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INCIDENCE FACTORS WITHIN THE CONSUMPTION OF APPELLATION OF ORIGIN'S IN MEXICO[1]

Laura Elena **Martínez-Salvador***

Instituto de Investigaciones Sociales. Universidad Nacional Autónoma de México.
*Corresponding author: laura.martinez@sociales.unam.mx

ABSTRACT

Food products with origin seals, such as Appellation of Origin (AO), have tangible and intangible characteristics that link them to both territory, and local culture; factors which may impact the consumption of AO goods. The objective of this article is to analyze the effect that sociocultural-environmental, nutritional-sensory-quality, and socioeconomic-accessibility factors have on the consumption level of AO foods in Mexico. It also aims to contribute to the understanding of changes in consumption that have occurred mainly due to exogenous and transitory factors, such as the health emergency (pandemic event). This is undertaken by applying 147 randomized surveys to consumers of AO products, whose information was analyzed using statistical tools and regression models. Results suggested that the socioeconomic factor, related to price and physical access to AO products, is the main incidence factor affecting level of consumption, followed by the perception of quality and safety that these foods have. Likewise, changes in level of income, and mobility restrictions derived from the health emergency, have also decreased the level of consumption of these goods.

Keywords: appellation of origin, consumption, seals of origin, territory.

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INTRODUCTION

Protection of agrobiodiversity assets has begun to play a greater role in the international agenda, driven by a clear and accelerated tendency of species and ecosystems to deteriorate (Grau, 2014). For this reason, many international agendas have begun to include a series of protective strategies and measures that conceptually integrate intellectual property, knowledge of local communities (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2016), and the safeguarding of traditional knowledge (Food and Agriculture Organization of the United Nations-FAO, 2021). One of these strategies has been the establishment of seals of origin, or Appellation of Origin (AO).

AOs are important for territorial development as particular assets with cultural, historical, and social anchorage promote the conservation of landscapes, animal and plant ecosystems, especially for production, transformation, commercialization, and even consumption of foods, whose identity traits are rooted in their origins. These foods, which may be grains, fruits or alcohol are related to the geographical space and with collective historical and ancestral elements that reflect a shared identity over time, leaving a mark based on food know-how and establishing themselves as bearers of community testimony (Bérard and Marchenay, 2006).

However, as part of the study of these strategies to protect original quality, it is important to analyze both the production aspect, sociocultural valorization, and also demand factors, because understanding these characteristics and changes in demand for traditional products could be viewed as a significant tool for the development of sustainable consumption models (De Boni *et al.*, 2019). Consumption of AO, as a variable, is relevant to the study: on one hand, because products linked to the origin, as well as those related to sustainable development (Bryla, 2017), may be apposite for higher prices; while on the other, there is an inherent consumer interest and concern that focuses on issues related to quality, safety, health, and environment (Sánchez, 2011).

Thus it is noteworthy that current studies related to AOs, from a consumption or demand perspective, have mainly focused on identifying mostly the perception of consumers regarding products with AOs (Menapace *et al.*, 2009; Giraud, 2004), the importance of these AO products in rural development (Vecchio *et al.*, 2020) and the propensity of consumers to pay an added value for products with quality seals (Faraoni *et al.*, 2017; Bazoche *et al.*, 2013). However, studies of AO in Mexico, based on the analysis of incidence factors related to consumption, have not been widely developed[2]. Therefore, this research work uses analytical tools, statistical correlation and linear regression, to identify the series of factors that may enhance or restrict the level of consumption of these food brands with seals of origin.

Therefore, the objective of this correlational exploratory research is to analyze the effect that sociocultural-environmental, nutritional-sensory-quality, and socioeconomic-accessibility factors may have on the consumption level of AO foods in Mexico, as well as to understand the changes that have occurred at this level of consumption due to exogenous and transitory conditions, such as the current health emergency (pandemic event).

This research is relevant because up until now, it has not been possible to locate studies that address the consumption of AO products in Mexico, let alone highlighting factors that may categorically influence the level of consumption. In the same sense, another related contribution of this paper refers to the recommendations made here that may boost those consumption levels.

Appellation of origin and factors affecting consumption

Appellations of Origin in Mexico are used to establish a geographical area name that serves to designate a product as originating from it, when the quality or characteristics of the product are exclusively or essentially related to either the geographical environment or the natural and human factors, or both; these elements give the product its reputation (IMPI, 2018). These AO are known as public policy instruments that seek to promote agri-food systems through the recognition of their original quality, their traditionalist element, and

their tangible and intangible essentials which add value to AO goods. AO, thus, intertwine the unique characteristics of the territory, such as the agronomic, topographic, cultural and identity factors with other territorial features, such as the transformation processes around the sowing, cultivation, and preparation of food products, which can promote their insertion into local, national and international specialized food markets.

Therefore, the mix between local foods and international consumers has enabled the expansion of AOs and has favored the formation of a gastronomic identity and regional cuisine. This, in turn, allows consumers to learn more about the culinary traditions of a region. Identity and cultural elements related to AOs can also be considered as a series of symbols that impact consumer emotions and even their perception of the contribution that food has on health (Espejel *et al*., 2014). These are factors that, together with the tangible features of food products (e.g. cost, access, availability, convenience and taste) may condition the choices and consumption trends of individuals (Steptoe *et al*., 1995).

Similarly, AO products can become a hallmark of local culture to foreign consumers (Camarena *et al*., 2011), while granting a special quality to the goods by also working under the economic principles of scarcity and typicality, as well as providing an added value, tangible and intangible, to food and, simultaneously affecting consumption behavior.

