarios, 2019.

B.D. del Cuestionario aplicado a la comunidad de la Universidad Tecnológica de la Costa Grande de Guerrero, 2019.

Díaz Martínez, S. (2011) Métodos Cuantitativos para la Toma de Decisiones. México. Libro en Revisión.

Hair, J. F. Bush, R. P. y Ortinau, D. J. (2010). Investigación de Mercados. México. McGraw-Hill.

Kinnear, T.C. y Taylor, J.R., (2008) *Investigación de Mercados un enfoque aplicado.* (Quinta Ed.) Ciudad de México, México: McGraw-Hill.