The diffusion of Cannabis impact on Gastronomy: Legality and culinary evolution

Difusión del impacto del Cannabis en la Gastronomía: Legalidad y evolución culinaria

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Abstract

The culinary integration of cannabis has been influenced by its increasing acceptance in both medical and recreational contexts across various locations, sparking considerable interest in contemporary gastronomy. This trend has elevated culinary exploration to a heightened level, challenging established norms. The research was conducted with the goal of disseminating knowledge about cannabis cuisine among culinary students, professionals, and the public. The methodology employed a combination of quantitative and qualitative approaches to analyze the perception and understanding of cannabis gastronomy within the studied population.

Conducting documentary research on cannabis use in food, a recipe book was compiled, and a survey involving 445 individuals, primarily advanced culinary students, was undertaken to assess their knowledge of cannabis in gastronomy, encompassing its incorporation into more sophisticated culinary dishes. Information dissemination among culinary students utilized both social media platforms and in-person conferences. Despite a general awareness of cannabis as a culinary ingredient, notable unfamiliarity was observed in terms of compound extraction, such as CBD and THC, as well as processes like decarboxylation and the extraction of these compounds into fats. Moreover, there existed ambiguity in comprehending the effects of cannabis, where recognized effects such as alterations in nervous functions, increased appetite, and anxiety (THC) were acknowledged, alongside properties of relaxation and anti-inflammatory characteristics (CBD); however, the information presented was often limited and unclear.

In conclusion, the research highlights the growing interest in cannabis cuisine within the culinary community but underscores the necessity for a more profound understanding of compound extraction and the effects of cannabis in gastronomy. This knowledge is crucial for the responsible and creative use of cannabis in the kitchen.

Cannabis, Gastronomy, Decarboxylation, THC, CBD

Resumen

La integración culinaria del cannabis se ha visto influenciada por su creciente aceptación en contextos tanto médicos como recreativos en varios lugares, lo que ha despertado un interés considerable en la gastronomía contemporánea. Esta tendencia ha elevado la exploración culinaria a un nivel superior, desafiando las normas establecidas. La investigación se realizó con el objetivo de difundir el conocimiento sobre la cocina cannábica entre estudiantes de cocina, profesionales y público en general. La metodología empleó una combinación de enfoques cuantitativos y cualitativos para analizar la percepción y comprensión de la gastronomía del cannabis dentro de la población estudiada.

A través de una investigación documental sobre el uso del cannabis en la alimentación, se elaboró un recetario y se llevó a cabo una encuesta en la que participaron 445 personas, principalmente estudiantes avanzados de cocina, para evaluar sus conocimientos sobre el cannabis en la gastronomía, abarcando su incorporación a platos culinarios más sofisticados. La difusión de información entre los estudiantes de cocina utilizó tanto plataformas de redes sociales como conferencias en persona. A pesar de una conciencia generalizada sobre el cannabis como ingrediente culinario, se observó un notable desconocimiento en términos de extracción de compuestos, como CBD y THC, así como de procesos como la descarboxilación y la extracción de estos compuestos en grasas. Además, existía ambigüedad en la comprensión de los efectos del cannabis, donde se reconocían efectos reconocidos como alteraciones en las funciones nerviosas, aumento del apetito y ansiedad (THC), junto con propiedades de relajación y características antiinflamatorias (CBD); sin embargo, la información presentada era a menudo limitada y poco clara.

En conclusión, la investigación destaca el creciente interés por la cocina cannábica dentro de la comunidad culinaria, pero subraya la necesidad de una comprensión más profunda de la extracción de compuestos y los efectos del cannabis en la gastronomía. Este conocimiento es crucial para el uso responsable y creativo del cannabis en la cocina.

Cannabis, gastronomía, descaboxilación, THC, CBD

1. Introduction

The intersection between gastronomy and cannabis has emerged as an extremely intriguing and debated territory today. What was once simply a discussion about the consumption and use of this plant has now expanded into the culinary world. This phenomenon has been partly driven by the growing acceptance and legalization of cannabis in various states in the United States and other primarily developed countries, for both medicinal and recreational purposes, shaping the social perception around this plant and paving the way for exploration of its application in cuisine (Pareja, 2014; Healy, 2019).

The rise of this culinary initiative goes beyond cannabis-infused edibles or homemade marijuana brownie recipes; it extends into the realm of haute cuisine. There has been a notable shift in focus towards cannabis gastronomy, evolving into professionally crafted culinary preparations.

In the United States, although federal laws prohibit the recreational use of marijuana, some state jurisdictions have legalized its medicinal and recreational use. Since 2014, the federal government in this country has respected local laws regarding cannabis.

Internationally, legislations vary considerably. In the year 2016, countries such as Australia, Canada, Uruguay, the Netherlands, Spain, and certain jurisdictions in the United States had less restrictive laws regarding cannabis. In contrast, nations like China, Japan, Saudi Arabia, and the United Arab Emirates maintained highly strict regulations around cannabis. In the case of Mexico, legislation for the medical and recreational use of cannabis has made significant progress, but its use in edibles or culinary preparations is prohibited (UNODC, 2014).

This diverse and ever-evolving landscape has fostered an environment in which the relationship between cannabis and gastronomy has flourished, driving culinary innovation that challenges traditional boundaries and promises to continue transforming the world of cuisine in the future.

Cannabis sativa L. is an herbaceous species of the Cannabaceae genus that has been used since ancient times for various purposes such as food, a source of fiber, a drug, and medicine. This plant has been referred to by different names over time and depending on the region. In the case of Mexico, the most colloquial term is "marihuana" (Contreras, 1978; Candela García et al., 2006; Inzunza y Peña, 2019).

Marijuana, also known as "marijuana," is a mixture of dried leaves, flowers, stems, and seeds of the hemp plant (NIDA, 2019). Additionally, among consumers, there are numerous nicknames or colloquial terms, such as "Mary Jane," "Amnesia," "Doobie Houdini," "Reefer" (derived from the Spanish term "Grifo"), "Spliff," "Herb," "Bud," "Grass," "Green" (Potheadtv.com, 2019). In a Mexican book, more than 1000 words are compiled to refer to marijuana; some of these names include "Chabela," "Chíchara," "Chipiturca," "De la buena," "De la verde," "Diosa," "Verde," "Doña Diablo," "Dama de la ardiente cabellera," "Flor de Juana," "Goma," "Grifa," "Grilla," "Güera," "Join," "Juana," "Juanita," "Mala hierba," "María," "Mari," "Mariana," "Mary Poppins," "Mois," "Mora," "Mota" (Plano Informativo, 2015). In other countries, such as Uganda, it is called "Khat" (Kyokunda et al., 2021).

Cannabis originates from Asia, America, and Africa; it belongs to the Cannabaceae genus and is divided into three main varieties:

1. *Cannabis Sativa*

This variety is generally associated with more cerebral and energetic effects. Plants of this species tend to be tall and slender, with more stylized leaves and a prolonged flowering period (Contreras, 1978; Kushka, 2016).

