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Cacau (*Theobroma cacao*): functional food with potential for the quality of older life

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Abstract. Cocoa fruit (*Theobroma cacao*) is originary from American. It's very little studied for its neuro-behavioral biological actions when regarding its origin, history, cultive and biological actions. Our group began to develop the study of this fruit with a view to its assisted cultive, for its use as a functional food with neuro-behavioral effect acting on neurotransmitters modulation, possibly also phyto-adaptogenic and immunomodulatory action. Our interest of scientific investigation of its complementary use as a functional food aims elderly people, among them indigenous peoples in urban situations with grief due to sequelae of Covid19 or major depression, is promising, meanwhile they have proper medical specialized follow-up. The study aims to increase the recovery of their emotional comfort and life quality through nutritional means, also through the recovery of affective memories of the use of cocoa for indigenous elders, as a psychosocial care strategy.

Keywords: *Theobroma cacao*. Functional Food. Elderly People. Originary People. Life Quality.

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Cacau (*Theobroma cacao*): alimento funcional em potencial à qualidade de vida de anciões

Resumo. O cacau (*Theobroma cacao*) é um fruto originário da América. É muito pouco estudado por suas ações biológicas neurocomportamentais no que diz respeito às publicações sobre sua origem, história, cultivo e ações biológicas. Nosso grupo começou a desenvolver o estudo desta fruta visando seu cultivo assistido, para sua utilização como alimento funcional com efeito neurocomportamental atuando em modulação de neurotransmissores, possivelmente também ação fito-adaptogênica e imunomoduladora. Nosso interesse de investigação científica de seu uso complementar como alimento

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funcional direcionado aos idosos é promissor, dentre eles, os povos indígenas em situações urbanas em luto, por sequelas de Covid19 ou depressão maior, desde que tenham acompanhamento médico especializado adequado. O estudo visa aumentar através da via nutricional a recuperação do seu conforto emocional e qualidade de vida também através de resgate de memórias afetivas do uso do cacau para os anciões indígenas, como estratégia de atenção psicossocial.

Palavras-chave: *Theobroma cacao*. Alimentos Funcionais. Anciões. Povos Originários. Qualidade de Vida.

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Resumen. El cacao (Theobroma cacao) es un fruto originario de América. É muito pouco estudado por sus ações biológicas neurocomportamentais no que diz respeito às publicações sobre su ações, historia, cultivo e ações biológicas. Nosso grupo começou a desenvolver o estudo de esta fruta visando su cultivo asistido, para su utilização como alimento funcional con efecto neurocomportamental atuando em modulação de neurotransmissores, posiblemente también ação fito-adaptogênica e imunomoduladora. Nosso interesse de investigação científica de su uso complementario como alimento funcional dirigido aos idosos é promissor, entre ellos, os povos indígenas em situações urbanas em luto, por secuelas de Covid19 ou depressão mayor, desde que tenham acompanhamento médico especializado adecuado. El estudio aumenta a través de la vía nutricional, la recuperación de su confort emocional y la calidad de vida también a través de la recuperación de recuerdos afetivos del uso del cacao para los antiguos indígenas, como estrategia de atención psicosocial.

Palavras-chave: *Theobroma cacao*. Alimentos Funcionais. Anciões. Povos Originários. Qualidade de Vida.

BACKGROUND

Among centuries-old trees present on the campus of the Institute of Psychiatry of the University of Brazil/UFRJ, the cacao tree has already been found, whose fruit is known in the country as cocoa (*Theobroma cacao* Lineu). March 26th is Cocoa Day. It was first cited in botanical literature in the early 17th century as *Cacao fructus* by Charles de L'ecluse. In 1737, the binomial Theobroma cacao L was introduced. The word Theobroma means "food of the gods" and is inspired by the Mesoamerican belief in the divine origin of the cocoa tree (BLAKEMORE, 2018).

Archaeological evidence indicates that the first use of criollo cocoa occurred in mesoamerica, around 3,900 years ago. archaeologists discovered the first example of the use of cocoa in the Americas, in pieces of rock and ceramics from mayo-chinchipe culture sites in Ecuador, which are around 5,300 years old—1,700 years before evidence of mesoamerica. and as the people of the mayo-chinchipe culture had contact with groups from the pacific coast, it is likely that they traded cocoa with individuals who took it north, to mesoamerica (BLAKEMORE, 2018).

