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Pomegranate (*Punica granatum*): affective memories and comfort

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Abstract. There are very interesting and helpful the biological and pharmacological activities of fruits of ancient trees which co-evoluted with planet to welfare for living beings and environment, as *Punica granatum* (Pomegranate). Pomegranate total aqueous extract is really effective besides a smooth action, as preliminarily observed at recovering of eroded soil. In parallel, at a period time of increasing of incidence of malignancies, types of anemia and cardiovascular diseases, its juice and its oilment shall be investigated aiming to be used as a complementary intervention during conventional specific treatment. Our professional experience with its use as functional food empirically suggested its metabolic regulation associated with immunemodulatory action. But, mainly, to ethnical elder people (Romani, Hebrew, Pakistanese, Japanese) evoked affective memories, something very hopefull in this period time of special attention to signals of collective major and minor depression previously existent besides medical news about decreased cognitive function post-Covid19, around the world. So our meaningfull qualitative strategy of psychosocial attention care seemed to be positive and, perhaps, stimulated neurotransmitters modulation way, as one probable mechanism of action. Analysis of this natural product effect and professional experience will be discussed, *a posteriori*, through the suitable method of evaluation.

Keywords: *Punica granatum* L.. functional food. elderly ethnic people. affective memories. quality of life.

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Pomegranate (*Punica granatum*): affective memories and comfort

Resumo. Muito interessantes e úteis para o bem-estar dos seres vivos e do meio ambiente são as atividades biológicas e farmacológicas de frutos de árvores antigas que co-evoluíram com o planeta, como *Punica granatum* (Romã). O extrato aquoso total de romã é realmente eficaz além de exercer ação suave, como preliminarmente observado na recuperação de solo erodido. Paralelamente, em um período de aumento da incidência de doenças malignas, de tipos de anemia e de doenças cardiovasculares, seu suco e pomada deverão ser investigados visando ser utilizados como intervenção complementar ao tratamentos convencionais específicos. Nossa experiência profissional com seu uso como alimento funcional empiricamente sugeriu sua regulação metabólica associada à ação imunomoduladora. Mas, principalmente, aos idosos étnicos (ciganos, hebreus, paquistaneses, japoneses) evocou memórias afetivas, algo de muito esperança neste período de atenção especial aos sinais de depressão coletiva maior e menor previamente existentes, associados à notícia sobre a diminuição da função cognitiva pós-Covid19, ao redor do mundo. Portanto, nossa significativa estratégia qualitativa de atenção psicossocial pareceu positiva e, talvez, tenha estimulado a modulação dos neurotransmissores, enquanto um provável mecanismo de ação. A análise do efeito deste produto natural e a experiência profissional serão discutidas, *a posteriori*, através do adequado método de avaliação.

Palavras-chave: *Punica granatum* L.. alimentação funcional. idosos étnicos. memórias afetivas. qualidade de vida.

Granada (*Punica granatum*): recuerdos afectivos y consuelo

Resumen. Muy interesantes y útiles para el bienestar de los seres vivos y el medio ambiente son las actividades biológicas y farmacológicas de frutos de árboles milenarios que coevolucionaron con el planeta, como la *Punica granatum* (Granada). El extracto acuoso total de granada es realmente eficaz además de tener una acción suave, como se observó preliminarmente en la recuperación de suelos erosionados. Al mismo tiempo, en un período de creciente incidencia de enfermedades malignas, tipos de anemia y enfermedades cardiovasculares, su jugo y ungüento deben ser investigados con miras a ser utilizados como intervención complementaria a tratamientos convencionales específicos. Nuestra experiencia profesional con su uso como alimento funcional sugirió empíricamente su regulación metabólica asociada a una acción inmunomoduladora. Pero, sobre todo, entre las personas mayores de etnia (gitanos, hebreos, paquistaníes, japoneses) evocó recuerdos afectivos, algo de gran esperanza en este período de especial atención a los signos previamente existentes de depresión colectiva mayor y menor, asociados a las noticias sobre el Disminución de la función cognitiva post -Covid19, en todo el mundo. Por lo tanto, nuestra importante estrategia de atención psicosocial cualitativa pareció positiva y tal vez estimuló la modulación de los neurotransmisores como un probable mecanismo de acción. Posteriormente se comentará el análisis del efecto de este producto natural y la experiencia profesional, utilizando el método de evaluación adecuado.