In order to satisfy food consumption needs, it is important to discern those factors that modify, promote or restrict consumer behavior towards food products with traditional value (Guerrero *et al*., 2009; Serrano-Cruz *et al*., 2018), such as AOs, especially those with the potential to enter specialized markets, like organic ones (Escobar-López *et al*., 2017).

In this sense, the choice of products could depend, to a great extent on the consumers´ profiles, as well as on the inherent factors of the product, such as its sensory aspects, its relationship with food tradition, its links with the gastronomy of certain localities, its nutritional contributions, and even, according to the ratio between price and quality. Thus, this article, as mentioned before, aims to analyze the effect that sociocultural-environmental, nutritional-sensory-quality, and socioeconomic-accessibility factors have on the consumption of foods with AO in Mexico.

Among sociocultural and environmental factors, that may have an impact on the consumption of AO products, those considered relate to an evaluation of the cultural and natural heritage of these products, which favors the formation of a cuisine with identity [Menapace *et al*., 2009] linked to local traditions, know-how, preparation and local consumption practices [Camarena and Sanjuán, 2008], as well as the ability of these products to generate nationalist sentiment (Espejel *et al*., 2014).

When considering sociocultural factors, importantly, there are other factors inherent to AO products, which have favored their insertion into specialized markets. These factors reflect food heritage and the traditional production processes that define them, as well as

their links to geographical contexts, cultural events or festivities (Guerrero *et al.* 2010), and also links between tradition, sustainability and reputation (Sánchez *et al.*, 2017), in such a way that this axis (sustainability –reputation) also integrates components like the preservation of vegetal biodiversity (Egea and Pérez, 2016) or agro ecological practices. Likewise, we consider the relationship that some AO products have with environmental protection and health, or the promotion of human and social values (Cerjak *et al.*, 2014). Concerning all food products, not only those linked to sociocultural elements such as AO, consumption levels may also be a function of nutri-sensory and food quality factors that are reflected in their flavor, consistency, texture or palatability (Steptoe *et al.*, 1995). Furthermore, an adequate price-quality relationship can favor the insertion of these products into markets that value the relationship with geographical space (Valkaj *et al.*, 2013). Nonetheless, it is important to mention that sometimes products conceived as traditional (like those with AO) may be considered inherently fresh and to have a good flavor (Pieniak *et al.*, 2013). The former being attributed to their elaboration from natural and typical local ingredients, thus providing a feeling of pleasure and satisfaction (Cerjak *et al.*, 2014). These may, in turn, have great influence on the decision to purchase and subsequently consume (Espejel *et al.*, 2014). Also, consumers may search for traditional products with an appropriate level of quality in standardized food manufacturing systems, but without losing the original and traditional quality of the AO. Thus, it is probable that this consumption will boost local competitiveness of agri-food systems based on AO products (Sanz and Macías, 2005).

Another relevant axis that can influence the level of consumption of AO products are socioeconomic and accessibility factors, which are related to the perception that consumers may have, regarding the prestige provided by the consumption of certain products. Thus, the decision to consume may be influenced by of the sensation that they are partaking in 'trendy' food, as when consuming products with quality seals, such as organic products. In this case, the demand may respond more to a hedonic trend than to an altruistic premise (Escobar-López *et al.*, 2017). This may occur because food products, with the valorization characteristics of AOs, work under the economic principles of scarcity and exclusivity (Linck, 2018), as well as limited production and specialization that aims to fabricate unique products; this premise may impact the price of the product and could restrict or encourage the acquisition of it. Similarly, accessibility and physical availability become an important incidental factor in consumption (FAO and CIHEAM 2015).

Notably other factors of exogenous and transitory nature may affect trends in food consumption with protections such as AOs. Although this work does not seek to investigate the effects of global and local disruptions, such as an emergency health (pandemic emergency), events of this nature may require consideration in the analysis, as they may have had an impact on consumption dynamics. This is especially true considering that

the health emergency, active during 2020 and until May 2023 affected both productive supply and food demand, due in part to the confinement measures implemented in each country, which materialized with the closure of food establishments and markets, as well as the loss of jobs[3] and subsequent effects on purchasing power.

In this sense, although currently no disaggregated information regarding the consumption of AO products is available, let alone about volatility of demand in current events such as the pandemic emergency, it is possible to discern that some foods considered 'basic', such as rice, have presented changes in their consumption levels by showing an increase of 251% (Alto Nivel, 2020). Likewise, considering the AO produced in Mexico, Tequila AO is an emblematic case, and by July of 2020, tequila producers reported a production growth of 3.6% compared to 2019, as well as an increase in sales during the early stages of the massive lockdowns for the health emergency. However, importantly this does not adequately reflect tequila consumption within Mexico, as more than 80% of tequila production is destined for the North American market (Agencia de Noticias EFE, 2020).

METHODOLOGY

Method for collection and analysis of information

To identify the impact that sociocultural-environmental, nutritional-sensory-quality, and socioeconomic-accessibility factors have on the consumption of AO products in Mexico, this research used a quantitative methodology, based on compiling consumer perception of products with AO in Mexico by applying a survey. This survey was based on a questionnaire, which was randomly applied to 147 people, through the virtual platform Google Forms. This questionnaire was disseminated through social networks during the months of December 2020 and January 2021.

