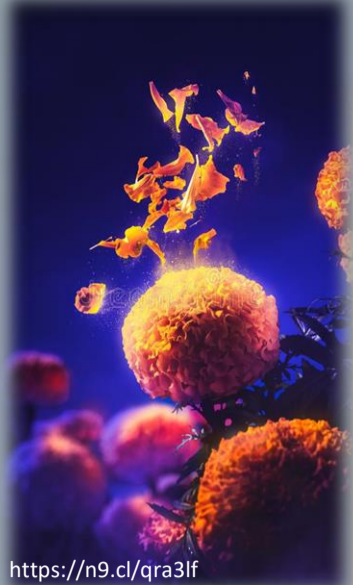


HISTORY



"Cempasúchil" is a flower native from Mexico, the name comes from the Nahuatl, "cempohualxochitl", cempohuali means 20 and xochitl means flower, so the name is flower with 20 petals

The flower was domesticated by pre-Hispanic settlers of Mesoamerica, to convert it from a wild plant, to an ornamental and medicinal plant. In the 16th century the flower was brought to Europe and then to Asia.

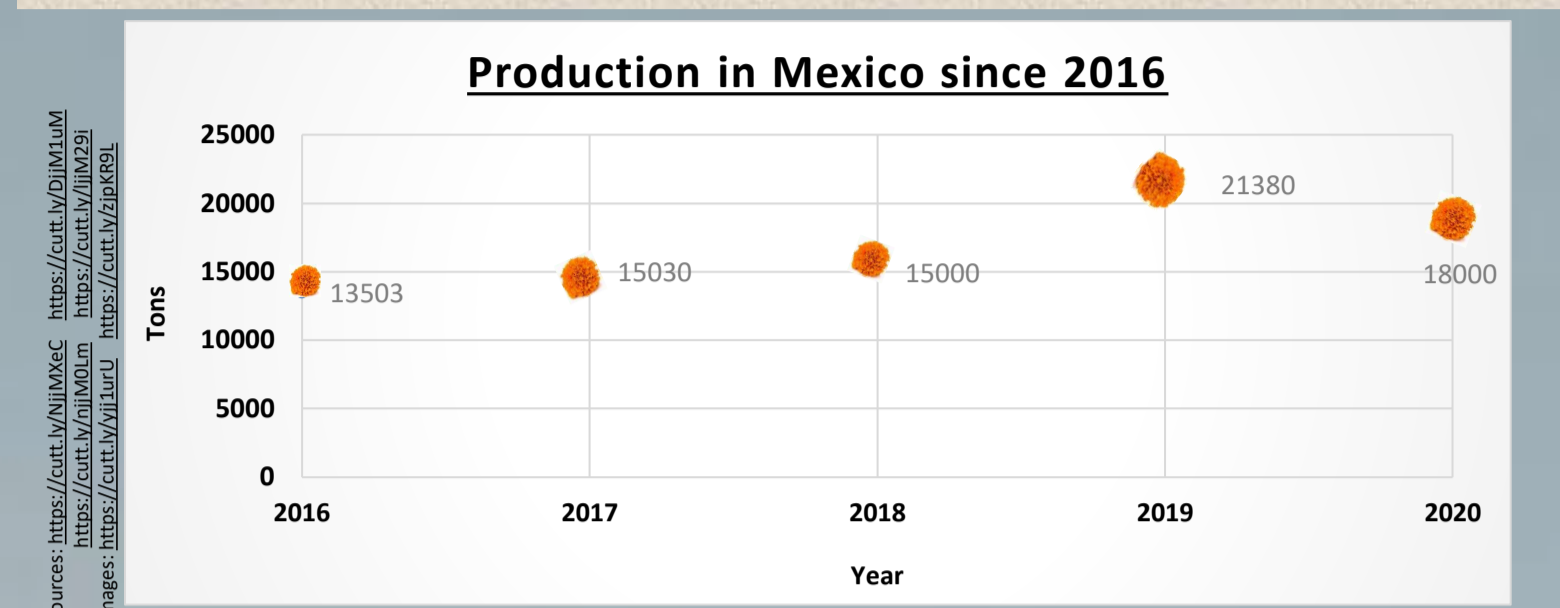
There is a legend of love about Huitzilil and Xochitl, that say that their love will be forever as long as the "cempasúchil" and hummingbirds exist in the fields.

Also people in Mexico believe that the scent of the flower guides the souls deceased to the altars with offerings, that awaits them in the world of the living.