Palabras clave: *Punica granatum* L.. nutrición funcional. ancianos étnicos. recuerdos afectivos. calidad de vida.

BACKGROUND

Faced with chronic degenerative diseases prevalent around the world, and also in the face of climate uncertainties whose repercussions affect harvests, we ask ourselves which foods are ancient on the planet, adaptable to different types of soil for cultivation and that offer better yields as functional foods, but also immunomodulators, perhaps adaptogenic (PANOSSIAN et al., 1999; BR/MS/ANVISA, 2004).

Used as functional foods, our research group encourages nutritional guidance for patients of ethnic origin to use beans, especially Cowpea beans (*Vigna unguiculata* L.); coconut (*Cocus nucifera* L.), babaçu (*Attalea speciosa* Mart. ex Sprengel), açaí (*Euterpe oleraceae* L.), among others (BELLIZZI et al., 2022).

Responding to all aspects questioned, the fruits of the pomegranate tree stand out. In truth, it is an infructescence. The pomegranate (*Punica granatum* L.) has a beautiful historical relationship with the planet. Originally from the Middle East, it became cosmopolitan (MELANDER FILHO, 2009).

The fruit consumed naturally is popular. It can also be used sprinkled on salads, sauces or desserts, always avoiding excessive heat as this can deactivate its active compounds. A simple recipe for pomegranate juice can be made by mixing a tea made up of water, honey, cinnamon and cloves, boiled and then placed in the refrigerator. After the mixture has cooled, the juice removed from the "lumps" must be mixed with this tea (MELANDER FILHO, 2009).

The name *punica* comes from the Phoenicians, who lived in the area that is present-day Lebanon and cultivated this plant species, spreading it throughout the Mediterranean in ancient times. The adjective *granatum* refers to the many 'grains' that the fruit of this plant presents. It is from this Latin name for the species that the word 'granada' came from, still present today in the name of the fruit in several languages besides Spanish: grenadier (French), pomegranate (English); melangrana | melograno (Italian); Granatapfel (German). In the composition of the last three words there is in common, in addition, the presence of another fruit, the apple, from which the pomegranate would be, in these languages, a kind of apple with many seeds. Regarding the meaning of the names of different countries across the continents, Marculino (2018) mentions that "The place of pomegranates" is the location known today as Granada, a Spanish city that was the last bastion of the Moors in the country (MELANDER FILHO, 2009).

The species *Punica granatum* is part of the National List of Medicinal Plants of Interest to brazilian Sistema Único de Saúde - SUS (RENISUS, 2017). What do we know about the pomegranate?

AIMS

Describe pharmacobotanical aspects of pomegranate that may suggest its use as a functional food.

METHODOLOGY

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

RESULTS

In the intercultural garden of the Homeopathy Service of the 7th ward of the Santa Casa da Misericórdia General Hospital in Rio de Janeiro the pomegranate tree was planted (HOMEOPATHY SERVICE, 2020; 2021).

The parts of infrutescence used are the seeds, fruit skin and trunk, root bark. In ethnobotany, its indications are varied: canker sores, tonsillitis, angina, sores in the mouth, intestinal colic, diarrhea, diphtheria, amoebic dysentery, dyspepsia, gastrointestinal diseases, diseases of the genitourinary system, sore throat, spasm, disinfectant, fever, strengthens gums and throat, anti-flatulent, relief of hemorrhoids, inflammation, eye wash, vaginal wash, leucorrhoea, uterus hemorrhage, uterus prolapse, tapeworm (taeniasis), verminosis, mouth ulcers (MCCARRELL et al. , 2008).

Once its biological action has been investigated. It presents medicinal properties as astringent, antidiarrheal, antidysenteric, anti-inflammatory, antiseptic, antipyretic, antiviral, diuretic, eupeptic, mineralizing, tonic, vermifuge (MCCARRELL et al., 2008).