The questionnaire, which was circulated among students, consumers, and the general population, with residence in Mexico as the only selection criteria, consisted of 38 questions divided into three sections. The first questions were aimed at gathering information on: (1) the general profile of those who responded the survey (statistical descriptors); and (2) their level of recognition and consumption of foods with AO. Finally[4], the questionnaire sought to; (3) identify the perception of consumers concerning the mentioned incidence factors of consumption, grouped into the three sections described above: (a) sociocultural-environmental factor; (b) nutri-sensory-nutritional quality factors; and (c) socioeconomic factor-accessibility.

All selected variables and sections were based on the proposal questionnaire designed by Steptoe *et al*. (1995): Food choice Questionnaire (FCQ), where incidence factors and behavior patterns in food consumption are defined. Likewise, the classifications of consumption impact factors proposed by Egea and Pérez (2016) were also contemplated. They developed multi-criteria to analyze protected AOs.

The sample size was established from the standardized statistical formula which considers an unknown population (Morales, 2008). This is because, to date, in Mexico there are no records or reports that provide information regarding the consumption of AO products within the country. This sample, contemplating a confidence level of 92%, was initially computed for 153 people and later, based on a dichotomous control question about whether they have consumed AO products or not, this gave way to a new and final sample of 147, which was later analyzed. Those 147 respondents continued the questionnaire, so they were considered as the valid sample.

The information analysis was carried out by using inferential statistical instruments, such as linear regression. The questionnaire, applied to the 147 subjects, was designed using the Likert survey technique, therefore respondents selected from a series of possible closed answers that were numerically quantified and valued, for each factor's item, on a scale from 1 to 5. These items are operationalized and shown in Table 1.

Notably, three of the questions concerning the aspect of the socioeconomic and accessibility factor, where answers were structured negatively, were inversely quantified to reflect the correct interpretation.

The mean (*average)* was used as the measure of central tendency and dispersion to carry out the calculations because the Likert scale questions were obtained on an ordinal scale. However, in the inferential statistical analysis, statistical mode values were also employed. To identify the homogeneity and internal consistency of the applied items, Cronbach's

Table 1. AO products consumption and their incidence factors.

Factor	Statement
(a) Sociocultural-environmental	I consume them because they are made by small producers
	I eat them because they help preserve culinary traditions
	I consume them because they inform me on national traditions
	I consume them because I consider that they are ecological and good for the environment
	I consume them because they encourage the conservation of native species
(b) Nutrisensory and nutritional quality	I eat them because they are healthier
	I consume them because they do not contain preservatives
	I eat them because they taste better than commercial products
	I consume them because they have higher quality standards than other commercial products
	I am willing to pay a premium for products with quality seals and certificates
(c) Socioeconomic and accessibility	I consume them because they are fashionable
	I consider that they are more expensive products than other commercial ones [a]
	I consider them to be 'luxury' products [a]
	I consider that a high price does not affect my frequency of consumption of these products
	I consider that these products are easy to find and acquire

Note[a]: in these questions the answer was formulated in a negative sense, so a positive perception of this element could have negative effects on consumption, in such a way that it was measured on a scale of 5 to 1. Source: self-elaborated based on Steptoe *et al*. (1995) and Egea and Pérez (2016).

alpha was estimated, which showed a value of 0.85, thus reflecting both the reliability and validity of the questionnaire.

Data Analysis

Information from the 147 valid respondents was analyzed, first by using descriptive statistical tools, and, later, through inferential statistics through the construction of a multiple linear regression model. The dependent variable would be the average consumption of AO products [Cons_AO]. This variable is understood as a linear function of the defined independent variables: Sociocultural-environmental factor [Soc_Cult_Env], Nutrisensory and food quality factor [Nutr_Sens_Qual], and Socioeconomic-accessibility factor [Soc_Econ_Ac].

Survey results were systematized and analyzed using an Excel® data sheet. It was therefore possible to use statistical methods, to determine the multiple linear regression coefficients. The conceptualization of the relationship between the variables generated the following vector of independent variables:

$$Y_i = B_1X_1 + B_2X_2 + B_3X_3 + \mu_i$$

where Y_i reflects the average consumption of AO products reflected in behavior related to level of consumption of each AO product, including food and alcoholic beverages. Besides this, B_1, B_2, and B_3 are the parameters to be estimated through the regression model. Finally, μ reflects the residual error of the regression model.

To understand the effect of the independent variables on the consumption level of AO products, the following methods and data were estimated and used: (i) Adjusted coefficient of determination (adjusted R^2); (ii) regression's coefficient of multiple correlation; (iii) beta coefficient values (B_1, B_2, B_3); and (iv) linear equation best fit.

Subsequently, each of the factors was analyzed in terms of the item's composition to further understand the decision-making around the consumption of AO products. Therefore, a new analysis process, through a simple linear regression, taking as independent variables, each item as relating to the three analysis factors, was carried out. In this second process, the statistical mean (average) level of consumption of AO products was again considered as the dependent variable [Cons_AO]. Similarly, beta coefficients (b_1, b_2, b_3, …, b_n) were obtained, interpreted, and analyzed.

Significantly, although the study seeks to provide knowledge about the incidence factors related to the general level of consumption of AO products, because the study was carried out in a context of a health emergency, with multiple aspects and incident factors affecting behavior, it was important to include a section in the questionnaire regarding the variations

that this eventuality might cause in level of consumption of products with AO. For this reason, items related to consumption variations and some causal factors for this behavior, within a period of one year were included. This information was quantitatively analyzed and, although it was not included as an independent variable in the multiple or linear regression models, it did contribute to better understanding of AO consumption trends.

