

Revisión / Review

***Madia sativa* (Asteraceae), an Araucanian plant**[*Madia sativa* (Asteraceae), una planta araucana]**Eduardo Tellez<sup>1</sup>, Rodrigo Ramirez-Tagle<sup>2,3</sup> & Carolina A. León<sup>1</sup>**<sup>1</sup>Universidad Bernardo O'Higgins, Santiago, Chile<sup>2</sup>Carrera de Enfermería-Nutrición, Universidad Academia de Humanismo Cristiano, Santiago, Chile<sup>3</sup>Escuela de Enfermería, Universidad de las Américas, Santiago, Chile**Reviewed by:**  
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<https://doi.org/10.37360/blacpma.23.22.4.32>**Abstract:** *Madia sativa* remains important to the traditional culture of many first peoples of Chile and is being studied for its biological abilities by medical researchers. The use of this species in Chile is researched through a series of retrospective analysis. This research indicated the use of this plant populations mapuche a long time ago.**Keywords:** *Madia sativa*; Medicinal plant; Traditional uses; Mapuche; Chile**Resumen:** *Madia sativa* sigue siendo importante para la cultura tradicional de muchos pueblos originarios de Chile y está siendo estudiada por sus capacidades biológicas por investigadores médicos. El uso de esta especie en Chile se investiga a través de una serie de análisis retrospectivos. Esta investigación indica el uso de esta planta en poblaciones mapuche desde hace mucho tiempo.**Palabras clave:** *Madia sativa*; Planta medicinal; Usos tradicionales; Mapuche; Chile

## INTRODUCTION

Natural resources such as plants, animals, and mushrooms have played a vital role since ancient times to treat illnesses. In recent years, the research on Etna-medicinal resources has been extended in order to develop new products and medicines to treat diseases. Medicines derived from natural resources majority posed a safer and more reliable medicine than synthetically produced drugs. *Madia sativa* Molina (Asteraceae), known by the common names coast tarweed and Chilean tarweed, is a native plant species widely distributed in Chile (between Atacama and Magallanes Region) and is very common in open habitats and disturbed grassland plant communities (Matthei, 1995; González *et al.*, 2008). *M. sativa* is an annual herb varying in size from 20 centimeters tall to well over two meters, the leafy stem branching or not. It is

coated densely in sticky resin glands, and it has a strong scent. The hairy leaves are linear or lance-shaped, the lowest up to 18 centimeters long (Villagrán, 1998). The inflorescence is generally a cluster of flower heads lined with bristly, glandular pillars. Each head bears approximately 8 yellowish ray florets a few millimeters long around a center of several disc florets tipped with dark anthers. The fruit is a flat, hairless achene with no pappus. This plant has been grown for its seed oil (Acevedo *et al.*, 2012) (Figure No. 1). This plant was cultivated by the Mapuche people for the high-quality oil extracted from its seeds (Wilhelm, 1992). However, this use is a little known from a historical perspective, thus the core research goal is to present ethnohistorical information on this traditional Araucanian plant.



**Figure No. 1**  
**Photography of *Madia sativa* (Aysén, Chile).**  
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## METHODOLOGY

In this work, we understand ethnobotany as: the study of interrelations between humans and plants; adopting the current use of the term implies the study of indigenous or traditional knowledge of plants (Iwu, 2002). An ethnobotanist thus strives to document the local customs involving the practical uses of local flora for many aspects of life, such as plants as medicines, foods, intoxicants and clothing. In this study, we associate the plant with cultural practices and beliefs that are rooted in the history and cultural traditions of Araucanian indigenous societies and document the importance of known plants to maintaining the continuity of that community's contemporary traditional beliefs and practices.