Tea made from pomegranate leaves is used against eye irritation; Fruit peel tea, as it is antimicrobial, helps in the treatment of throat infections in the form of a gargle, and if ingested, it is used to combat worms and has antimicrobial activity against *Staphylococcus aureus, Clostridium perfringens* and the *Herpes simplex II virus* (genital herpes). Tea made from pomegranate root bark is used in cases of diarrhea and chronic dysentery as it contains alkaloids that serve as astringents, which are also responsible for the vermifuge effects (MCCARRELL et al., 2008).

Pharmacobotanical Aspects of Pomegranate:

a) scientific name: *Punica granatum* L.;

b) family: Punicaceae;

c) popular names: Granada pomegranate, zakuro (Japanese);
d) chemical constituents: alkaloids (perethierine, isoperetierine, methyl-isoperethierine pseudo-perethierin), tannins, Vitamin B1 (thiamine), Vitamin B2 (riboflavin), salts minerals (phosphorus, potassium, sodium, calcium, iron).

Chemical constituents of used parts:

Fruit skin: tannins, resin, sugars, pigments (anthocyanins).

Flowers: tannins, pigments (anthocyanins).

Seeds: organic acids (citric, malic and tartaric), vitamin C, water, sugars.

As for how to use it, it could be infusion, syrup, decoction: However, care is needed. Contraindications are justified due to the presence of alkaloids that are so toxic that they can cause nausea, vomiting and even death. However, toxicity in extracts is reduced as a complex is formed between alkaloids and tannins. In some countries, its use is even prohibited. There are records of poisoning followed by death after ingesting 150 g of root bark powder.

DISCUSSION

Pomegranate (*Punica granatum* L.) has several scientifically proven therapeutic properties, with new and promising biological activities being investigated. One of its most widespread activities, as it is rich in antioxidants, is the fact that it stimulates increased blood circulation in the male genitals, facilitating erection (OLIVEIRA et al., 2010).

Studies in plant chemistry have shown that pomegranate is rich in gallic and ellagic acids, substances that can help reduce blood pressure and prevent some cardiovascular problems, as it reduces LDL cholesterol levels, responsible for the formation of plaque, hardening and obstruction of blood vessels (OLIVEIRA et al., 2010).

Among the constituents of pomegranate are manganese, vitamin B2 and vitamin C, fundamental elements necessary for the human body to perform various functions and whose shortage can cause various illnesses (MCCARRELL et al., 2008).

Benefits of pomegranate against Cancer are officially described (AFAQ et al., 2005). Consuming pomegranate juice can help fight prostate cancer by reducing the number of cancer cells and their metastasis, causing cell death and the adhesion of malignant cells to each other. After surgery and tumor removal, the juice causes PSA, a marker protein for tumor activity in prostate cancer, to have its serum levels reduced (OLIVEIRA et al., 2010).

For other types of tumors, gallic, ellagic and protocatechinic acids prevent the action of molecules that damage cellular structure and trigger cancer; anthocyanins also have proven anti-cancer

activity. Thus, pomegranate extracts help to reduce the rate of cell division of malignant cells (LANSKY & NEWMANN, 2007).

It is believed that the large number of active substances is due to the fact that in its native habitat the pomegranate tree had to develop ways to withstand the arid climate and also sudden changes in temperature. The antioxidants produced served to minimize the damage caused by extreme heat during the day and cold at night, in addition to the amount of fat in its seeds, which facilitate their germination in unreceptive soils (PINTO, 2019; VARRICCHIO & CASTELO BRANCO, 2019).

Issues related to ethnoknowledge, ethnovaluation and ethnodevelopment have been reflected and implemented. One of them is teaching crops and the basics of research to our students (also those from ethnic groups), through courses and extension activities. The study of the pomegranate has become a good example of a plant species that highlights plant-humanity co-evolution, through the diverse uses of its parts and the symbolic meanings that are added to each culture and each ethnic group (MACHADO/Duigó-TUKANO, 2019 In OLIVEIRA et al., 2019; PINTO, 2019).

Indeed, tested products and bioproducts for animal, human and non-human health were obtained, such as ointment to local use to epithelial neoplasms and for healing wounds and burns (VARRICCHIO, 2008; SEERAM, 2005 *apud* VARRICCHIO & CASTELO BRANCO, unpublished data). In addition to trials for biotechnological activities aimed at phytorecovery, bioremediation (PINTO, 2019) as environmental health procedure, including using total of pomegranate extract (VARRICCHIO et al., 2019; VARRICCHIO & CASTELO BRANCO, 2019 a, b).