RESULTS AND DISCUSSION

Analysis of the consumption of products with AO

Results show that in terms of the generalities of the respondents, the prevalent age ranges are between 30 and 40 years (Table 2). Female participation in the survey stands out, as 69% of the participants surveyed were women. Likewise, it was interesting to find that the majority of those surveyed have higher or postgraduate studies[5].

Regarding the spatial distribution of the respondents, the participation of people from all the states in México stands out, although a significant majority resided in Mexico City and the State of Mexico (43 and 56 percent respectively). Respondents were also asked about their knowledge and level of familiarity with different institutional protections, among which AOs were placed. The majority claimed familiarity with the term 'quality or provenance seal' (~73%), and when asked about the type of seals, the majority recognized appellations of origin as positive (38%), whereas geographical indicators or collective marks were recognized only in 46% of the cases (Figure 1).

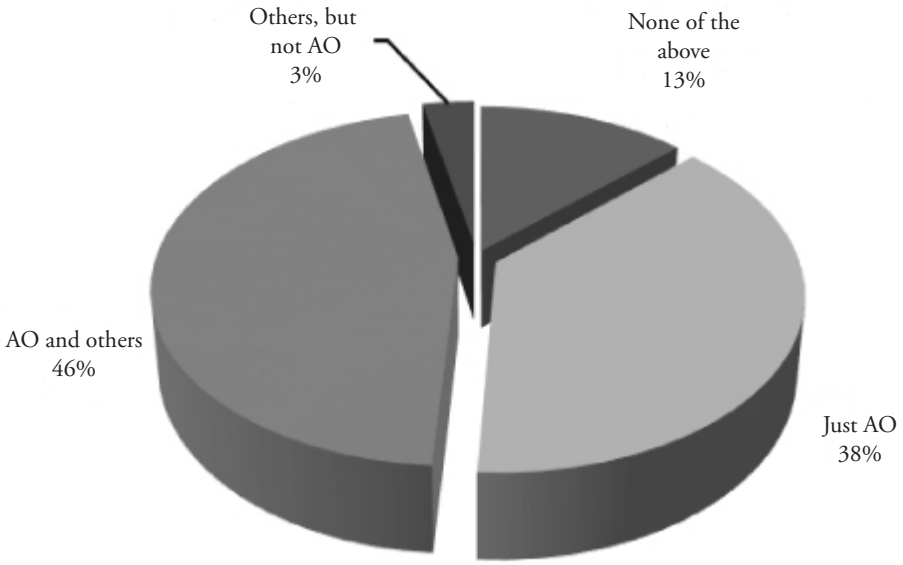
Interestingly, of the 108 people who positively identified the 'quality seals', 95% firstly identify AOs, whereas collective brands were in second place with 44 mentions (40%), while geographical indications accounted for 36% of recognition. This may relate to the fact that in Mexico, both AO, and collective brands are the most widely used institutional figures for the valuation of food products. Geographical indications or food heritage protection figures (such as patrimony) are not widely used and are viewed as emerging criteria for institutional protection.

Similarly, in terms of familiarity with Mexican AO's, Figure 2 shows the comments that each respondent made to the 15 existing AO products, including distillates and food.

Table 2. General data on consumers of AO products in Mexico (survey).

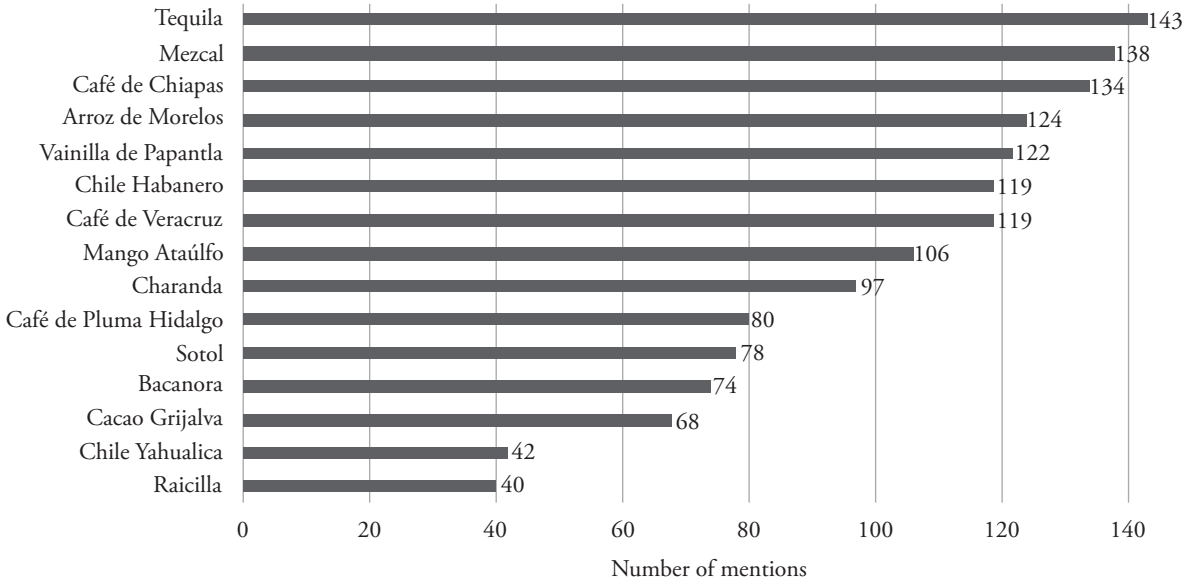
Age		Sex		Educational level	
20 to 30	20%	Female	69%	Junior high school	1%
30 to 40	48%	Male	28%	High school	3%
40 to 50	21%	I prefer not to say	3%	Technical school	3%
<50	11%			Undergraduate studies	40%
				Postgraduate studies	53%

Source: self elaborated based on surveys.