### *Ethnobotany of M. sativa*

The modern rediscovery of the Mapuche “madi” is due to Claudio Gay, the inquisitive French naturalist with the support of the Chilean government began at the dawn of the republic, a systematic and patient work of collecting and cataloging the national flora. However, the first Christian advanced in Chile raided four centuries before the oilseed plant directly met and saw in use in the first history of the Araucanía in the mid-sixteenth century. Pedro Valdivia was the first to refer to it, although adulterated under the name of “mare” telling the king the “maintenance” of whom spoke mapudungún south of the Biobío. According to her primary citizens of those natives were “corn, potatoes, quinoa, mare, chili and beans” (de Valdivia, 1960 [1551]). Speaking this term of the oily plant, verified through Don Garcia Hurtado de Mendoza, who praised its benefits, with the same name, about the time of the foundation of Osorno (1559) (Wilhelm, 1992). “There was found a tiny seed, called a mare, that grounded and cooked gives off lots of oil, so excellent and clear, which is spent on food, serving in the other things that usually olive, with good taste. It was taken an “azumbre” from a bushel, with little or no expense of their culture” (Garcia Hurtado de Mendoza finds Gay, 1846). From this point of view was a bush of low energy investment in native communities in proportion to their fatty liquid yield. Shortly after (1574), the greatest chronicler Juan López de Velasco, enrolled the media in American natural history by delivering a glowing description of it in the Geography and universal description of the Indies. Among indigenous goods, particularly highlighted the “oil, which also is made from a seed called Mady, which is similar to a lettuce seed, and is good to eat and to

illuminated” (López de Velasco, 1894 [1571-1574]). Seventy years later, however, the Chilean oil, says Alonso de Ovalle (1644), had yielded considerably to the olive tree, which has filled the earth (de Ovalle, 1646) Dispersal continued to appear in the Amerindian vegetable (*Madariopsis chilensis* Nutt.) in the colonial writings winning a place in the natural history of the Abbe Juan Ignacio Molina, who described more morosely, and even put his own stamp on its classification in the field of universal botany. In any case, long before, another eminent Jesuit, Father Diego de Rosales, and the French botanist Louis Feuillé

Madi a consistent advanced in the description of this American plant. Rosales in profuse catalog devoted to 'Araucan' herbals in his General History of the kingdom of Chile (1674) dared to say: “Madi is an herb seed that gives a half a yard high stick, and grounded the seeds give as good and tasty to eat oil like olive” (de Rosales, 1877). However, the benefits of the madi were not reduced in the Culinary field. Its therapeutic qualities, according to Rosales, were outstanding. First as an antidote bowel obstruction, but also as a purgative and regulator of female menstruation. “This oil quantity given by two güebos every morning for eight days, admirably rid abstractions. And this seed dissolved in Maidenhair water, makes women bleed when they have not purged either childbirth or miscarriage, and when his custom suits them” (Molina, 1788). Oppilation in its most general concept refers to obstructions, but in the medical profession refers more specifically to amenorrhea, i.e. the absence or suppression of the menstrual flow and dropsy, or irregular fluid in a cavity, tissue or organ of the human body. Alternatively referred to constipation and intestinal blockage. Hence “take a maize porridge and throwing a fist of this seed, ground, belly mollifies the constipated” (de Rosales, 1877). At the same time, adds Rosales, effectively fighting tumor formation “And to remove or mature tumors is admirable, and called out with great effectiveness in the materials, put the ground and hot seed on tumors” (op. cit.). As if not enough “Madi oil is excellent for painters, and food for the birds, if they are sick, it cures them and bleed them. And to the person who uses to eat, it does not allow weeds inside the body, which is like a universal soft purge, and remove vessel obstruction and heal mothers” (de Rosales, 1877). The Abbe Juan Ignacio Molina ended up spreading the virtues of media through a detailed description of Aboriginal plant for the Italian public and then, after translation

into Spanish and many other languages, however its industrial stopped, but not its heal properties. The Madi, *Madia Genus Novum*, he writes, "is a plant from whose seed is extracted a good oil for food. The cultivated made, which call *Madia sativa* has hairy, with many branches and five feet tall stems, leaves three by three, shaggy, four and a half inches long, and six lines wide, clear, and a very similar shape to the pink, laurel green: wears listed yellow flowers, and seed is enclosed in a nearly spherical cocoon, eight or ten lines in diameter. These seeds are convex on one side, will have four or five lines long, and covered with a thin film and brownish. There was no difference between wild-honeyed *Madia* and cultivated except leaves. These trunks covered with such intensity that seemed wrapped in oily matter" (Molina, 1788). The testimony of the Jesuit scientist credited Madi had ceased to be an exclusive Amerindian element since it was the subject of beneficial exploitation by the Creoles peasants into the eighteenth century. "The farmers, points, take them (seeds) by expression or by simply firing a sweet oil, with good flavor, clear, and with the color of the olives" (Molina, 1788). Molina recalls praise of the French naturalist, father Louis Feuillé, who devoted to make while he was in Chile, whose oil got over the olive oil grown in France. Feuillé really stressed, not only take out the Chilean natural vegetable oil of high quality, sweeter and better tasting compared to European olives, which did not differ in their color. The tenor of his remarks, the Indians also employed to temper the pain anointing the affected part of the body and nourish "lights" (fuel). Molina, in any case, lamented that this Chilean oil still had not been acclimatized in Europe, a continent where he could, in his opinion, be given very good, even in areas unsuitable for olive (Feuillé, 1725). Some anonymous critic to Molina estimated lower madi juice to olive in every way, arguing that in Chile only consumed it, for lack of a better option, the humblest farmers (Hanisch, 1976). On the other hand, attempts by Molina of implanting the madi in the Old World were wrecked. The abbe vainly tried to acclimate experimentally the madi after successive tests performed in Rome, Imola and Bologna. The same had happened to the progressive Manuel de Salas, who tried, also unsuccessfully, to popularize its spread in Spain in 1796 (*op. cit.*).