Cempasúchil: the Flower that migrated to the World

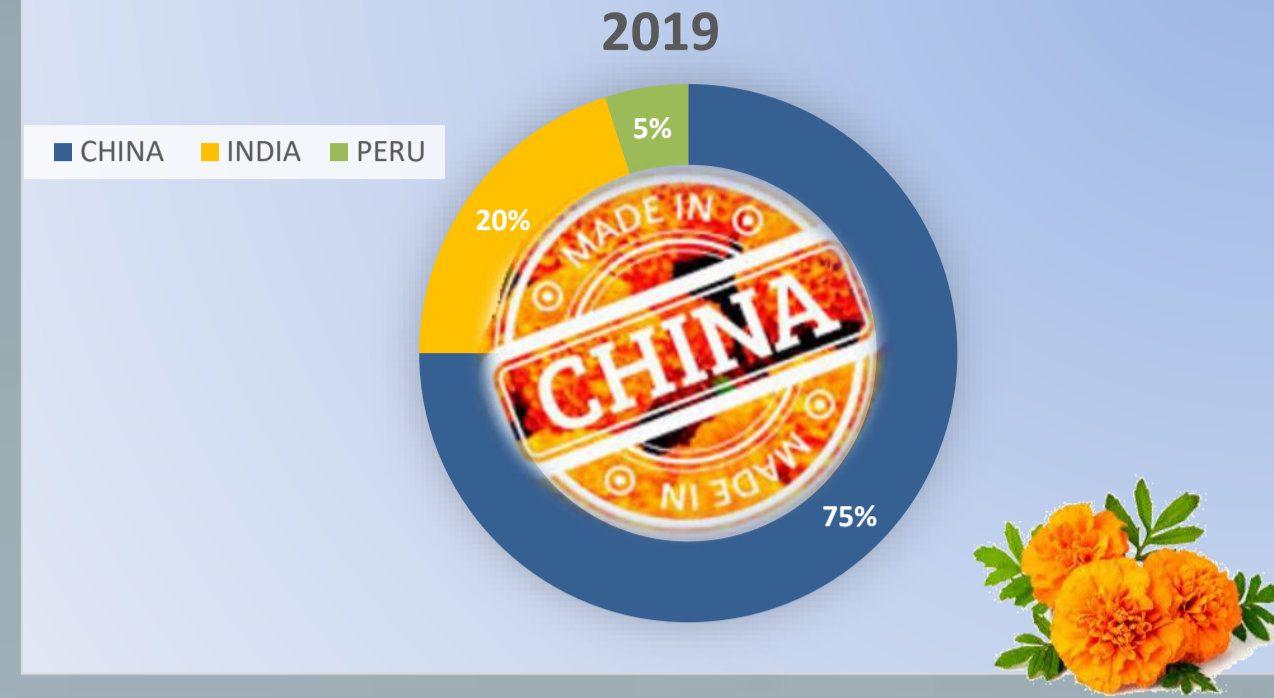
Mexico was the first producer of "cempasúchil" until 2010. In 2010 the graph shows a decrease in the sowing of almost 673 hectares, that is, 17% based on the year 2000. In that year, the pharmaceutical company that used the production most was relocated to India.



State	Percentage
Puebla	77.00%
Hidalgo	6.00%
Guerrero	5.00%
San Luis Potosí	4.00%
Tlaxcala	3.00%
Oaxaca	2.00%
Durango	1.80%
Morelos	1.10%
Baja California	0.08%

Open-pit "cempasúchil" production in Mexico is distributed in different states. In 2017, the total open-pit "cempasúchil" production was 15030 tons, of which 11524 tons were produced in Puebla, representing more than 70% of the total production.