Source: self elaborated based on surveys.
Figure 1. Identification of quality or provenance seals

In this sense, the agave distillate known as Tequila was the AO with the highest level of recognition and the greatest number of mentions (97%). This was not a surprise, as Tequila is the oldest AO in the country and one of the most successful in terms of national



Source: self elaborated based on the survey.
Figure 2. Recognition of Mexican products with AO (dichotomous variables accounted for (YES=1; NO= 0).

production and size of international market (Bowen, 2015; Rodríguez, 2007; Bowen and Zapata, 2009). Other products with high social recognition are the Mezcal distillate and Café Chiapas with 91% of mentions, These represent AOs that have been recognized nationally for more than a decade, and are part of what is known as national collective imagination, (Pérez and Tapia, 2012; Pérez, 2011).

Coffee "Café Pluma Hidalgo" is a noteworthy case. Despite the fact that the product only obtained its AO recognition at the beginning of 2020, it has had a good social response meaning that 54% of respondents claim to recognize it. This may refer to the fact that, for more than two centuries, coffee has been linked with the town of Pluma Hidalgo, in the state of Oaxaca in Mexico. This is an area recognized for being a huge coffee plantation hub since the beginning of the 19th century (IMPI, 2020). Furthermore, when looking at the consumption trend of products with AO, Table 3 shows the consumption of each product in terms of frequency mentioned. It is important to highlight that, although in Mexico there are also AOs for handicrafts, and these constitute part of Mexican heritage, they were not included in this study, as they were not considered perishable food products. The previous results showed that the most recognized AO products among those surveyed, and those recorded as occasionally consumed, therefore placing them at mid-level are Café Chiapas and Tequila, whereas contrastingly, products that are not commonly consumed meaning respondents selected the 'never' option in terms of consumption level), are Cacao (cocoa) Grijalva, Chile Yahualica, Bacanora, Raicilla, Charanda and Sotol distillates. The latter is interesting, because even though AO of Bacanora, Charanda and Sotol alcoholic beverages, became official more than 18 years ago (2000, 2003 and 2002 respectively), they have shown a low consumption level, which may be due to an excessive localized production, with distribution concentrated locally, (within the production states) with no further transportation. This highlights the need to promote wider marketing channels that allow the insertion of AO specialized products into national and international markets.

Table 3. Consumption trend of products with AO (%).

Frequency of mention by respondents	Arroz Morelos	Café Veracruz	Café Chiapas	Café Pluma	Mango Ataúlfo	Cacao Grijalva	Vainilla Papantla	Chile Habanero	Chile Yahualica	Tequila (distilled)	Mezcal (distilled)	Bacanora (distilled)	Raicilla (distilled)	Charanda (distilled)	Sotol (distilled)
Always	12.9	6.1	8.8	3.4	7.5	2.7	8.8	8.2	4.1	11.6	12.2	2.0	1.4	3.4	2.0
Frequently	34.7	30.6	21.8	8.8	35.4	12.2	12.2	20.4	4.1	19.7	27.9	2.0	1.4	4.8	2.7
Occasionally	35.4	40.8	46.3	37.4	28.6	26.5	38.1	36.1	23.8	38.8	34.0	24.5	19.0	20.4	27.2
Hardly ever	8.2	15.6	16.3	22.4	15.6	22.4	18.4	20.4	15.0	15.0	17.0	17.7	15.0	22.4	17.0
Never	8.8	6.8	6.8	27.9	12.9	36.1	22.4	15.0	53.1	15.0	8.8	53.7	63.3	49.0	51.0

Source: self-elaborated based on applied surveys.

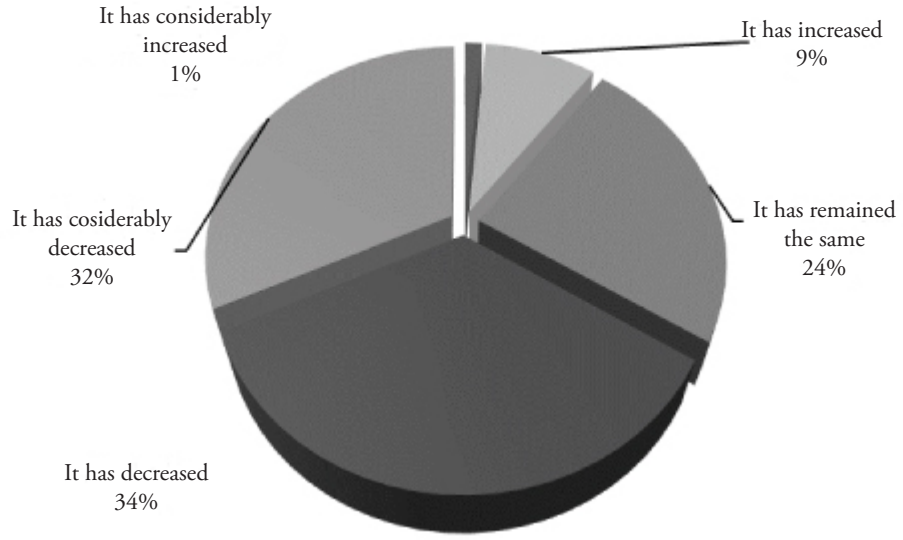
Concerning Cacao Grijalva, Raicilla and Chile Yahualica, consumption behavior is still unknown, as declarations are recent (they were made official in 2016, 2019 and 2018 respectively), and, in this instance, there are still no mechanisms, such as Regulatory Councils, to manage and enhance these declarations.

