v. 3, n. 18, 2023

Scientific Journal of Applied Social and Clinical Science

RESCUE OF BLACK CORN AS AN ANCESTRAL ANDEAN PRODUCT APPLIED IN A MACERATE BASED ON A TRADITIONAL ECUADORIAN DRINK

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Abstract: The purpose of the research is to recover ancestral ingredients that have been passed down for years, transforming them into innovative products that are consumed by new generations. This research is based on the knowledge and use of purple corn, as is the case in the preparation of colada morada, being a traditional drink that has been consumed historically, especially on November 2 as an offering to souls.

The experimental phase for the use of corn occurs through the preparation of a macerate with vodka-based spices, which will present characteristic aromatic notes, similar to colada morada, thus giving a different approach to this traditional drink, which is why this liquor was tasted, determining visual, olfactory and taste analysis parameters.

Keywords: purple corn, tasting, Colada Morada, artisan macerated.

INTRODUCTION

Corn is considered an ancestral food since its origin dates back to between 8000 and 600 BC, it is believed that it was cultivated in Mesoamerica and later distributed to the rest of America. Researchers agree that its origin is in the American Continent, because if ancient texts including the Bible are reviewed, it is not mentioned; its appearance in Europe dates back to 1942, when Christopher Columbus saw the Island of Cuba for the first time. (McClintock & Kato, 1981).

Black corn is considered a variety that is grown mainly in the Andean zone of some South American countries. Its scientific name Zea mays L belongs to the amylaceous group. This variety dates back 2,500 years, even before the Inca conquest.

In the book Corn, Gift of the Gods, it is mentioned that the colada morada is considered an offering to souls; and a delicacy for the living. Consequently, for many years it has been considered a traditional dish, which has been adapted in each region of the country to its own customs and incorporating ingredients from each province into its preparation.

Purple corn is used to naturally color certain drinks and foods, currently it is used in the form of flour, which is used to make the traditional Colada Morada, a very popular dish on November 2. (Echeveria & Muñoz, 1988)

The use of black or purple corn is varied, the grain is turned into flour and used in the preparation of the traditional colada morada; extraction of pigments from gophers, grain or stem provide color to various beverages, sweets and candies, bakery products, jams, jellies, fruit juices, wines and macerates. (National Institute for Agricultural Research, INIAP, 2016).

Black corn taxonomy (Zea mays L.)

To understand and identify the specific context of black corn, it is necessary to start from the classification or taxonomy within what is botany, that is how the systematization is determined:

Kingdom: Plantae

Division: Magnoliophyta

Class: Liliopsida

Order: Poles

Family: Poaceae

The Poaceae family is one of the most diverse groups within the flora, important for its diversity worldwide, with 10,000 species; These grasses are relevant for their nutritional, medicinal and nutritional content. This natural group makes up the natural grasslands that make up the world, the same ones that are used in the practice of grazing or also as an agricultural activity, so many species are produced massively at an industrial level, such as cereals, corn, wheat, barley, etc.

The taxonomy of the flora has undergone many variants in the classification, such is

the example of the grasses, historically there are three moments that marked the grouping of these plants. Initially, there is the intuitive classification, which arises at the beginning of the 19th century and lasts until the end of the 20th century; the second moment was considered the classifications that are based on the phenetic method (or numerical taxonomy), beginning with the works of Watson & Dallwitz (1992) and finally those phylogenetic classifications that are the result of the application of the cladistic method where Kellogg & Campbell (1987) made the first contributions for the Poaceae family (R. Reinheimer, 2007).

As a complementary work to the first classifications of the Poaceae, we can cite the works of Brown in the year 1810, dividing this family into two large groups, the Paniceae and the Poaceae. This division was made on the basis of morphological characteristics of its seeds or spikes. Subsequently, the classification proposed by Brown of dividing grasses into two large groups was established as nomenclaturally valid by Bentham (1878) and confirmed by Bentham & Hooker (1883) and Hackel (1887) (R. Reinheimer, 2007).

In 2001, the Global Paleofire Working Group (GPWG) presented a classification for the Poaceae family based on the combination of 5 genes (rbcL, ndhF, phyB, rpoC2 and Waxy) and morphological data. The results presented by the GPWG are highly supported and constitute the most current phylogenetic classification of grasses.

In the phylogeny presented by the GPWG, the Poaceae family is divided into 12 subfamilies, 11 previously considered by other authors (Anomochlooideae, Pharoideae, Pue-lioideae, Bambusoideae, Ehrhartoideae, Pooideae, Aristi-doideae, Arundinoideae, Chloridoideae, Centothecoideae, Panicoideae), to which is added the new subfamily Dantho-nioideae. This phylogenetic hypothesis proposes that the lineages that first diverged were the Anomochlooideae, Pharoi-deae, and Puelioideae, respectively. The rest of the grasses form a monophyletic, within which numerous groups are recognized, among them: the Bambusoideae sensu stricto (s.s.) + Ehrhartoideae + Pooideae (The BEP Clade), which form a poorly resolved clade, while the Aristi-doideae + Danthonioideae + Arundinoideae s.s. + Chlori-doideae sensu lato (s.l.) and Centothecoideae + Panicoideae form a highly supported monophyletic clade (The PACCAD Clade) (R. Reinheimer, 2007).