Figure 1 *Cannabis sativa*

Source: Antropocene.it, 2017

2. *Cannabis Indica*

With more relaxing and physical effects, plants of this variety are usually shorter and more compact, with broader leaves and a shorter flowering period. (Contreras, 1978; Kushka, 2016).

Figure 2. *Cannabis indica*

Source: Cannabisindustria, 2019

3. *Cannabis Ruderalis*

Less common and typically smaller in size, it has been used to develop auto flowering varieties. (Contreras, 1978; Kushka, 2016).

Figure 3 *Cannabis Ruderalis*

Source: Weediid.com, 2020

It is important to highlight differences in the effects, the appearance of plants, and the characteristics of each Cannabis variety within the Cannabaceae genus.

The physicochemical composition of cannabis is diverse and can vary depending on the strain, cultivation, and other factors. The plant contains many compounds, among which the most relevant ones are:

– Cannabinoids: THC and CBD stand out. THC induces psychoactive effects, whereas CBD offers therapeutic properties without significant effects on the mind (Thomas & ElSohly, 2015; Clarke & Merlin, 2016; Lawson, 1997; Chandra, Lata & ElSohly, 2017; Pacher *et al*., 2018; Cano-Valle *et al*, 2019).

– Terpenes: Aromatic compounds present in cannabis and other plants. They contribute to the unique aroma and flavor of each strain and may have therapeutic effects. Examples include limonene, myrcene, pinene, and linalool. (Thomas & ElSohly, 2015; Clarke & Merlin ,2016; Lawson, 1997; Chandra, Lata & ElSohly, 2017; Pacher *et al*., 2018; Cano-Valle *et al*, 2019).

– Flavonoids: These compounds, with antioxidant and anti-inflammatory properties, are found in various plants, including cannabis. Although less studied than cannabinoids and terpenes, they are believed to offer health benefits. (Thomas & ElSohly, 2015; Clarke & Merlin ,2016; Lawson, 1997; Chandra, Lata & ElSohly, 2017; Pacher *et al*., 2018; Cano-Valle *et al*, 2019).

It is crucial to consider that the exact composition of these compounds varies depending on the plant's genetics, cultivation, harvest, and processing. Laboratories employ advanced techniques such as gas chromatography and mass spectrometry to precisely analyze the chemical composition of cannabis.

From these three base varieties, new variations have been created through combinations, grafts, and modifications. Differences among these variants are based on the content of THC, CBD, aroma, flavor, and the effects they produce. Some of these modified varieties are detailed in Table 1. Cannabis varieties derived from the three original types (sativa, indica, and ruderalis), with commercial names.

The cannabis plant has a millennia-old history in Central Asia, with diverse uses ranging from fiber production for textiles to medicinal applications and religious rituals.

In China over 4,000 years ago, it was used for therapeutic purposes, documented in ancient medical texts such as the "Nei Ching," attributed to Emperor Huang Ti, which included cannabis recipes for treating diseases. In India around 2000 B.C., the Aryans used cannabis in religious rituals, and it is mentioned in the sacred Vedas as an herb associated with the god Siva, considered sacred and endowed with magical properties and health benefits. Cannabis spread from China and India to Persia, Assyria, and Scythia, where it was used in religious and funeral rituals, as well as for therapeutic purposes to alleviate various ailments. Throughout history, cannabis has been valued by various cultures for its medicinal properties, religious rituals, and recreational uses, showing a wide range of applications and effects in different societies (Lorenzo and Leza, 2000; Escohotado, 1998; Ramos and Fernández, 2000).

Cannabis has been used throughout history by various cultures and civilizations. From archaeological remains of hemp vessels dated around 6000 B.C., cannabis becomes one of the oldest plants cultivated by humanity (Leal-Galicia et al., 2018). The historical uses are presented below:

As Medicine:

Even though the U.S. Food and Drug Administration (FDA) has not approved the marijuana plant as medicine, the study of its cannabinoids has led to the approval of two pill-form medications containing cannabinoids. The legalization for medicinal use is under discussion, as its potential to treat a wide range of diseases has been observed. Several states have legalized its use for medicinal purposes.

Effects as Medication:

Numerous beneficial effects of cannabinoids on health have been identified, including anti-inflammatory, analgesic, protective of nervous tissue, anticonvulsant properties, among others.

As a Drug:

a. Smoked or Inhaled: It is common to consume cannabis by smoking, either mixed with tobacco or alone, in cigarettes or pipes. It is also used in water pipes. Oral or Ingested: The resin is incorporated into foods such as cakes, candies, and sometimes leaves and stems are used in food products like tortillas or pastries.

b. Cannabis has been studied for its potential medicinal benefits, although its use as a drug has also been historically significant in various consumption forms, whether smoked, inhaled, or orally ingested (NIDA, 2015; Infodrogas.org, 2020; Fundación Canna, 2020).

On the other hand, the history of cannabis in Mexico spans five centuries since its introduction in the 16th century by the Spaniards. During the 20th century, the influence of the United States affected Mexican drug policies. Starting in the 1980s, cannabis trafficking became a matter of public security due to U.S. pressure and increased competition in illegal markets, resulting in violence and corruption.

The domestic consumption of cannabis solidified in Mexico, becoming the preferred illegal drug, with an incidence of 4.2% in the population aged 12 to 65, according to the National Addiction Survey of 2008. According to the 2009 International Narcotics Control Board, cannabis is the most widely used drug by young people and adults worldwide, with a usage rate of 3.3% to 4.4% in the population aged 15 to 64 in 2007 (UNODC, 2009; CONADIC, 2009).

Throughout the centuries, cannabis has had a constant presence in Mexico, influencing policies, trafficking, and consumption, shaping its role in Mexican society and culture.

The legalization of cannabis for recreational purposes has sparked a broad global debate. While some seek to reduce drug trafficking through regulation and control, others are concerned about the risks of consumption. Despite its legalization in some countries, a consensus on its regulation and the elimination of the black market remains elusive.

Table 1 Strains of cannabis derived from the three original varieties (sativa, indica, and ruderalis), with commercial names

Name	Genetics	Name	Genetics	Name	Genetics
A.M. S	Indica dominant (60%)	Galaxy	Indica Dominant 70%	Orange Candy	Sativa 65%
Aroma	Indica dominant	Gorilla	Indica Dominant 60%	Ogre	Sativa
ASH	Indica dominant (75%)	Guayaka	Indica dominant	Pandora	Indica 70%
Atomic	Indica /Sativa	Haoma	Indica dominant 70%	Purple	Indica-Sativa 50-50%
Banana	Sativa dominant (60%)	Honey b	Sativa 90%	Qleaner	Sativa 60%
Big bang	Indica dominant	Ice kush	Indica/Sativa	Quash	Indica 70%
Black Domina	Indica 90-100%	Irie	Sativa dominant 75%	Royal Gorilla	Indica-sativa 50-50%
Cannatonic	Indica Sativa 50-50%	Jack	Indica /Sativa	Runtz	Indica/Sativa 50-50%
Caramelo	Indica dominante70%	Juanita	Sativa dominant	Sugar Loaf	Indica / Sativa 50-50%
Cheesus	Indica dominant 60%	Kaya 47	Sativa dominant	Sangria	Indica dominant
Dementia	Sativa dominant 80%	Khufu	Indica dominant 75%	TNT Kush	Indica 90-100%
Desfran	Sativa 90%	LSD	Indica dominante70%	The OX	Indica dominant
Dr. Who	Indica dominant	Lennon	Sativa Dominant 80%	U2	Sativa dominant
Easy Bud	Indica dominant 55%	Malawi	Sativa 90%	Utopia Haze	Sativa 90%
Eldorado	Sativa 90%	Michka	Sativa dominant 80%	Veneno	Indica/Dominant 85%
Ewe-2	Indica 90-100%	Nordle	Indica	Vertigo	Indica/Sativa
F13	Sativa dominant	Nebula	Sativa 60%		