LEADERS IN PRODUCTION AND EXPORT 2019

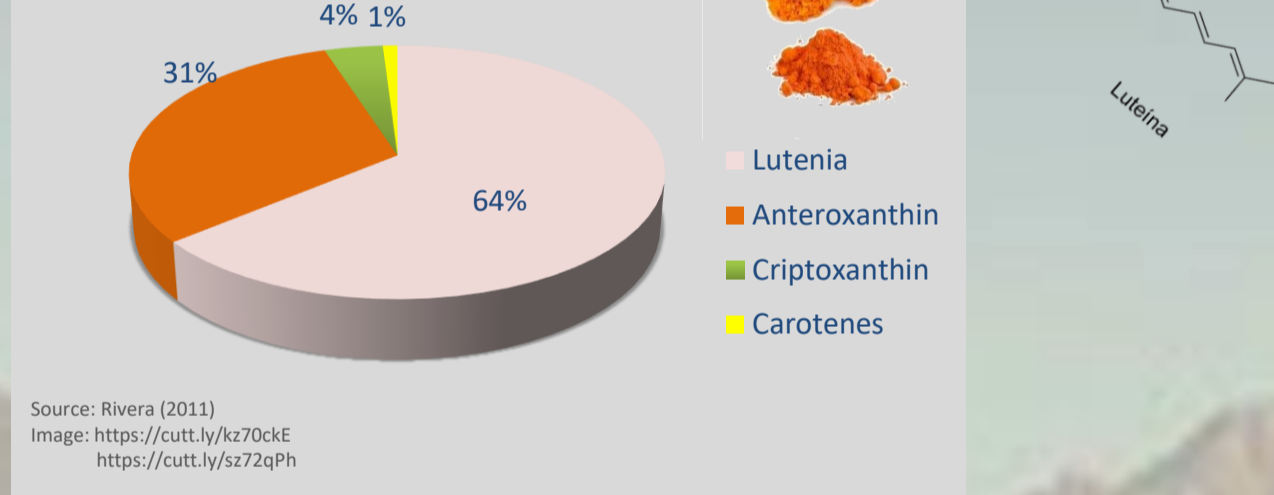


Why is the flower important at an industrial level?

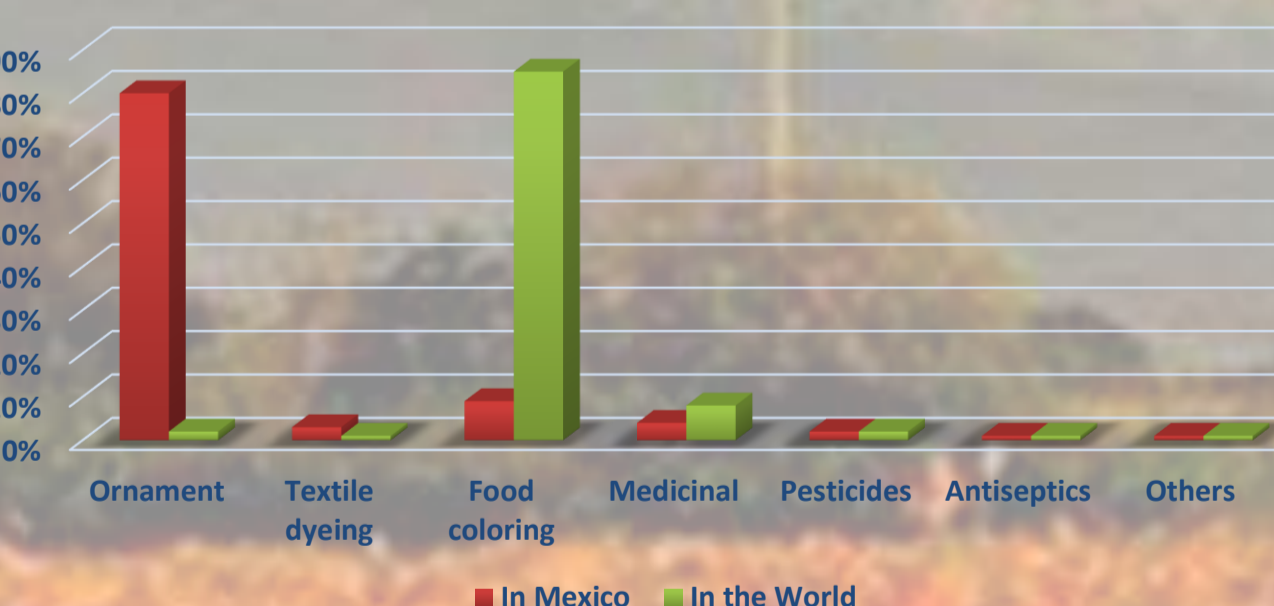
The petals of these flowers are rich in carotenoids, which are natural pigments ranging from yellow to red. The hydrocarbon carotenoids are called carotenes, while the oxygenated derivatives are called xanthophylls. A xanthophyll present in "cempasúchil" petals is lutein.

It is known that a hundred tons of fresh flowers yield 10 tons of petals that in the extraction will produce 1 ton of oleoresin (rich in lutein) which is sent to consumer countries such as Mexico or Spain, among others, where the product is saponified to make liquid or powder formulations, and supplied to poultry.

Antioxidant pigments in the "Cempasúchil" flower



The flower is used as:



Analyzing the above graph, it is known that in the case of the flower as an ornament, the world uses only 2.5% compared to Mexico. The rest of the world prefers more than 800% to use "cempasúchil" flower as a natural colorant, for the elaboration of poultry, fish and crustacean food and thus to improve its appearance for human consumption, including as a food colorant. Also the rest of the world prefers 100% use the flower in the pharmaceutical field, special for eye health. Despite the fact that the use of "cempasúchil" is greater in textile dyeing in Mexico, let us remember that production worldwide is higher, so in terms of volume the use of textile dyeing is greater worldwide.