Otherwise, considering the interest of broadly assessing how the current conditions, derived from the global and local health emergency, have impacted the level of consumption of AO products, Figure 3 presents data referring to level of consumption of products with AO in Mexico, where 32% reported a high decrease in consumption.

Variations in the income were considered to constitute an influence factor as 48% of the respondents reported a decrease in income, ranging from 'little' to 'considerable'; whereas 44% of respondent's income had remained stable, and only 8% claimed to have noticed an increase in income. Nonetheless, considering income variations as the only incidence factor in the consumption of products with AO may be misleading. Therefore, other questions were integrated to assess changes in consumption. These are summarized in Table 4.

Apparently, the main reason expressed for the changes on AO consumption related to mobility restrictions implemented during 2020, as part of the strategy to address the heath emergency; meanwhile, the second most mentioned reason for these changes relates to the closure of physical spaces where consumers were accustomed to acquire these products, such as product fairs, local markets, organic and producers' markets, and bazaars.

It is interesting that, opposed to what may have been thought, changes in income, as a reason for the change in AO consumption, are placed third. It is also relevant that 53%



Source: self elaborated based on applied surveys.
Figure 3. Trend in the level of consumption of products with AO in Mexico.

Table 4. Factors of change in the consumption of products with AO in Mexico.

Influencing factors	Number of mentions	% of total mentions
Mobility restrictions due to health emergency	89	28.9
Closure of sale-spaces, such as street markets or markets	64	20.8
Changes in my personal or family income	51	16.6
Changes in my eating habits	30	9.7
Changes in delivery methods (home delivery)	25	8.1
Access to more information about the products	22	7.1
More information and dissemination of these products on social networks	17	5.5
Other	10	3.2

Source: self elaborated based on applied surveys.

of consumers have shown an increase in the consumption of these products (which, as apparent in Figure 3, represents 9% of those surveyed). This may be attributed to changes in eating habits, where consumers looked for more origin-linked, healthy, local products.

Statistical estimation and linear regression model

The regression statistical results can be observed in Table 5. It is important to mention that this linear regression model explains 92% of the effects of the independent variables on the dependent variable, with a coefficient of determination (R^2) of 0.92.

Considering the value of the coefficients of the independent variables, in descending order, the (iv) regression linear equation best fit is the following:

$$\text{(iv) } Y = 0.69\ Soc\_Econ\_Ac + 0.44\ Nutr\_Sens\_Qual - 0.22\ Soc\_Cult\_Env.$$

Thus, the coefficient values reveal that, if the independent variable changes by one unit,

Table 5. Statistical results (multiple linear regression).

Adjusted coefficient of determination R^2 (i)	0.92
Coefficient of multiple correlation (ii)	0.96
Typical error	0.82
Number of observations	147

Variables (original*)	(iii) coefficients value	Error
Soc_Cult_Env	-0.22	0.14
Nutr_Sens_Qual	0.44	0.14
Soc_Econ_Ac	0.69	0.08

Source: self-elaborated based on model results.
The estimates were made considering a 95% confidence level with an alpha error of α=0.05 and a constant ≠ 0.

the level of consumption of products with AO will change 0.69 units, if the change occurs in the elements perceived within the socioeconomic-accessibility factor, whereas 0.44 for the nutrisensory and food quality factor, and -0.22 if the changes are in the sociocultural-environmental factor. Thus, the socioeconomic-accessibility factor reveals the highest incidence in terms of the behavior of the average consumption of products with AO, followed by the nutri-sensory and food quality factor. The sociocultural-environmental factor is found in third place.

Factor 1: Socio-economic factor-accessibility

This factor was positioned as the element with greatest impact on the consumption level of AO products. In first place, although it can be considered that the perception of fashion products can impact positively (b_3: 0.19) in the consumption of AO products, 67% of those surveyed showed some level of disagreement that their consumption is motivated exclusively by fashion (Table 6).

Also, as evident in this table, the perception that these products are more expensive than regular ones has a negative effect on level of consumption and, as the questions were applied with negative connotation, the value of the coefficients (and the positive sign) (b_5: 0.07) confirms the impact premise. This statement is accepted by 47% of those surveyed, which implies that the greater the perception of high price for these products, the lower consumption.

The previous statement was complemented by asking the respondents whether changes in the price of these products could affect their frequency of consumption, for which apparently most responses fell into the 'agree' interval; in 92% of the cases. Only 8% stated that a change in the price would in no way affect their frequency of consumption of AO products. Therefore, it is possible to infer that there is a negative relationship between price increase and increase in the consumption of these foods with AO.

The impacts on consumption lead us to consider that products with AO manifest typical behavior similar to 'luxury goods', which show highly varying demand. This implies that

Table 6. Socio-economic and accessibility factor and its incidence in the consumption of AO products.

Factor	Statement presented to survey respondents	Coefficient values
Determination coefficient Socioeconomic factor-accessibility, (R^2): 0.91	I consume them because they are fashionable	b_3: 0.19
	I considered that they are more expensive products than other commercial ones	b_5: 0.07
	I consider them to be 'luxury' products.	b_2: 0.25
	I considered that a high price does not affect my frequency of consumption of these products	b_4: 0.13
	I consider that these products are easy to find and easy to acquire	b_1: 0.31

Source: self elaborated based on surveys.

small variations in price may generate more than proportional changes in the consumption level or quantities demanded, meaning that the price factor is very important when looking at purchasing decisions (b_4: 0.13). The perception of luxury related to AO goods is accepted by 46% of those surveyed, while only 1% expressed total disagreement with this statement. However, in this same category, it is important to mention that 32% expressed having no defined position, placing themselves among the intermediate responses in the scale. The latter reflects a bias in the perception of the qualities and particularities of local products, which may encourage consumption according to *status*, but may also simultaneously restrict demand. Therefore, unique characteristics that make them 'valued products' may ultimately have the potential to become 'barriers' to consumption, when otherwise regarded as a luxury food (b_2: 0.25).