The term cocoa derives from the word cacahualt (Nahuatl language) spoken by the Mayan civilization. The Mayan and Aztec people cooked cocoa and ground it with corn and pepper, flavoring the preparation with vanilla and cinnamon. They called the drink xocatl, which had to be ingested ritualistically, the cocoa beans circulated as currency (RIBEIRO, 2019).

Evidence currently presented shows that Kuna Indians, from the coast of Panama, were protected against elevated blood pressure by ingesting large quantities of cocoa, even consumed with salt. Mortality from cardiovascular events compared to Pan-American individuals is nine versus 83 per 100,000 individuals. Emigrants to urban areas lost this protection (RIBEIRO, 2019).

Regarding the use of cocoa as currency, Peter Martyr of Algeria wrote in 1530: “Blessed money, which provides a sweet drink and is beneficial to humanity, protecting its possessors against the infernal plague of greed, for it cannot be accumulated for long nor hidden underground” (RIBEIRO, 2019).

AIMS

Describe the historical process of research into cocoa as a functional food aimed at producing comfort and psychological well-being for elders of indigenous peoples in urban situations in Rio de Janeiro/Brazil.

METHODOLOGY

It was performed a bibliographic review study about publications whose correlate elderly originary people, *Theobroma cacao*, affective memories, quality of life, comfort and psychosocial attention through Virtual Brazilian Health Library (BVS) Platform.

RESULTS

The cocoa tree is a tree native to Brazil and Central America, found scattered throughout tropical forests. Europeans' first contact with cocoa dates back to 1502, when Columbus, on his fourth trip to America, on the north coast of present-day Honduras, found a large native boat transporting, among other goods, a type of almonds ("money almonds"). used by indigenous people as currency (“currency of happiness”) and with which they prepared a delicious drink (NATIONAL ARCHIVE, 2021).

The exploration of cocoa in the Brazilian Amazon began in the 17th century, harvested by Indians who went down the Amazon River, collected the fruits in the forest and sent them to the metropolis. The General Company of Grão-Pará and Maranhão held a monopoly on trade and cocoa represented around

80% of its total exports, being the company's main product until its extinction in 1777. Until the 19th century, all cocoa production was obtained from the American continent (NATIONAL ARCHIVE, 2021).

In South America, Venezuela was one of the first countries to introduce cocoa cultivation. The oldest reference to cocoa cultivation in Bahia dates back to 1655, when the viceroy D. Vasco de Mascarenhas confessed, in a letter sent to the captain-general of Grão Pará, that he was "affected by chocolate" and considered it useful for Brazil the intensification of its planting, mainly in Bahia, due to the climate similar to the Amazon. In 1746, Antonio Dias Ribeiro, from Bahia, received some seeds from the Amelonado Forastero group, from a French colonizer called Luiz Frederico Warneau, from Pará. Thus, he introduced cultivation in Bahia. The first planting was done on the Cubículo farm, on the banks of the Pardo river, in the current Municipality of Canavieiras. In 1752, plantations were made in the Municipality of Ilhéus (RIBEIRO, 2019).

From the 1770s onwards, the Portuguese crown began to encourage the planting of new export crops to reduce dependence on the sugar trade. The planting of alternative crops such as coffee, cocoa and cotton began. The beginning of commercial cultivation in the municipality of Ilheense was in 1820. The pioneers were mainly Swiss and Germans with capital. From 1835 onwards, cocoa took a regular part in the province's annual exports. Its value was small in relation to total provincial exports, but cocoa was one of the rare agricultural products to grow in importance in Bahia's income in the 19th century. In 1860, the first exports of the product to the North American market took place (RIBEIRO, 2019).