Source: Canna Connection, 2019

Cannabis consumption has increased globally, according to the United Nations Office on Drugs and Crime. Although there have been attempts to decriminalize its use since the 1970s, the implementation of reduced sanctions has been limited, especially for recreational use. Despite progress in its exclusively medicinal use, resolution for recreational use remains unclear.

The discussion about the legalization of cannabis for recreational use remains complex, balancing the regulation of its market and controlling its risks, while its consumption continues to rise globally (Blickman and Jelsma, 2009; Madoz-Gúrpide and Ochoa Mangado, 2014; UNODC, 2014; Cannabis.senado.gob.mx, 2022).

In Mexico, the process of marijuana legalization has been progressive and controversial. In 2017, its use for medicinal purposes was approved, and since 2019, the Supreme Court demanded Congress to legislate on its recreational use, considering it unconstitutional to prohibit its consumption. Faced with Congress's failure to regulate recreational marijuana, the Court approved a historic ruling in June 2021 allowing recreational self-consumption, though not commercialization (Quillupangui, 2021).

The "Federal Law for the Regulation of Cannabis and Reform" authorizes adult use and establishes conditions for consumption, cultivation, and commercialization. Self-consumption of up to six plants per person is allowed, limited to the residence, but access to those under 18 is prohibited, and sales are restricted to authorized establishments. The law regulates packaging, labeling, and information about cannabis products. Additionally, it prohibits the marketing of products that exceed certain levels of THC or CBD, among other restrictions.

A study by Reynoso González et al. (2021) reveals that the Mexican population has a mostly positive attitude towards medicinal marijuana, supporting its legalization and consumption (85.2% and 75.9%, respectively). However, there is greater opposition to recreational use, where 42.5% of respondents reject its legalization, indicating a greater reluctance towards recreational consumption (74.1%).

These contrasting positions reflect widespread acceptance of marijuana for medicinal purposes but significant divisions regarding its recreational use, showing a trend favoring therapeutic use but more reluctance towards its use for entertainment or pleasure.

In 2021, the topic of cannabis cuisine or gastronomy gained popularity in Mexico due to legislative processes for its legalization. However, in other countries, the procedures to legalize it and its gastronomic uses are topics of a distant past. It has been an entrenched trend in countries where cannabis consumption is decriminalized, such as the Netherlands and some U.S. states. Specialized restaurants, like Yerba in Amsterdam and Gracias Madre in California, have made marijuana their specialty (nytimes.com, 2018).

Figure 4 ***Cannabis cuisine***

Source: gourmetdemexico.com 2019

This cuisine not only seeks the psychoactive effect, but chefs use it as a flavor enhancer, like monosodium glutamate, generating salivation, intensifying flavors, and stimulating appetite (nytimes.com, 2018). History shows the millennia-old relationship of cannabis with food. From its role as an economic engine in early civilizations to its contribution to the rise of agriculture and its use in the production of wines and pastries in ancient Rome (Robinson, 1999). In Chinese culture, the plant was a staple in their diet in the 6th century, later replaced by grains with lower fat content, thus forgetting its nutritional properties (Robinson, 1999).

Indians contributed the sacred drink Bhang, made with milk and cannabis, used on the night of Shiva, and in the 10th century, its use as medicine was extrapolated with 50 different preparations (Gottlieb, 1993; Robinson, 1999). This drink was offered to deities, followed by the tradition of serving it to family and visitors along with traditional sweets.

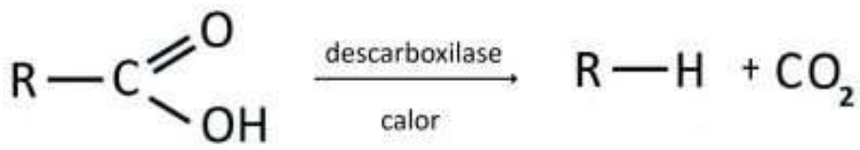
Cannabis seeds were a staple in ancient cultures of Australia, India, and Africa due to their versatility and nutritional value. In Europe, it was consumed during festivities in the form of a drink, and its seeds were a common ingredient in soups, especially accentuating its use during World War II as survival food. Impoverished tribes in Africa and India also used the seeds as essential food (Robinson, 1999).

In Mexico, the presence of cannabis dates to the exploration trips to America during the 16th century. It was introduced as a fiber source in Chile in 1545 and in Peru nine years later. During the Conquest, hemp reached Mexico, brought by Pedro Cuadrado, a conqueror who was part of Pánfilo de Narváez's expedition. Hernán Cortés recommended its planting and cultivation (Honorable Cámara de Diputados LX Legislatura, 2009).

But for the use of cannabis and to obtain its effects, a chemical process called decarboxylation is required.

The term Decarboxylation designates a chemical reaction in which the carboxyl group is removed from a carboxylic acid, resulting in the release of carbon dioxide (CO_2) (see Figure 5). Decarboxylation occurs through the action of enzymes called decarboxylases, and it can also occur, in certain cases, spontaneously after the heating of metabolites (Quesada Moya, 2021).

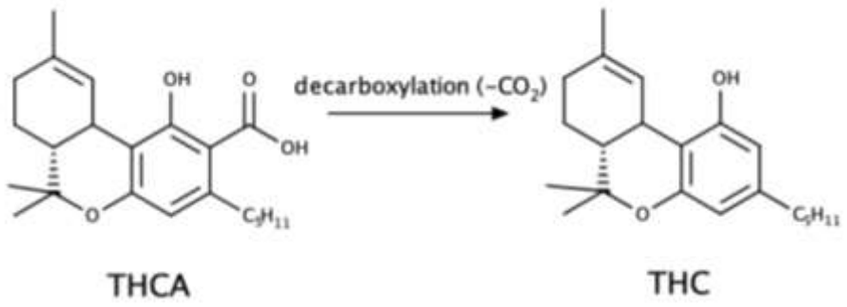
Figure 5 The general decarboxylation reaction



Source: Quesada Moya, 2021

Based on the foregoing, fresh or dried cannabis, without being heated, lacks psychoactive effects since tetrahydrocannabinol (THC) is present in its inactive form, known as tetrahydrocannabinolic acid (THCA). THC activation is achieved through decarboxylation, a process that requires heat. THCA is converted into THC (see Figure 6), responsible for psychoactive effects, when subjected to heat. Smoking or vaporizing cannabis naturally induces decarboxylation due to heat. However, when cooking it in recipes such as brownies, prior decarboxylation is necessary for the resulting edibles to be psychoactive (Quesada Moya, 2021).