Likewise, even though consumers internalize the elements described above in various ways, which in turn may serve as incentives or limitations for the acquisition of AO products, with the physical availability and accessibility playing a fundamental role, as the factor having greatest impact on level of consumption (b_1: 0.31). This is because these products can be considered as 'occasional treats', implying that the purchase is made impulsively if those goods are within reach and sight of the consumer. Thus, the existence of immediate and perfectly identified sale points is a very relevant factor in terms of final consumption. This represents a window of opportunity, as more than 50% of those surveyed express that these goods are not easy to find or easy to acquire.

Factor 2: Nutrisensory and food quality factor

Another of the factors that may influence purchasing decisions for AO products relates to the characteristics or qualities that give food the property of natural or healthy. This factor is positioned as the second most relevant and has a positive impact on decision-making for the consumption of products with AO [b_4 :0.03 and b_3 :0.24 respectively, (Table 7)], therefore, by linking the dietary tradition with seals of origin related products, such as AOs, an association is created with what is conceived as 'natural' and 'free of preservatives'; those are elements relevant to 68% of those surveyed.

Regarding the sensory elements, which involve the textures and flavors of food or alcoholic beverages, 82% of those surveyed considered that these AO products taste better than similar products that can be found in market. However, this perception of the product is not reflected as a positive impact on consumption (b_5: -0.05). However, the determining factor for the consumption of AO products lies in the higher quality standards they manifest that may be similar to other commercial products, as well as having quality seals that guarantee the above (b_1:0.29 and b_2 :0.23 respectively). This second factor may be linked to the following sociocultural-environmental factor, because these products are usually associated with artisanal and traditional forms of production and small-scale

Table 7. Nutrisensory and food quality factors and their influence on the consumption of AO products.

Factor	Statement presented to survey respondents	Coefficient values
Determination coefficient Nutrisensory factor and food quality (R^2): 0.89	I eat them because they are healthier	b_4: 0.03
	I consume them because they don't contain preservatives	b_3: 0.24
	I eat them because they taste better than the commercial alternatives	b_5: -0.05
	I consume them because they have higher quality standards than other commercial products	b_1:0.29
	I am willing to pay a premium for products with quality seals and certificates	b_2 :0.23

Source: self elaborated based on surveys.

manufacturing, which can somewhat enhance the sensation of identity but may decrease confidence concerning the quality and standardization of production processes.

This may represent another window of opportunity, given that only 16% of surveyed participants considered that AO products have higher quality standards than those found in other commercial products, whereas 34.6% expressed doubts concerning this factor. The former could be addressed by, for instance, printing some identification symbols on their packaging designs, such as professional labels. AO producers could also improve that quality perception by getting quality seals or certifications, such as agro ecological and organic labels or indication of compliance with official quality and safety standards. The former can be considered a good proposal for AO consumption and demand as well (b_1: 0.29) as the consumers interviewed (56%) reflected a positive tendency to pay a higher price to obtain products with quality seals.

Factor 3: Sociocultural-environmental factor

Analysis of the sociocultural and environmental factor represented a challenge within this research, as this factor was positioned last in importance, for consumption of products with AO. Furthermore, in the multiple regression analysis, this showed a tendency towards negative impact on consumption, which could be considered counterintuitive.

However, by analyzing each factor individually, it was possible to appreciate that, although in theory some of these might enhance consumption, when they are considered in the framework of complexity of factors, their incidence could actually hinder consumption. Thus, we should reflect deeply on the fact that, even when consumers value social features that relate to AO products (such as the fact that AO products are manufactured by small artisans, (90% of those surveyed consider this to be the case), final consumption will not be influenced by this social value attributed to AO products.

It is possible that the former relates to what was discussed in the Nutrisensory and food quality context, where the consumer´s perception of the 'artisanal' or 'traditional' aspect

of AO products may be received emotionally, and therefore influence their decision to consume, nonetheless, these same traditional elements may sometimes seem estranged of standardized transformation processes (usually linked to higher quality and food safety) which is especially important for distillates and alcoholic beverages.

On the other hand, when looking at consumption, based on the willingness to pay a premium price for having quality seals and certificates for AO (Balogh *et al*., 2016), it is possible to , based on the results, that the sociocultural element becomes either an insignificant, or even, negative element, that may influence consumption [($b_{5:}$ -0.06 (Table 8)], especially if the product fails to convey an equilibrium between being traditional and being safe (indicating that AO is made with quality ingredients that comply with health standards).

However, perceived qualities linked to culinary traditions or the cultural and historical heritage of AO products (which is perceived by 87%), could positively impact final consumption (as apparent in these two factors $b_{1:}$ 0.29 and $b_{3:}$ 0.13, respectively).