The use of natural products and bioproducts originating from biotechnology, in our case, plant biotechnology, are of interest due to their use in primary health care both for communities located in their territories facing neglected diseases, and for those ethnical and originary beings living in situations of social vulnerability due to environmental problems (VARRICCHIO & CASTELO BRANCO, 2019 a, b), political violence, catastrophes such as the case of refugees (VARRICCHIO et al., 2019; BORSATO et al., 2021).

Furthermore, also because through this way, they rescue concepts of symmetry, equity of access, of not doing harm, all of them recommended in research bioethics, clinical bioethics and professional ethic code (KOTTOW, 2011; VARRICCHIO et al., 2019; VARRICCHIO & CASTELO BRANCO, 2019 a , b; CORREA et al., 2020; BORSATO et al., 2021).

Historical and Symbolic Relationships of Pomegranate

The earth is about 4.5 billion years old. When the continents and oceans were formed, they had configurations and distribution that were very different from what we know today. To achieve this

formation and distribution, the continents and oceans underwent long and slow transformations with different characteristics. Geochronology science has developed more precise methods, through the study of rocks to determine the age of the earth. Knowing and unraveling how they were formed and what is recorded in the rocks, as well as the animals and plants that existed in the earth's geological past is fundamental to understanding the transformation processes and consequences brought to our reality. Without knowing the geological past of our planet, it is not possible to understand the present or predict future events (CRISVICK, 2014).

These events that occurred throughout the history of the earth are scientifically recorded in the geological table, a division into units of time in which larger periods are called Era, which are subdivided into smaller units of time called Periods and Epochs. The Paleozoic Era occurred between 570 and 230 million years ago. In the Permian period, the supercontinent Pangea was formed. During this period, metamorphic and sedimentary rocks were formed. And the existence of five continents: Indo, Afro, Brazilian, Canadian and Siberian (POPP, 1998 In CRISVICK, 2014).

Shirley Santos (2014) mentions that 400 million years ago, Pangea brought together all the lands on a single continent. With the slow movement of tectonic plates (blocks into which the Earth's crust is divided), 225 million years ago Pangea broke apart in an east-west direction, forming Laurasia to the north and Gondwana to the south and only 60 million years ago the Earth assumed the current shape and position of the continents.

Melander Filho (2009) brought the reflection that plants do not have national borders, but eco-geographical, and, ultimately, continental. And it is exactly the confinement of some plant or animal species in different ecological systems that makes them evolve, giving rise to new species.

Therefore, about 290 million years ago there was only one continent called Pangea. It separated into two blocks 210 million years ago: Laurasia (formed by present-day North America, Eurasia and Greenland) and Gondwana (South America, Africa, Antarctica, Australia, India and Madagascar). From then on, the continents began to separate, but joined each other later (MELANDER FILHO, 2009).

South America separated from Africa 140 million years ago, joining Antarctica 75 million years ago for a brief period. North America was separated from present-day Europe and Greenland 40 million years ago. It was only 5 million years ago that the Americas came together through Central America, giving rise to an exchange of animal and plant species, after a long period of isolation (MELANDER FILHO, 2009).

Near 10,000 years ago the process of domestication of plants and animals by man began, whose species produced here were different from those of the “old world”. It was only after the discovery of the Americas that these plants spread across all continents. Thus, we relate the origin of the majority of

plants consumed in Brazil as food. Loofah, coffee, dendê, jiló, gherkin, chili pepper, okra, pomegranate and sorghum would have come from Africa (MELANDER FILHO, 2009; OLIVEIRA, 2019).

The French historian Jean Bottéro, renowned specialist in studies on the Bible, Assyriology and the Middle East of the past, in his book "The Oldest Kitchen in the World" (Audibert: Paris, 2002) formally contested previous information, where he states that the first recipes of the world emerged in Mesopotamia, millennia before Apicius (father of cuisine). It is worth remembering that the ancient natural landscape of Mesopotamia differs from the present one. In areas where extensive deserts are currently located, there were vegetable gardens and lush crops (SANTOS, 2014).