Figure 6 The decarboxylation reaction of THCA to THC



Source: Beadle, 2023

To decarboxylate cannabis, it is finely ground to increase the contact surface. The recommended method involves placing it on a tray with wax paper, preheating the oven to 105ºC, and baking it for 45-50 minutes to activate it. If the temperature is increased to 120ºC, the process can be accelerated to 30 minutes. This procedure ensures a uniform and controlled activation of cannabis. When the process is complete, the cannabis changes from a bright green color to an opaque brown – this is normal and one of the visual changes that occur during the cannabis decarboxylation process (Quesada Moya, 2021).

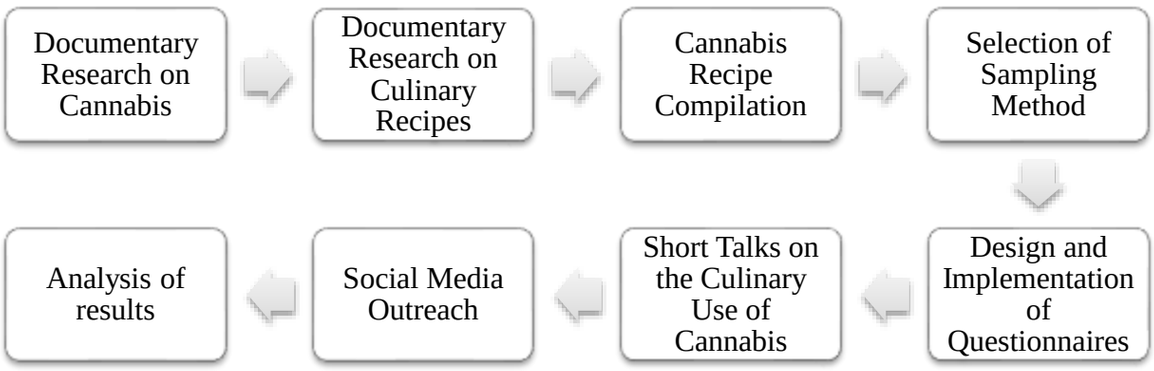
2. Methodology

A mixed methodology was employed, combining quantitative and qualitative approaches. The scope encompassed both an exploratory and descriptive approach, addressing a relatively understudied topic from an innovative perspective, allowing for the identification of concepts. Furthermore, relevant concepts and variables in the study were outlined. A qualitative approach was chosen to examine the perception and experience of the culinary population regarding knowledge about cannabis cooking, delving into their viewpoints, interpretations, and meanings.

The sample size used for this mixed-methods study was based on a cultural ethnographic approach, recommending a range of 30 to 50 individuals as the suggested minimum sample. A homogeneous sample was selected, consisting of individuals with a similar profile, specifically students and professionals in the culinary field. The sampling method used was non-probabilistic convenience sampling.

The methodology followed for this research is summarized in Figure 7 Research Methodology, and each step undertaken is detailed later.

Figure 7 Research Methodology



A comprehensive documentary investigation on cannabis in gastronomy was conducted, analyzing scientific articles, websites, and videos. Recipes worldwide incorporating cannabis as an ingredient were identified. A cookbook for cannabis cuisine was compiled, featuring representative dishes from various regions. Stratified random sampling was employed to survey students, culinary professionals, and restaurant personnel. A data collection instrument was designed to assess knowledge of cannabis in gastronomy. Lectures on cannabis cuisine were delivered to culinary students, and information was disseminated through social media. Finally, results from questionnaires and social media outreach were analyzed.

3. Results

The survey included a total of 445 participants, with 61% identifying as culinary students, while the remaining 39% comprised other groups, including restaurateurs, professionals, or workers in the culinary field. According to the obtained results, 94% of the respondents claimed to have knowledge about cannabis, whereas 57% demonstrated understanding of the concept of cannabis gastronomy. However, 68% indicated a lack of awareness of the fundamentals of this culinary form, and 63% admitted to not having tried food prepared with cannabis.

Regarding the perception of cannabis-infused foods, only 3% of the participants expressed the belief that this type of food is harmful. It is noteworthy that most respondents were culinary students, representing 61%, while only 1.6% belonged to individuals involved in the restaurant industry, as depicted in Graph 3.1 illustrating the distribution of occupations among the surveyed individuals.

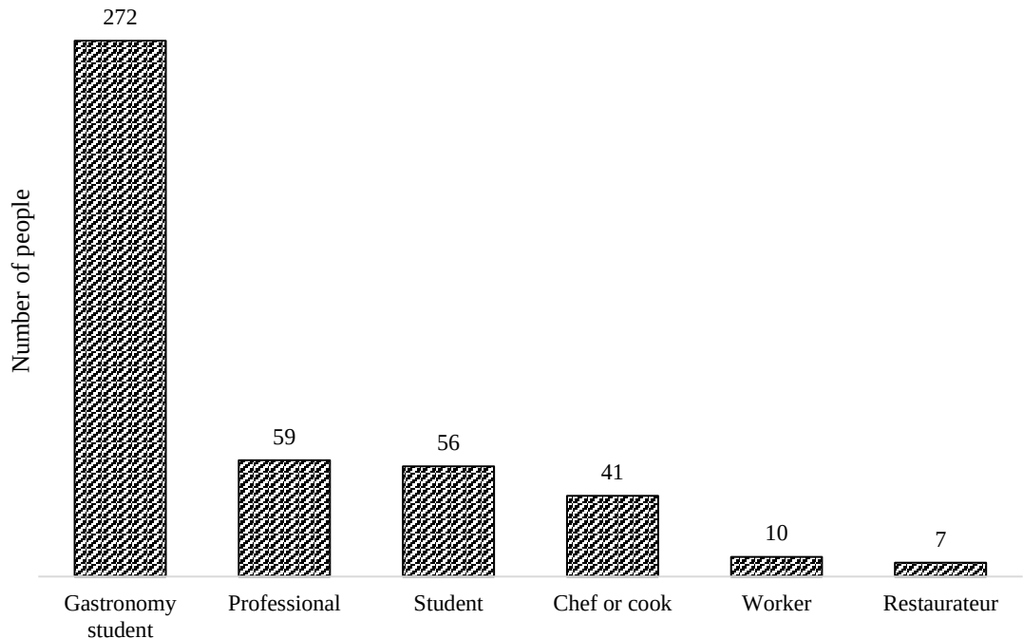
Concerning students, they came from various educational institutions, including TESVB, TESH, TEST, UAEM, TESOEM, IUEM, CUI, ENVB, UNITEC, and other recognized institutions in the culinary field.

Most surveyed students were from TESVB, the institution where the research was conducted, constituting the initial sample with 28.82%, as shown in Graph 3.2. This represents the institution where the surveyed students study gastronomy.