Concerning this sociocultural-environmental factor, there are questions that imply that consumption of AO foods may depend on the consumer's perception as to whether these AO products are linked to ecological aspects (50% do agree with this statement), or whether they promote the conservation or balance of ecosystems by preserving endemic agri-food species (70% of the people surveyed agreed with this statement as well). However, despite that this might be considered as a positive impact factor over consumption ($b_{4:}$ 0.12 and $b_{2:}$ 0.16 respectively), sometimes products perceived as 'agro ecological' or 'environmentally friendly' are reflected in higher prices (April-Lalonde *et al*., 2020), reducing the so-called positive effect on consumption, especially when considering that shown by the socioeconomic factor (previously manifested), which shows a negative relationship between consumption and the perception of a higher price.

Considering these results, we can establish that the socioeconomic factor related to both, price and physical access, and the perception of quality and safety are the main elements of incidence on AO consumption level, while factors perceived as sociocultural and environmental are rated as the least relevant in terms of consumption.

Table 8. Sociocultural-environmental factor and its incidence in the consumption of products with AO.

Factor	Statement	Coefficient values
Determination coefficient Sociocultural-environmental factor (R^2): 0.87	I consume them because they are made by small producers	$b_{5:}$ -0.06
	I eat them because they help preserve culinary traditions	$b_{1:}$ 0.29
	I consume them because they purvey national traditions	$b_{3:}$ 0.13
	I consume them because I consider that they are ecological and good for the environment	$b_{4:}$ 0.12
	I consume them because they encourage conservation of native species	$b_{2:}$ 0.16

Source: self elaborated based on surveys.

Notably, consumption decisions, and changes in trends, are influenced by both internal and external consumer factors, which transcend those that consider only the type of product, or even its price. This is especially important when we discuss products that have unique tangible and intangible characteristics that augment their value such as AO products, particularly when the product can reflect a link to the territory and entail both producing communities and their traditions.

When stressing the incidence of the socioeconomic dimension, we see that changes in level of income were ranked of great importance for level of consumption of products with AO; it is worth mentioning that income, supply and demand of AO products, were greatly impacted because of the health crisis, in a negative sense. Nonetheless, it is also important to point out that the results indicated a positive and rising consumption trend for some respondents, who actually increased their consumption of AO goods, to a large extent, because of changes in their eating habits, which can be linked to raising awareness concerning nutritional qualities and health benefits related to these types of products.

Similarly, an increase in consumption may have been favored by consumer's perception regarding the new marketing strategies and alternatives established by groups of producers whom, when confronted with closures and mobility restrictions, transited towards e-commerce marketing strategies, home delivery services and digital transactions.

CONCLUSIONS

This exploratory and correlational research provided us with important information regarding the incidence factors related to consumption of products with AO in Mexico. The socioeconomic factor, particularly the specific elements of price and the physical access to these products, were found to be the main factors of incidence in the level of consumption of products with AO. The perception of quality and safety that the consumer has about these foods came in as the second most important factor influencing consumption levels. Similarly, changes in income level and mobility restrictions because of health emergency tactics have negatively influenced the level of consumption of these products.

Likewise, it is also important to mention that this research may constitute an initial baseline for establishing elements that may affect the consumption of these products. However, more information regarding consumption trends is necessary, which is why further studies are required. These studies should increase the analyzed sampled participants. They should also include regional analysis, age group or income categories, as consumer behavior may vary depending on these criteria. In the same way, a crossed analysis that provides us with better understanding of consumption differences between each AO product is required.

The ideas expressed in this research enable us to make some recommendations that can boost the consumption level of AO products, such as: strengthening the productive chains of AO goods at local and national levels; generating strategies and public-private alliances

to ease the insertion of products with origin added value in national markets; promote the institutional consolidation of AOs in Mexico based on the formation of regulatory councils (in AOs where this has not been achieved to date), and through the definition and publication of guidelines and technical requirements for obtaining the seals (Official Mexican Standards). Other measures might include implementing governance structures, where multi-level public-private actors promote agreements for the consolidation of projects to enhance production, transformation, and consumption of AO products, while providing financial and institutional support. On the other hand, the enhance and use of others alternative quality seals of origin such as geographical indications, collective marks or territory marks may also work. Also, create and strengthen short marketing channels that favor product-consumer linkage, and promote strategies and awareness of the consumption of products with identity and ties to their territory may be helpful.

AOs are placed as seals that favor the collective recognition of food-territory binomial; however, they are still not fully developed for commerce in Mexico, which might be considered as a failure to exploit seals, as the insertion of these goods in general consumption depends not only on the characteristics of the products themselves, but also on the capacity of actors within the agri-food value chains and protection territories to implement these origin seals and guarantee their entry to food markets, as well as the ability to fulfill consumer needs, even in times of local and global adversity.

NOTES

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[2]The later even, though in Mexico there is a growing tendency of AO studies, thus this have been mainly done for the Tequila case (Rodríguez, 2007; Bowen, 2015; Bowen y Zapata, 2009), being the Tequila one of the most successful and internationally recognized AO.

[3]Briefly, it is possible to highlight that it has been estimated that, by August of 2020, more than seven million jobs had been lost in Mexico. The percentage of people that, officially recognized, were not able to generate enough income to afford basic foods (known as basic food basket) reached up to 54% (Castañares, 2020).

[4]At this point, for each product, the questionnaire resumed the Likert-type structure to identify consumption, with questions that had, as possible responses, 'always', 'frequently', 'occasionally', 'almost never' and 'never'. These responses were quantified from 5 to 1 to determine frequency of consumption.

[5]This may be related partially to the fact that the questionnaire was applied through a virtual platform, so certain technological skills may be necessary for using these communication and information technologies. This is relevant since this may be important matter to include, in future research, the application of surveys using other techniques that

allow access to information from consumers of other ages, and with different technical capabilities.

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