Excavations carried out in present-day Iraq and work that deciphered the cuneiform writing probably invented by the Sumerians - whose syllables and words are formed by a combination of wedge-shaped strokes - expanded knowledge of Mesopotamia's participation in the evolution of human culture (SANTOS, 2014).

As for agriculture, the region produced wheat and barley, two ingredients theoretically originating from the Euphrates valley; sesame, lentils, chickpeas, pumpkin, onion, cucumber, leek, turnip, beetroot and perhaps eggplant; almond, pistachio, walnut, plum, fig, pomegranate, blackberry, date and table grape, as the wine did not stand out. It lost in popularity to beer, which was still made without hops (SANTOS, 2014).

Professor Roux points out that in the ruins of the great palace of Mari, located in Tell Hariri, currently Syria, a profusion of kitchen utensils was found, including clay casseroles, bronze kettles and gold tableware. "Food could be boiled in water, sometimes mixed with fat, steamed, roasted, or cooked over hot coals," he notes. Furthermore, Babilônia cooks knew how to combine seasonings and ingredients to obtain unusual aromas, textures and flavors. Also in culture, nothing is lost, everything is transformed. Mesopotamian cuisine formed the basis of Middle Eastern cuisines and, to some extent, those practiced in the West. It can be said that the delicacies displayed today on the tables of many European countries, such as France, Italy and Spain, evoke the old wonders of the Tigris and Euphrates valleys (SANTOS, 2014).

Bottéro was based on unpublished documentation, which fortunately survived the extinction of Mesopotamia, t clay tablets with cuneiform inscriptions. In them he found four dozen recipes. They weren't dishes for every day. They were destined for the tables of the king and the powerful. They could also be made for placement in graves and as offerings to the gods. They included pomegranates (SANTOS, 2014).

The pomegranate originates from the Middle East, and its name is derived from rimmon and rumman, from the Semitic and Arabic vocabularies, respectively. In the Portuguese language, the fruit 'pomegranate' was named in another way; a path of Egyptian and Semitic origin in the root mnr. Just as

there are several references to the different therapeutic properties, there are also very varied mentions of the use of pomegranate throughout History (SANTOS, 2014).

This globular and fragrant fruit, with coral or salmon-colored skin and deep red pulp, has acquired the most varied symbolic meanings since ancient times. Firstly, it is linked to the Phoenician goddess Astarte and, later, to the Greek myth of Persephone (Proserpina), the daughter of Demeter (Ceres) kidnapped by Hades and taken to the underworld. By eating a few grains from a pomegranate in Hades, the daughter of Ceres condemned herself to live there eternally. In an agreement made through the intercession of Zeus, Hades allowed Persephone to live half of each year on earth, alongside her mother, a time when nature germinated and flourished. The goddess's passage through the earth then brought spring, while the six months of confinement in Hades corresponded to the times of the infertile earth. For this reason, the pomegranate was linked from an early age to the symbolic aspects of fecundity and fertility CHEVALIER & GHEERBRANT, 1995.

In ancient Rome, the pomegranate held by Juno was a symbol of marriage, and the tree with red, fragrant flowers was linked to the very idea of love and marriage that produced children. That's why brides wore wreaths braided with these flowers. The pomegranate is surrounded by many symbols: biblical texts and Greek people considered it as a symbol of love and fertility, consecrating its tree to the goddess Aphrodite (CHEVALIER & GHEERBRANT, 1995). With the same meaning it is cited among gypsy people (VARRICCHIO, 2017). It is worth noting that in Iranian mythology, the desired fruit of the sacred tree of knowledge and knowledge is the pomegranate and not the apple (MTMAMN, 2018). For Jews, the pomegranate is a religious symbol, included in the New Year ritual (MUSMANNO et al., 2021). In many cultures, in ceremonies and worship, the pomegranate was considered a symbol of order, wealth and fertility (MTMAMN, 2018).

Currently, Agenda 21 is an action program that constitutes the most daring and comprehensive attempt ever made to promote, on a planetary scale, a new pattern of development, reconciling methods of environmental protection, social justice and economic efficiency (SANTOS, 2014). Environmental Health, therefore, is closely related to the Mental and Spiritual Health of people and their understanding of nature thus contributes to promoting Quality of Life and Sustainability (VARRICCHIO & LAGE, 2020; BORSATO et al., 2021).