The modernization of the city of Ilhéus actually began in the 20th century. In practice, an urbanism that aimed to consolidate the idea that the "Princess of the South" represented the ethos of the cocoa region par excellence. Planting and processing techniques in a geographical area with its own characteristics resulted in the production of cocoa traditionally classified as Superior Bahia or Type I. At the beginning of the second half of the 19th century, the Pará and Maranhão species belonging to the Forastero group were introduced into southern Bahia. This variety gave a great boost to cocoa farming due to its lower demands on ecological conditions, which made it possible to plant the fruit in areas considered to be less suitable for its development (RIBEIRO, 2019).

The traditional planting of cocoa in southern Bahia followed the cabruca system, characterized by planting cocoa under the shade of trees in the Atlantic Forest and has been used in the cocoa growing region of southern Bahia for more than two hundred years. It is responsible for the conservation of biodiversity, soil and water and the production of forestry and seeds, oils, resins, flowers and other non-timber products (RIBEIRO, 2019).

Currently, the creation of the Geographical Indication of Cocoa South of Bahia seeks to protect and revalue Superior Bahia cocoa, conserve the biodiversity of the Atlantic Forest associated with cocoa

planting and protect the heritage collection related to cocoa cultivation in addition to the sustainable development of agriculture and tourism through certification and territorial marketing processes (RIBEIRO, 2019) but its historic cultive has also asked for protection by the National Historical and Artistic Heritage Institute – IPHAN (VARRICCHIO & LAGE, 2020).

The use of cocoa for sustainable development by the indigenous people themselves has been encouraged by FUNAI, especially in Roraima. Initially, in Brazil, cocoa consumption was restricted to indigenous peoples from the Amazon region. One of the reports is that they used the fruits crushed, sifted and mixed with water, served as an accompaniment to other foods. Chocolate consumption also began on a restricted basis in Brazil, without the same popularity it had achieved in Europe. Imported chocolate was drunk mixed with cattle milk, sugar and egg yolk (UNICAMP, 2020).

Bahia remains prominent for its cultivation areas, but was recently surpassed by Pará in production volume. A strong impact on Bahian cocoa farming was the spread of the witches' broom disease from 1989 onwards. In 2019, according to the International Cocoa Organization, Brazil was the seventh largest cocoa producer in the world. African countries are ahead, where cultivation was introduced by European imperialism (UNICAMP, 2020).

The use of chocolate in religious ceremonies among the Mayans and Aztecs finds a parallel in the fame it acquired as an aphrodisiac product among Europeans, and as a symbol of abundance among Hindus. Ancient legends and traditions of fertility rituals existing since the emergence of human societies justify the stance of Christian religions in the 18th and 19th centuries, trying to restrict the consumption of chocolate because they believed it aroused feelings of offense to Christian morality (BR/MEC, 2022).

What are the known functional neurologic actions of cocoa components?

DISCUSSION

According to the table published by IBGE's Endef, a 100 g chocolate bar has the following composition: Proteins 4.4 g, Lipids 35.1 g, Sugar 57.9 g, Vitamin B: 0.46 mg. This amount of nutrients is capable of generating 528 Kcal for cells. Chocolate is an extremely energetic food (with a high fat and sugar content), although it is not capable of providing the human body with all its daily nutrient needs (vitamins, proteins and minerals). Industrialized chocolate with added refined sugar increases the effect of saturated fat consumption. This increase in cholesterol in the blood circulation may lead to cardiovascular diseases, such as Systemic Arterial Hypertension and Coronary Insufficiency (BR/MEC, 2022).

According to the Health Surveillance Agency (BR/MS/ANVISA, 2004), functional foods are foods or ingredients that produce beneficial effects on health, in addition to their basic nutritional

functions. Based on this definition, natural cocoa has been investigated for diverse health uses as a functional food, especially in the area of modulating neurotransmitters, including serotonin.

As previously recorded (VARRICCHIO & LAGE, 2020), faced with the successive deaths of indigenous people and their leaders, urban indigenous elders present in Rio de Janeiro developed great psychological suffering, feeling devastated, which culminated in outbreaks of empirically observed diseases, such as such as ophthalmological, cardiovascular, tobacco and alcohol addiction, self-harm diseases and, especially, depression. At that moment, at the beginning of the pandemic, they spontaneously used Urucum (*Bixa orellana* L.) tincture. As there are many compounds with antioxidant activity and it belongs to their habits, they also used it orally by diluting the seeds in water, with an improvement in mood being empirically observed, reported by their family members. However, Urucum production is seasonal. It was necessary to look for an alternative to another natural resource that was produced throughout the year and was still resistant to cultivation.