DESCRIPTION OF BLACK CORN (ZEA MAYS L.)

Anatomically, the fruit is a caryopsis that is characterized by being inseminated with the external integument that develops fused to the internal wall of the ovary. The embryo is lateral, but unlike the rest of the monocot embryos, it is highly specialized since the stem and root meristems, the leaves and the vascular system are clearly differentiated at this stage of development. Grass pollen is distinguished by having a single pore. One of the newest and most interesting aspects of this family is the morphology of its flowers and with it the appearance of structures known as spikelets, typical of grasses consisting of an axis or rachilla that supports a series of alternately arranged bracts and floral whorls (R. Reinheimer, 2007).

The inflorescence of grasses is a differentiating structure among angiosperms and it turns out to be complex in its development, evolutionarily intriguing and agronomically important. Their structure controls pollination and seed production and dispersal, and is therefore crucial in the process of natural and human selection (Friedman & Harder, 2005; Malcomber et al., 2006).

It is characterized by species with tubular,

woody trunks, its development is shown vertically, internally it has a solid consistency; there are divisions known as nodes where the leaves are born, this characteristic allows the development and growth of the plant until its mature age and flowering.

Another of the external characteristics are its lateral prominences, sole leaves, the same ones that have an alternate disposition, their composition is given by a sheath, ligule and limb, these parts provide adequate protection to the stem and its lateral extremities such as its leaves and ears.

Purple corn is a plant whose ear is blackish in color, its anthocyanin content is found in the body of the fruit, that is, in the cob, also in the grain casing and to a lesser extent in the stem (Fucamachi et al., 2007; Carhuapoma, and López 2008).

According to Timothy et al. (1996), the species Zea mays L., is the only corn that has a bluish-black color in its entirety of the fruit, its size is medium, characteristic of the grain is round with black or red pericarp, grouped in rows of 10 - 20 irregularly, in a spiral shape like a cluster of black grapes. The characteristic of the plant is the reddish and purple coloration, various arch-shaped and rigid ramifications, the central spike is dense, the spikelets have no representative grouping. The fruit of black corn has larger grains than other species of the same family, they are round and slightly pointed.

METHODOLOGY

The methodology applied for the present investigation was based on a descriptive application, for which data from secondary sources were taken, providing the historical and cultural survey of the species Zea mays L. In addition, an experimental methodology was applied, based on the artisanal maceration of alcoholic beverages in a traditional way, which will help us to obtain a product from purple corn, once the final product is obtained, the liquor is tasted with parameters established in three phases: visual, olfactory and taste. tive.

ORIGIN OF THE PURPLE WASH

The traditional sacred drink known as "Yana Api" in Kichwa, which is currently taken on November 2; It is a preparation made with purple cornmeal and brown bread, cinnamon, cloves, lemon verbena, lemon verbena, naranjilla juice, blackberry, orange leaves and myrtle are added. This drink in many communities is drunk as a rite that represents the meeting with the ancestors and they do it next to the graves of deceased relatives.

The indigenous worldview of the relationship between life, death and rebirth, gave rise to the tradition of the Day of the Dead. This festivity could have been started about a thousand years ago by the Quitu-Cara culture, in the vicinity and slopes of the Pichincha volcano. (Samaniego, 2019)

In this indigenous worldview, a new cycle begins with the sowing that signals a rebirth, and ends with the harvest that marks death. To celebrate their life and death, and a new beginning, these rituals were carried out by bringing Andean-scented fruits to the tombs and drinking llama blood, a sacred animal for those communities. (Samaniego, 2019)

These rituals were altered with the arrival of the Spanish who considered them profane and unhygienic.

The colada morada as it is currently known is a combination of religious cults brought from Europe with the conquest and prohibited indigenous rituals.

The drink incorporates elements of past rituals: fruits and aromas and the red color given by purple corn that represented llama blood. (Samaniego, 2019)

Over time, species typical of sectors of the country have been incorporated, such as in the north a species of myrtle different from

the one cultivated in the south, as well as the use of mortiño in certain sectors that has left aside the ancestral purple corn. (Samaniego, 2019)

ELABORATION OF CORN LIQUOR

The process to obtain the purple corn liquor will be through maceration, giving it an even more traditional connotation, adding sweet spices, which are used in the preparation of a traditional drink called "colada morada", a drink that is consumed in November for the day of the dead in Ecuador and which is made from purple corn flour.

Based on the concept of maceration that, according to the RAE, mentions that: "it is an extraction process between materials of different solid-liquid physical states, in which the chemical compounds of interest are found in the solid material, since they have solubility; a liquid is used that allows its extraction", this process in turn can be elaborated in two ways: cold macerate and hot macerate.