The age range of the surveyed individuals spanned from 18 to 25 years, accounting for 71.68% of the total respondents. Meanwhile, those aged between 41 and 55 years comprised only 2.47% of the sample. The female gender predominated in the surveys, reaching a percentage of 58%.

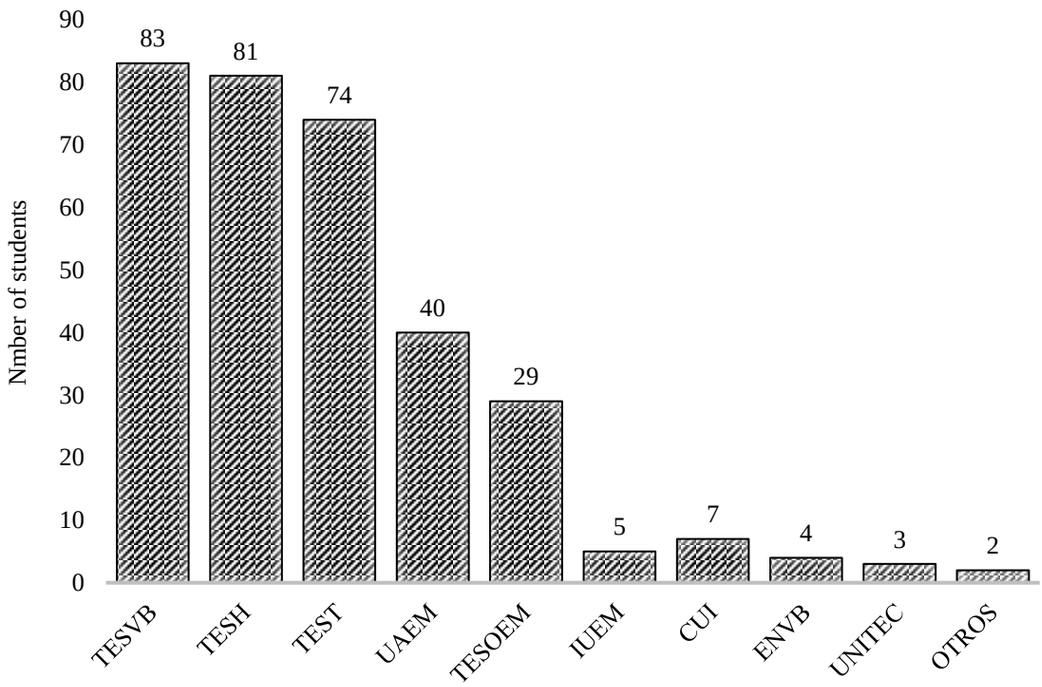
Regarding the geographical location of the surveyed individuals, the majority resided in Valle de Bravo, representing 16.62% of the total. Toluca followed with 13.25%, and 21.79% corresponded to other places of residence, as depicted in Graph 1. Places of residence of the surveyed individuals.

Graph 1 Occupation of the people surveyed



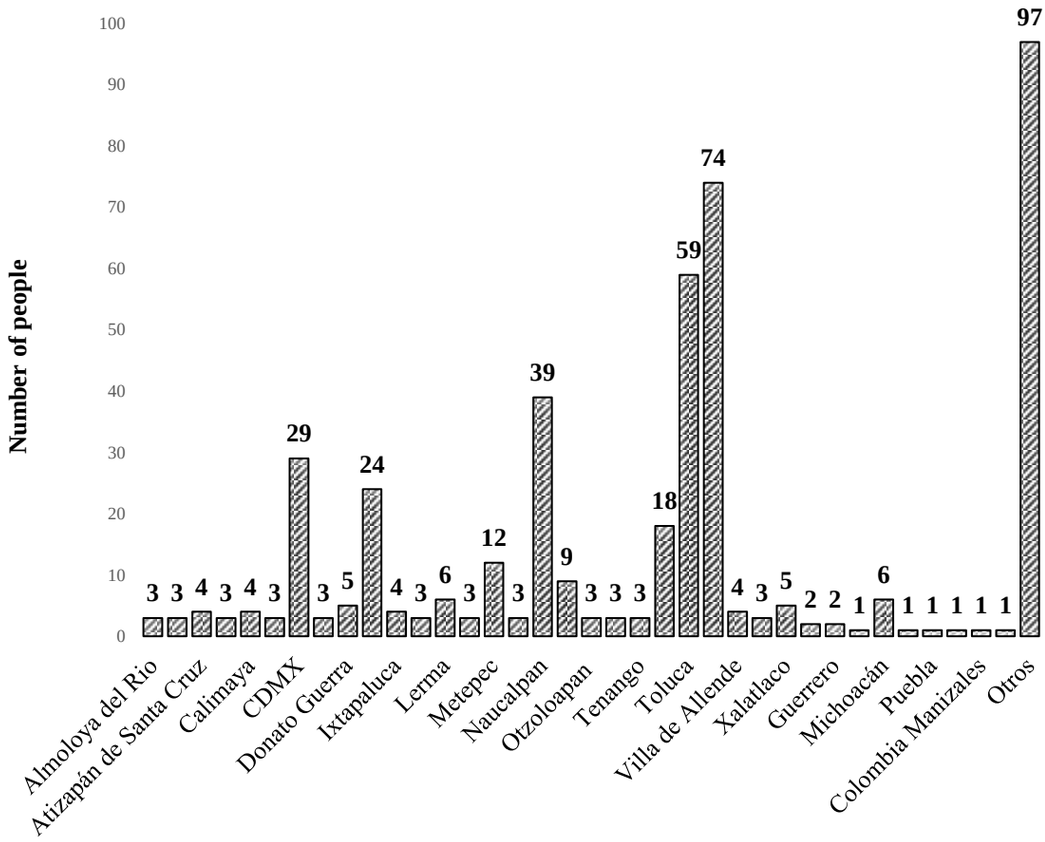
Ninety-four percent (94%) of the surveyed individuals expressed awareness of what cannabis is, and 91% indicated familiarity with the scientific name of marijuana. When asked about cannabis gastronomy, 59% claimed to have information on the topic, while 57% admitted to being unfamiliar with this subject.