Bioethics, in turn, promotes the principle of human dignity, radiated by Fundamental Human Rights (in all its generations); guarantees reflections and actions aligned with Environmental Law and also rescues the Spiritual Health of ethnicities and peoples subjected to social markers of differences and social determinants, both of which are major causes of suffering and chronic illness, that require creative and consistent strategies in psychosocial care (VARRICCHIO, 2017; OLIVEIRA et al., 2019;

MACHADO/Duigó-TUKANO et al., 2019; 2020; IBGE, 2020; BORSATO et al., 2021; MENDES et al., 2022).

Pomegranate Juice for Emotional Comfort to Ethnic Elderly People

As previously recorded (VARRICCHIO & LAGE, 2020), faced with the successive deaths of romani people, urban and elders present in Rio de Janeiro, whose developed great psychological suffering, and outbreaks of empirically observed repeated infections of SARS-Cov-2 to some of them. At that moment, at the beginning of the pandemic, they spontaneously used Lemon (*Citrus limon)* and Pomegranate (*Punica granatum* L.) juices at diet, indeed, a mix able to enhance biological activity of pomegranate as previously verified by MCCARRELL et al. (2008) and MONEIM (2012).

As there's declining of memory during aging, we thought about using Pomegranate as already shown it's use to loss of memory at São Paulo University (MORZELLE, 2012). The pomegranate peel, which is generally discarded, is the part of the fruit where the largest amount of substances that help fight Alzheimer's are concentrated. "The peel has ten times more of these antioxidant substances than the pulp." Consumption of the extract was able to inhibit the activity of the enzyme acetylcholinesterase, which acts harmfully on nerve endings, by up to 77%. Furthermore, the animals that consumed the pomegranate showed memory maintenance, which did not happen in the animals that were not treated. The treated animals presented levels of substances that favor the survival of neurons, and were able to reduce amyloid plaques, one of the main characteristics of Alzheimer's disease (MORZELLE, 2012).

While consistent scientific investigations have been carried out in this area, a literature review was carried out upon the nutritional aspect, regarding the role of functional foods in the well-being of these elderly people besides to provide emotional comfort through the preservation of their cultural and also singular habits when in urban situation at Rio de Janeiro/Brazil, as a strategy of care (TAVARES & GEROLIS, 2019; VARRICCHIO & LAGE, 2020).

Years later after pandemic, we have seen the emergence of many patients surviving the pandemic, presenting Covid19 sequelae, especially neuro-behavioral ones (YAMAMOTO et al., 2020). So, we had maintained recomendation to the use of pomegranate and lemon juices, mainly to our ethnical elder people patients, and also to several other patients (VARRICCHIO, PYRRHO, LAGE, 2021; VARRICCHIO, 2022).

CONCLUSION

It's a very interesting and helpful to study biological and pharmacological activities of ancient trees fruits which co-evoluted with planet to welfare for living beings and environment, as *Punica granatum*. Pomegranate total aqueous extract is really effective besides a smooth action, as observed at recovering of eroded soil. Granulometry analysis and other physical aspects of these cultives performed will be reported in near future.

At a period time of increasing of incidence of malignancies, types of anemia and cardiovascular diseases, its juice and its oilment shall be investigated, aiming to be used as a complementary intervention during conventional specific treatments.

Our professional experience with its use as functional ailment empirically suggested its metabolic regulation associated with immunemodulatory action. But, mainly, to ethnical elder people (Romani, Hebrew, Pakistanese, Japanese) evoked affective memories, a neuro-behavior effect very hopefull in this period time of special attention to signals of collective major and minor depression besides decrease of cognitive functions after Covid19 pandemic, around the world.

So our meaningfull care as strategy of psychosocial attention to elderly people seemed to be positive offering and also evoking welfare and comfort increasing their quality of life; And, perhaps, suggested neurotransmitters modulation way as one of the mechanism of action. Analysis of this effect and professional experience will be discussed, *a posteriori*, through the suitable and proper qualitative method of evaluation.

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