For the maceration of purple corn, it is done cold, this process consists of introducing the ingredient(s) to be macerated directly into the liquid for a period of time so that they release their aromas and flavors and become part of the liquid. This type of processing helps us so that the flavors, colors and aromas merge without being altered, the disadvantage is the maceration time that is needed for all these characteristics to be released in the liquor (Romero, 2013).

The purple corn macerate is made with the following ingredients as shown in the following table:

Ingredients	Temperature
Vodka	650 ml
Purple corn	200 g
Cinnamon	3 g
Ishpingo	4 g
Clove	1 g
Sweet pepper	1 g
Star anise	1 g
Brown sugar	15 g

Table 1. Mash Ingredients List

The spirit drink that is used for this process is vodka since it has a neutral flavor and will facilitate the perception of flavors and aromas of the ingredients to be placed; the characteristic color that the liquor will obtain is given by the pigments that the black corn possesses, the species together with the corn contributes the strong and powerful flavor of the drink; sugar helps speed up the fermentation process.

This maceration is carried out in a cool, dark place for 20 days, so that it does not alter the flavor and color, both noise and light accelerate the putrefaction process, every 3 days it is shaken so that it does not settle and does not begin to rot.

After this time, the liquor for tasting is prepared with the following ingredients to balance the flavors:

Ingredients	Temperature
Mashed	550 ml
Syrup	250 ml
Vodka	100 ml

Table 2. List of liquor ingredients

During the tasting carried out, three visual, aromatic and taste parameters are measured. The results obtained in the tasting process are the following:

LOOK	Nothing 0	Weak 1	Moderate 2	Potent 3
Color Depth	0	0	2	10
Tonality	0	0	5	7
Limpidity	2	0	3	7
SMELL	**Nothing 0**	**Weak 1**	**Moderate 2**	**Potent 3**
Intensity	1	2	6	3
Spices	2	1	8	1
Fruit	1	4	5	2
Vegetables and herbs	3	3	5	1
Alcoholic	5	4	3	0
Wooden	3	5	3	1
Roasted	6	4	1	1
Chemicals	8	2	2	0
SAVOR	**Nothing 0**	**Weak 1**	**Moderate 2**	**Potent 3**
Intensity	0	1	3	8
Salty	7	4	1	0
Sour	5	3	3	1
Acid	3	7	1	1
Sweet	1	0	7	4

SAVORS					
INGREDIENTS	**YES**	**NO**	**INGREDIENTS**	**YES**	**NO**
S.1. Orange	1	11	S.14. Good grass	4	8
S.2. Lemon	3	9	S.15. Mint	3	9
S.3. Tangerine	0	12	S.16. Valerian	2	10
S.4. Passion Fruit	0	12	S.17. Purple corn	4	8
S.5. Black berry	8	4	S.18. Corn	2	10
S.6. Blue Berry	1	11	S.19. Kidron	2	10
S.7. Cinnamon	8	4	S.20. Ginger	0	12
S.8. Black Pepper	3	9	S.21. Honey	1	11
S.9. Clove	9	3	S.22. Cane	3	9
S.10. Ishpingo	4	8	S.23. Vodka	2	10
S.11. Sweet pepper	8	4	S.24. Ron	1	11
S.12. Red pepper	1	11	S.25. Tequila	2	10
S.13.Worm wood	0	12	S.26. Whisky	0	12

Table 3. Tasting results

CONCLUSIONS

Black corn historically played an important role in the agricultural, livestock and nutritional contribution of humanity, however with technological evolution it has issued the production and conservation of this important ingredient in daily food mainly in the Andean zone; in such a way that there was also a discontinuity in the research and survey of information with qualitative and quantitative data that contributes to the construction of new projects within academia and industry.

Within the worldview of the Andean culture, black corn also provides benefits such as being a fundamental ingredient for the production of beverages, food and dyeing of natural textiles, in such a way that the rescue of the tangible and intangible heritage of the different communities and corners of the Ecuadorian highlands is encouraged.

Regarding the tasting carried out in the facilities of the "Yavirac" Institute made to the teachers of the same, it is concluded according to the established parameters that the purple corn liquor in the visual phase presents a depth in color: powerful, tonality: powerful and limpidity: powerful.

In the olfactory phase it presents that the intensity of the aroma: moderate, aromatic notes related to spices: moderate, fruit: moderate, vegetables and herbs: moderate, alcoholic aroma: nothing, macerated: weak, roasted: nothing, and chemicals: nothing.

The third and last phase referring to taste shows the following characteristics: intensity: powerful, salty taste: nothing, bitter: nothing, acid: weak, and sweet: moderate.

Among the ingredients that were most felt from the list given were: cloves, sweet pepper, cinnamon and blackberry, however, the latter was not present in the recipe, but the sensation of its presence is due to notes of ferment and the fruit-like color due to purple corn.

THANKS

To the Higher Technological Institute of Tourism and Heritage Yavirac, who has provided support for the development of this research.

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