Graph 2 Institution where the students surveyed study gastronomy



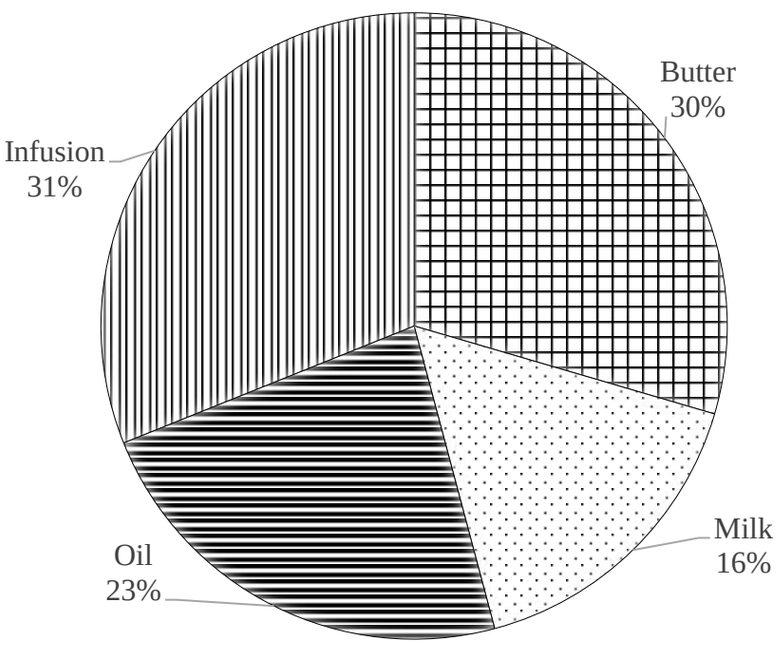
Furthermore, 68% of the respondents stated that they are not familiar with the foundations for preparing cannabis-infused foods. Among those who are acquainted with these foundations, 31% mentioned that preparation is carried out through infusions, 30% using butter, 23% with oil, and 16% using milk, as detailed in Graph 4. Preparation of Cannabis-infused Foods.

Graph 3 Places of residence of the surveyed individuals



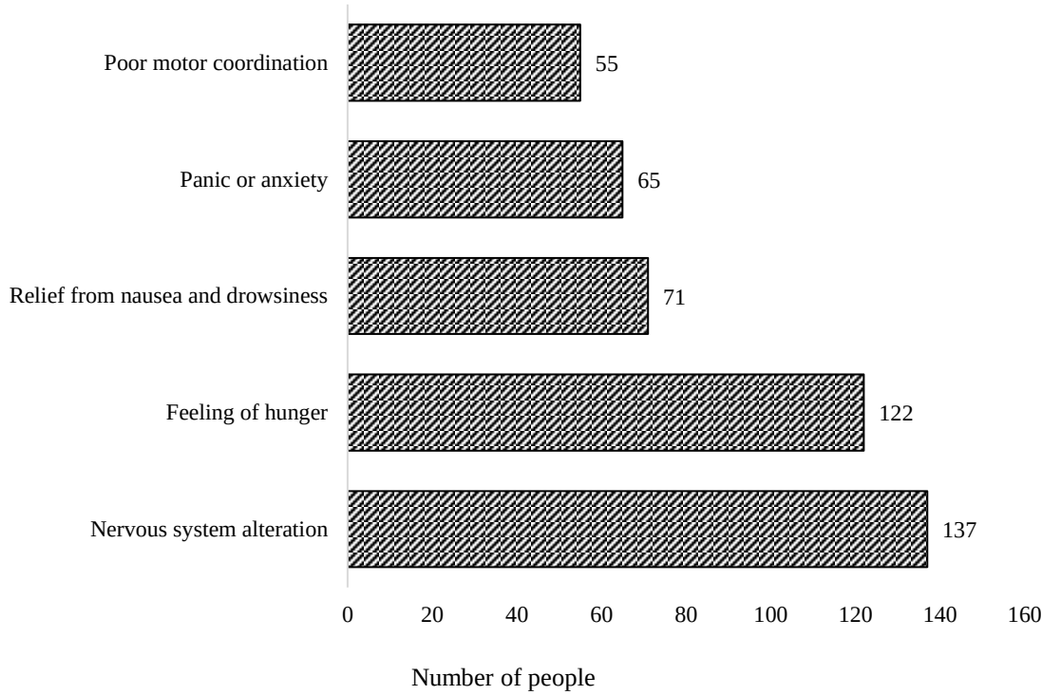
Regarding knowledge of tetrahydrocannabinol (THC), the primary active compound in cannabis, 58% of the respondents admitted to not being familiar with it. Nevertheless, 30% recognize the effects associated with THC.

Graph 4 Preparation of Cannabis-infused Foods



According to respondents familiar with the effects of THC, 30.79% consider the alteration of the nervous system to be one of its main effects, followed by the sensation of hunger at 27.41%. In contrast, low coordination was identified as the least known effect, with only 12.35% awareness, as depicted in Graph 5. THC Effects Known by Survey Participants.

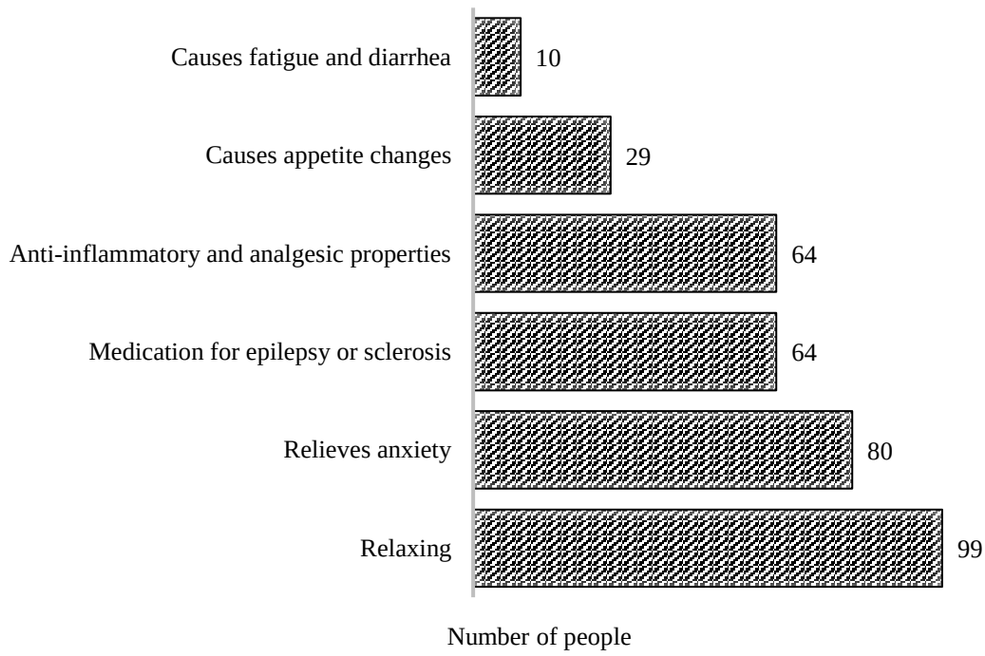
Graph 5 THC Effects Known by Survey Participants



On the other hand, only 28% of the respondents have knowledge about Cannabidiol (CBD). It is noteworthy that a significant 78% of the individuals surveyed regarding the effects of CBD indicated complete unfamiliarity with them. Among the respondents, 22.25% identify the relaxing effect as one of the main attributes attributed to cannabis consumption, followed by anxiety relief, recognized by 17.98% of the respondents. In contrast, only 2.25% of the respondents identify tiredness and diarrhea as effects derived from cannabis use, as presented in Graph 6. CBD Effects Known by Survey Participants.

In response to the question about the consumption of cannabis-infused foods, 37% of the respondents claimed to have ingested such foods. When asked about their willingness to try food with cannabis, 67% responded affirmatively, while 23% were undecided about this possibility. Regarding attendance at restaurants that offer cannabis-infused foods, 61% stated that they would be willing to go, while only 12% refused to do so.

