



The Mexican Oregano *Lippia Palmeri* and their Benefits on Nutrition and Health



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Abstract

The Mexican oregano *Lippia palmeri* is an aromatic herb that is exploited mostly by collection in the wild and to a lesser extent by cultivation. It has socio-economic importance in the region due to its use as a seasoning but also because its essential oil contains substances with important properties that benefit the health of the consumer. This document describes the importance of this plant in Mexico, the composition of its essential oil and its main uses, as well as the problems for a better management and utilization.

Keywords: Lippia; Oregano; Essential oil; Carvacrol; Thymol

Introduction

Despite important advances in technology and food chemistry, food safety continues being a fundamental problem for public health. Access to sufficient amounts of healthy and nutritious food is key to health. According to data from the World Health Organization [1], an estimated 600 million people suffer illnesses from consuming contaminated food, and about 420,000 of them die each year. Malnutrition and diseases transmitted through food impede economic development by altering the quality of life, affecting welfare. This particularly affects the health of newborns, the elderly and children. Likewise, infectious diseases are common reasons of morbidity and mortality in the world. The introduction of antibiotics has had a consequence not only in the management of infections, but also in society security, since the abuse of these compounds has led to the increase of pathogens resistant to several drugs. Because no new drugs have been introduced to improve the fight against these resistant pathogens, physicians have been forced to continue prescribing the same medications in spite their complications. From this, emerges the importance of exploring and identifying new compounds with beneficial properties without toxic effects for human cells [2].

Besides, the use of products that increase the attractability and palatability of foods (as is the case of oregano), is important to incentives the appetite and improves the nutritional conditions of the consumer [3]. Essential oils are complex natural mixtures that contain around 20 to 60

components. Two or three main components are found at high concentrations (20-70%), and the rest in very small amounts. For example, in the essential oil of *Oregano compactum* the major components are carvacrol (30%) and thymol (27%) [4]. Essential oils derived from plants are a source of compounds with antimicrobial and antioxidant activity that provides options for novel alternative medicine [5]. Due to the "green culture" boom, the trend of the use of essential oils as a complementary health practice has increased not only in the United States, but in the rest of the world. The use of essential oils is a complementary and integrative modality that continues to grow in popularity [6] since they represent alternatives or effective complements to the synthetic compounds of the chemical industry, but without the same secondary effects [7].

The Mexican Oregano: Production Status and Beneficial Compounds

It is known generically as oregano, to a great variety of plants that share a particular taste and smell. At least 60 species and 17 genera belonging to different families of oregano species are known [8]. The most important, from the economic point of view, belong to four groups: the Greek oregano (*Origanum vulgare*), the Spanish (*Caridohymus capitatus* L.), the Turkish (*Origanum onites* L.) and the Mexican oregano (*Lippia graveolens*, *Lippia berlandieri* Schauer, *Lippia palmeri* W.) [9]. Different strains of oregano vary in the composition of the essential oil due to genetic factors, and environmental

stimuli such as the duration and quality of light, temperature, water stress and the administration of nutrients, which affect the development of the plant [10-12]. The Mexican oregano, belonging to the Verbenaceae family, is quite different from its European counterparts, has a stronger and more robust flavor that is described as "wild", attributed to the characteristics of its essential oil, which contains mostly carvacrol and thymol. These compounds are of special interest for their antioxidant and antimicrobial effect [13]. Carvacrol has a broad spectrum of antimicrobial activity and, in addition, numerous studies report its antioxidant, anti-inflammatory, antifungal, antiprotozoal, anticancer, antidiabetic, antinociceptive, cardioprotective and neuroprotective effects [14]. Also in thymol (a derivative of p-cymene), antioxidant, antispasmodic, antimicrobial, anti-inflammatory and anticancer properties have been observed [15]. It is necessary to determine the optimal dose of these compounds either individually or in combination, in addition to a better understanding of their biological mode of action [16] to achieve better management and the development of new applications in human health, agriculture, aquaculture and the environment.

The oregano *L. palmeri*, is distributed naturally in north-western Mexico, where it is exploited by seasonal collection of wild plants, mostly when they are in the flowering stage, which results in a subsequent lower production of seedlings, leading to a decrease in natural populations.

The cultivation of oregano has a socio-economic relevance in the state of Sonora, since it is a source of income generation for the inhabitants of those regions in the harvest season. The most abundant compounds of the essential oil, vary according to the collection site; for example, in Hermosillo, Sonora, it was reported that it was composed mainly of carvacrol (24.57%), thymol (15.11%) and p-cymene (14.25%), while in Alamos, Sonora, p-cymene was mostly found (22.37%), followed by thymol (21.39%) and carvacrol (8.76%). For greenhouse culture conditions, the main components were thymol (28.90%), p-cymene (24%) and carvacrol (12.80%) [17]. These results are similar to those found by Pino et. al [18] for *Lippia graveolens*, where thymol and carvacrol were the two main compounds.

Conclusion

In spite of its nutritional and medicinal benefits and its potential marked, this plant has not been completely domesticated, and consequently their cultivation is not extended enough, which would be very desirable to take advantage of it in a more integral way, both by collectors, farmers and the industrial sector of Mexico. This will have an impact on economic benefits, job generation, as well as the conservation of natural populations.

Conflict of Interests

The authors declare no conflict of interest.

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