Claudio Gay in 1800, despite insisting on the use of Native American origin and oilseed Chile, reported that in 1850 was in full retreat. Hardly grown in the country due to the introduction of the olive

(Gay, 1865).

Anyway, by then it had entered to some European gardens. Both the gardener (Bosch) of the king of Württemberg, who made the first tests by inserting in the principedom, as the agronomist Philippart, weighted it well in the early nineteenth century. Philippart tested in his experiments that 12.51 kg. of moldy seeds contained 25% by weight of a very clean oil heavier than olive oil, with bright yellow color and a very pleasant taste, beyond that afforded by the common oil. The chemist Girardin, ratified the tests performed by Philippart, making a comparison between Madi seeds with other oilseeds. So, on more than one quintal of palm Christi seeds contained 62 parts of oil, 50 in the case of olive trees, 46 in case of the almonds and the 25 in case of Madi (Gay, 1865). These results -concludes Gay- "are presented as a perfect expression analysis as give very precise methods of chemistry, and not that of the industrialists who usually only take three quarters of this product" (*op. cit.*). The balance against the ability made in oil content, was not, according to Gay, the determining factor in the abandonment of cultivation. This was probably due more to the plant exudes a thick, resinous matter that bothered operators and harmed the oil taste if the seeds had not been washed Before thoroughly with hot water. From there it was thought to redirect the plant for use as a plant fertilizer, given the high content of nitrogen that owns. Jean-Baptiste Boussingault, the French agronomist and chemist, without going any further, found that 126 pounds of media were equivalent to 100 pounds of good stable manure (Gay, 1865). Having in mind this result, says Gay - "should greatly landowners to let it grow this weed, so common in Chile, and bury it after it has flowered. Instead of exhausting the lands with fallow where it grows in more abundance, would fertilize the land with great benefit for the future cultures, it is necessary to take into account the depletion that has already been observed in the lands of some locations as a result of the cultivation too often of cereals" (Gay, 1865). In the successive historical transfiguration, he endured, the media was relegated as dietary and pharmacological potential. Currently, it is known that the seed of media has a 26% oil, which has fatty acids: palmitic (12.9 to 14.0%), stearic (3.8-3.9%), oleic (7.9 to 10.2%) and linoleic (71.4 to 72.4%); and has a high protein content (28-31%) (Schmeda-Hirschmann, 1995). On the other hand, Antova *et al.* (2017) determined that *M. sativa* seeds grown in Bulgaria as a potential source of glycerin oils rich of biologically active components. The seeds

of all three varieties are favorable for the production of vegetable oil whose oxidation stability is similar to that of sunflower oillinoleic type. (Angelini *et al.*, 1997) There are studies that show the activity of oleic acid as an anti-inflammatory; could be presented as an anti-inflammatory fat given the role in the activation of different signaling mechanisms of immunocompetent cells (Carrillo *et al.*, 2012), which would explain its antirheumatic effect noted in studies ethnopharmacological (Zardini, 1992). Also the high content of linoleic acid can turn this plant in an oil with the potential of reducing body fat and increase lean body mass, due to the reduction of the activity of lipoprotein lipase (Botelho *et al.*, 2009). Other medicinal properties, as a purgative, are attributed to the herbaceous part of the plant, whereas the

nutritional and energizing properties, to the seeds. (Silva, 2021)

## CONCLUSION

This article confirms that *M. sativa* have been used by mapuche a long time ago and this plant is a potential oil crop for Chile. Nevertheless, future studies are needed to evaluate another bioactivity, use as a food supplement in the food industry, among others. Moreover, it is necessary to develop standards for large-scale production and commercialization. (San Martín *et al.*, 2011)

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