Graph 6 CBD Effects Known by Survey Participants



In terms of perception, 73% of the respondents do not consider cannabis-infused foods to be harmful, in contrast to the 3% who do. Additionally, a notable 82% expressed support for the use of cannabis in gastronomy.

Regarding cannabis consumption in general, 51% of the respondents indicated having tried or consumed this substance in some of its forms, not necessarily in foods. Of these, 39.10% have consumed it in the form of joints, 44.71% have ingested it in foods or as medication, and 49% have not consumed cannabis in any form.

Furthermore, because of the literature review, 30 cannabis-based recipes were compiled, categorized into entries, soups and creams, main courses, desserts, beverages, bread, Mexican recipes, and others, detailed in Table 2. Cannabis-Based Recipes.

Table 2 Cannabis-Based Recipes

Category	Name
Appetizers	Vegetable pie
	Ceviche
Soup and creams	Vegetable soup
	Tomato soup
	Mushroom soup
	Green cream soup
Main course	Salmon
	Chicken breast
	Hamburger
	Lasagna
Desserts	Classic Brownies
	Chocolate chip cookies
	Chocolate cake
	Lemon mousse with yogurt
	Mint ice cream
Non-alcoholic beverages	Infusion
	Strawberry milkshake
	Hot chocolate
Alcoholic beverage	Mojito
	Liqueur
	Mariman
	Green dragon
Bread	Boxed bread
	Hot cakes
Mexican recipies	Pan de muerto
	Pozole
	Enchiladas
Extras	Butter
	Oil

As part of the achievement of the overall goal of promoting cannabis gastronomy, profiles were established on the social media platforms Instagram and Facebook under the name "Cannabis Gastronomy." Since its creation on September 26, 2021 (refer to Figures 8a and 8b), continuous monitoring has been maintained until March 2022. During this period, the following results were recorded on Instagram.

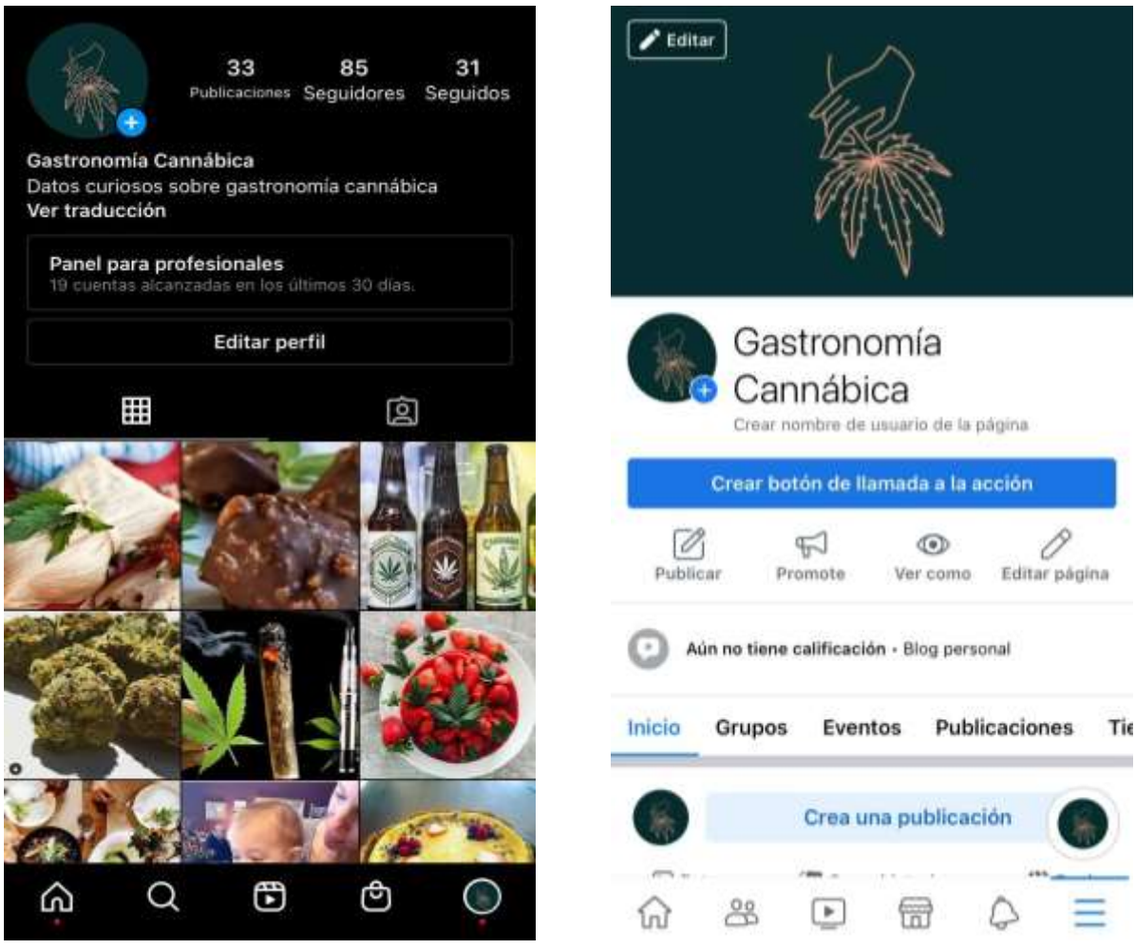
Regarding the Instagram social media platform, the results obtained are depicted in Figure 3.7, illustrating the achieved reach. Over a span of 5 months with a total of 33 posts, 85 followers were gained, and 370 likes were obtained.

As for the Facebook platform, a total of 163 followers were reached, and 157 'likes' were garnered in the posts. These publications generated a reach of up to 627 individuals, as detailed in Figure 3.8. Results of the posts on Facebook.

The dissemination of cannabis gastronomy through 8 virtual talks within the gastronomy program of TESVB proved to be an excellent way to introduce and explore an innovative and relevant topic in the culinary field.

Reaching 75 students from different semesters (1st, 3rd, 5th, and 7th) is a significant achievement, as it allowed for sharing knowledge and experiences with a broad range of apprentices, from those just starting their training to those more advanced in their careers.