Years later, we have seen the emergence of many patients surviving the pandemic, presenting Covid19 sequelae, especially neuro-behavioral ones (YAMAMOTO et al., 2020). While consistent scientific investigations have been carried out in this area, a literature review was carried out on the nutritional aspect regarding the role of functional foods in the well-being of these elderly people and to provide emotional comfort through the preservation of their cultural habits (VARRICCHIO & LAGE, 2020; VARRICCHIO, PYRRHO, LAGE, 2021; VARRICCHIO, 2022). We thought about using cocoa. What has literature shown us?

Based on VETTORI et al. (2022), data indicate that, by 2060, about 16 million people per year will die of malignant neoplasias, representing a 109% increase compared to 2016. This will involve an increase in the number of patients, specially older adults, and their relatives who will need paliative care for an appropriate management of the physical, psychosocial and spiritual effects of cancer in order to reduce the suffering and to improve the quality of life (QL).

On this scenario, there is growing concern about the impact of nutrition on cancer patients receiving palliative care. Nutrition should preserve the nutritional status, prevent malnutrition and provide physical, emotional and psychological comfort by rescuing pleasure and convivial memories. Nutritional assistance during palliative care focuses on the most comfortable manner of doing this, respecting food preferences, beliefs and memories (VETTORI et al., 2022).

Some foods have been associated with benefits for general well-being, pleasure and emotional comfort. The characteristic flavor, carbohydrate and fat content and highly palatable orosensory qualities of chocolate contribute to its definition as comfort food. Chocolate with a greater cocoa content has beneficial effects, acting against oxidative stress and systemic inflammation, which are risk factors for

the progression of cancer. In addition, chocolate can be considered an oral supplementation by being a source of energy and nutrientes, contributing to nutritional requirements (VETTORI et al., 2022).

Few studies are available about the impact of nutritional intervention on the Quality of Life (QL) of patients in palliative care, especially regarding supplements enriched with specific nutrients, with no studies on accessible consumed foods such as chocolate. In view of this scenario, the main objective of the present study was to assess the effects of chocolate consumption on the nutritional status of older cancer patients in palliative care. Food consumption, anthropometry, body composition, oxidative stress, inflammatory activity, and QL were also evaluated. The group concluded that consumption of chocolate with a greater cocoa content may contribute to the improvement of the nutritional status and functionality among older cancer patients in palliative care. While the consumption of white chocolate was associated with improved oxidative stress (VETTORI et al., 2022).

Cocoa and products derived from the fruit have effects on the release of endorphins and amphetamines in nerve cells that have been explored (UNICAMP, 2020), a mechanism of interest for the number of indigenous people in urban situations with reports of depression, especially those elderly people worn out by so many social demands in urban society whose repercussions are at the level of psychoneuroendocrinoimmunology, based on the above, the object of study is the professional experience with leaders of original peoples and traditional ethnic communities who justified the interest in ethnopharmacology, ethnobotany and functional foods (VARRICCHIO, PYRRHO, LAGE, 2021; VARRICCHIO, 2022; BELLIZZI et al., 2022; 2023).

Therefore, scientific investigation of the complementary use of cocoa (*Theobroma cacao*) as a functional food for elderly people of indigenous peoples with great pain and grief in urban situations at risk of food shortages, vulnerable, and in need of palliative care, whether due to terminal illnesses or sequelae of Covid19 or major depression is promising, meanwhile they have proper medical specialized follow-up, as it aims to increase the recovery of their emotional comfort, as a psychosocial care strategy.

CONCLUSION

With this information regarding its origin, history and cultivation, we can see that cocoa (*Theobroma cacao*) is still very little studied for its neuro-behavioral biological actions. We began to develop the study of this fruit with a view to its assisted cultivation, guided by professionals in the field, for its use as a functional food, with neuro-behavioral, phyto-adaptogenic and immunomodulatory action. Once completed, it will be notified.

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