Figure 8 a) Instagram, a social media platform where cannabis gastronomy was promoted, b) Facebook, a social media platform where cannabis gastronomy was promoted



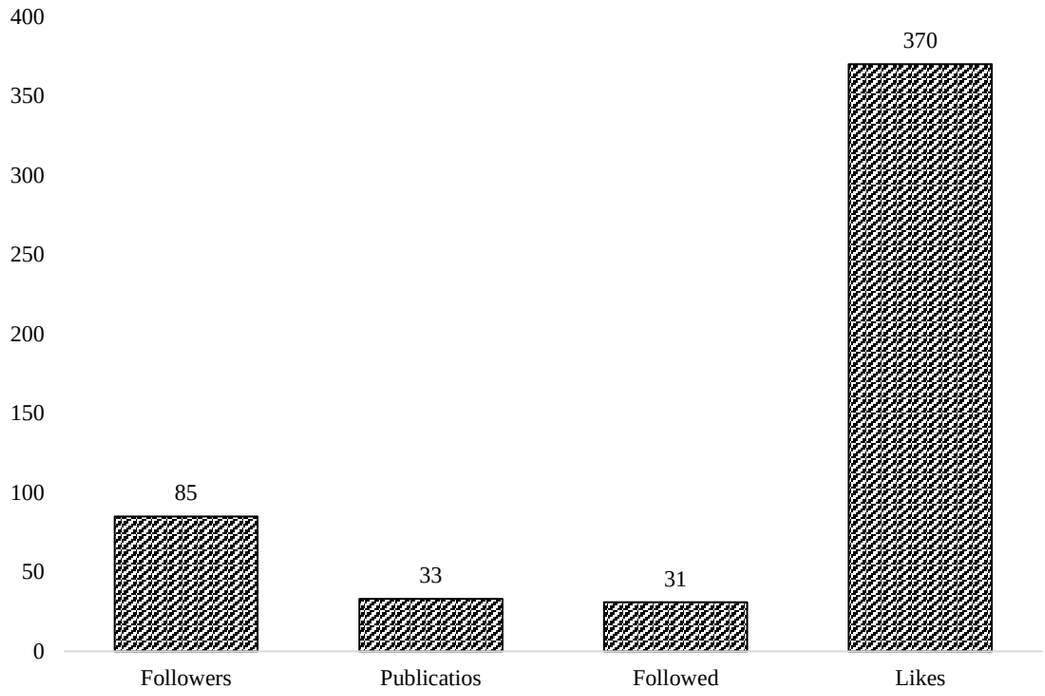
a) b)

The diversity of the audience provided an opportunity to address the topic from various perspectives and levels of understanding, thereby enriching the overall comprehension of cannabis gastronomy.

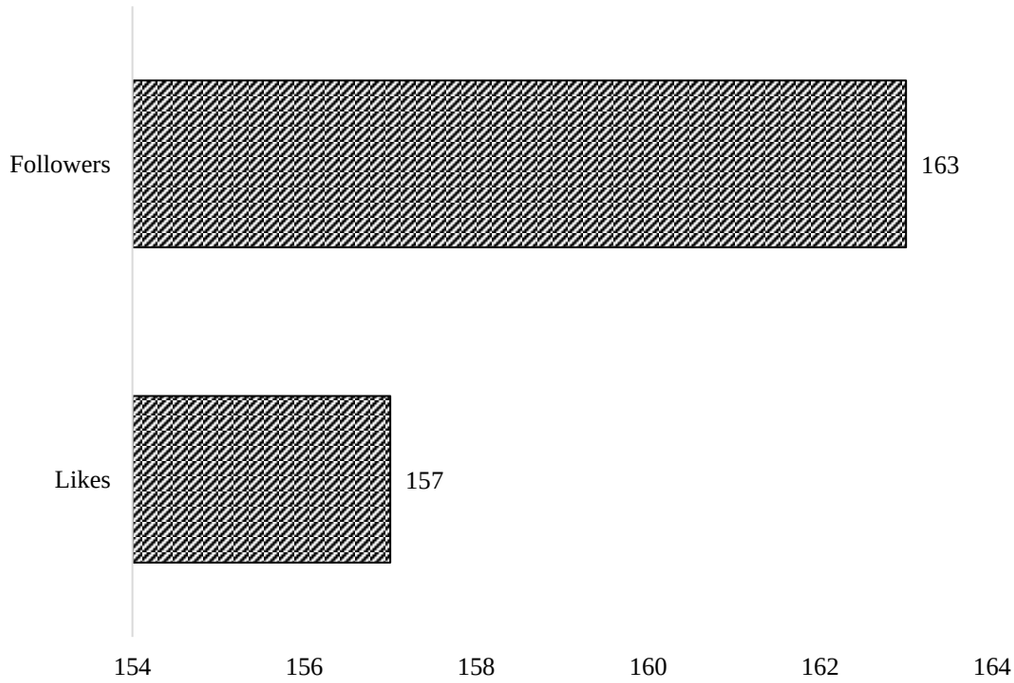
The talks were informative, educational, and sparked a positive and thoughtful interest among the students. Furthermore, initiatives of this nature not only expand knowledge but can also foster open and responsible dialogue on a topic that is gaining relevance in both culinary and medicinal contexts.

In conclusion, the research highlights the growing interest in cannabis cuisine within the culinary community but underscores the need for a deeper understanding of compound extraction and the effects of cannabis in gastronomy. This knowledge is crucial for the responsible and creative use of cannabis in the kitchen.

Graph 7 Results obtained from the dissemination on Instagram are as follows



Graph 8 Resulted of the post on Facebook



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We deeply appreciate both institutions for their commitment to academic excellence, their ongoing support, and the opportunity afforded to carry out this project. Their contributions have been essential to the growth and success of this research.

5. Conclusions

Knowledge and Perception of Cannabis Gastronomy:

There is a high overall level of knowledge about cannabis among respondents (94%), but there is a significant lack of understanding about cannabis gastronomy (68% are unfamiliar with its culinary fundamentals).

Most respondents (57%) admit to having no information about cannabis gastronomy, although a significant proportion (59%) claims to have knowledge about it.

The general perception of cannabis-infused foods is mostly positive (only 3% believe they are harmful), indicating a willingness to try them (67%) and visit restaurants that offer them (61%).

Profile of Respondents:

Many participants are culinary students (61%), with minimal representation from restaurant industry professionals (1.6%).

The surveyed group is predominantly composed of young individuals, with an age range between 18 and 25 years (71.68%), and a majority being female (58%).

Knowledge Level about Cannabis Components:

Although the majority have knowledge about cannabis, a substantial portion (58%) is unaware of the active compound THC, while a considerable number (78%) is unfamiliar with the effects of CBD.
THC effects are more widely known than those of CBD. Respondents identify effects such as alterations in the nervous system (30.79%) and increased appetite (27.41%) as the most common.

Habits and Cannabis Consumption:

A significant percentage of respondents have tried cannabis-infused foods (37%) and express a willingness to do so in the future (67%). Furthermore, the majority does not consider these foods harmful (73%).

Regarding general cannabis consumption, over half of the respondents have tried or consumed the substance in various forms (51%).

Promotion and Dissemination of Cannabis Gastronomy:

A social media promotion strategy was implemented to promote cannabis gastronomy. A modest but significant number of followers and likes were achieved on Instagram (85 followers, 370 likes) and Facebook (163 followers, 157 likes).

Virtual talks were conducted in the TESVB gastronomy program, reaching 75 students from different semesters. This allowed for sharing knowledge and experiences, enriching understanding of cannabis gastronomy from various perspectives.

Overall, there is a growing interest in cannabis gastronomy among culinary students, with a good overall knowledge of cannabis. However, significant gaps are identified in the understanding of the active components of cannabis and their effects. Social media promotion and educational talks have proven to be effective methods in fostering dialogue and understanding on this emerging topic in the culinary industry.

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