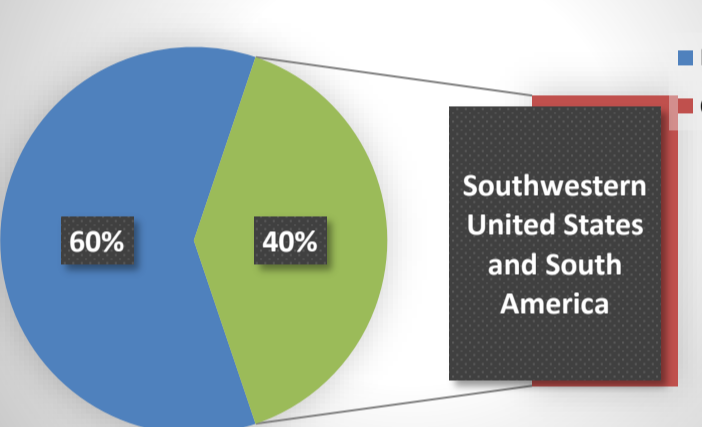
OBJECTIVE AND HYPOTHESIS

To know the use and regions where the production of the "cempasúchil" flower exists and the importance of the flower at an industrial level.

Is the original country of the flower the main world producer and how is the flower used?

DEVELOPMENT

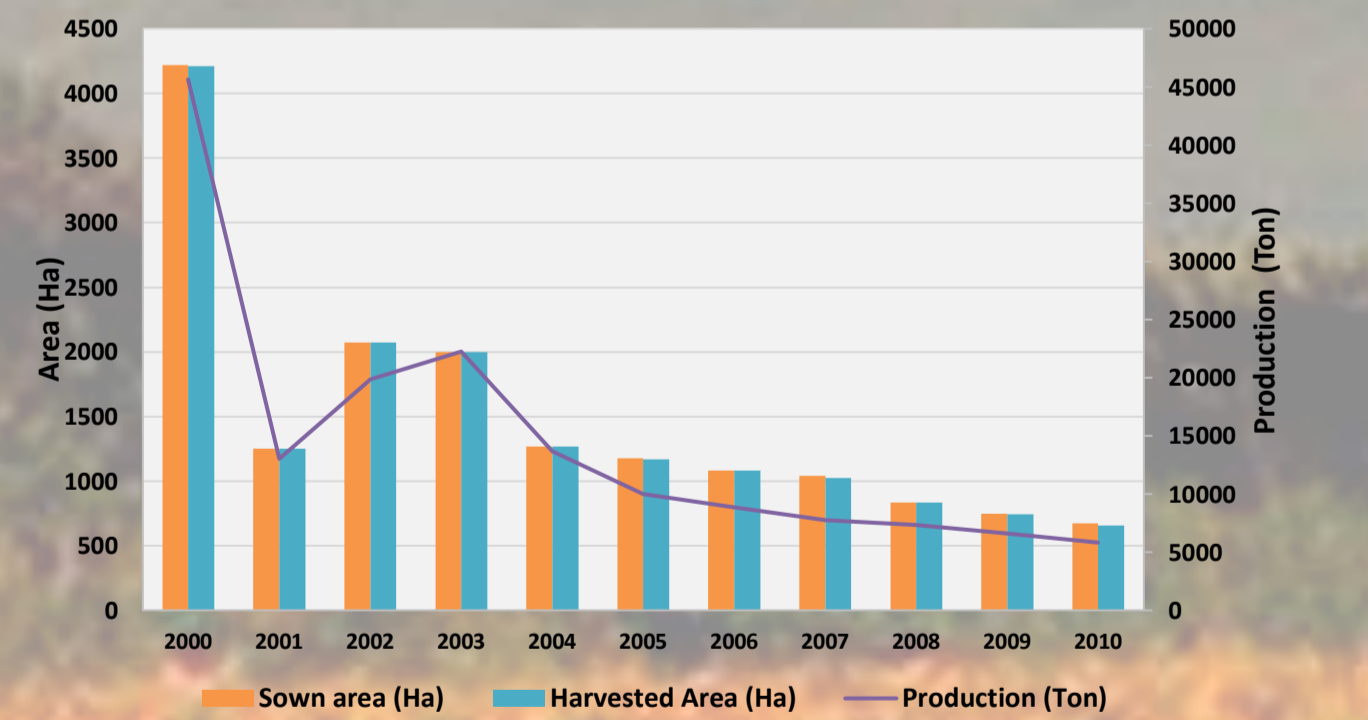
Distribution percentage of "Cempasúchil" in America



"Cempasúchil" belong to the compositae family and to the genus tagetes, it is endemic to the American continent where there are 58 species, of which 35 are located in Mexico, the others 23 are from Texas, Arizona, New Mexico, Peru, Bolivia, Chile, Ecuador, Paraguay and Argentina.

The planting and harvesting of "cempasúchil" in Mexico has varied over the years, depending on climatic factors and the interest of companies and government to take economic advantage of this flower.

Harvest and Production in Mexico

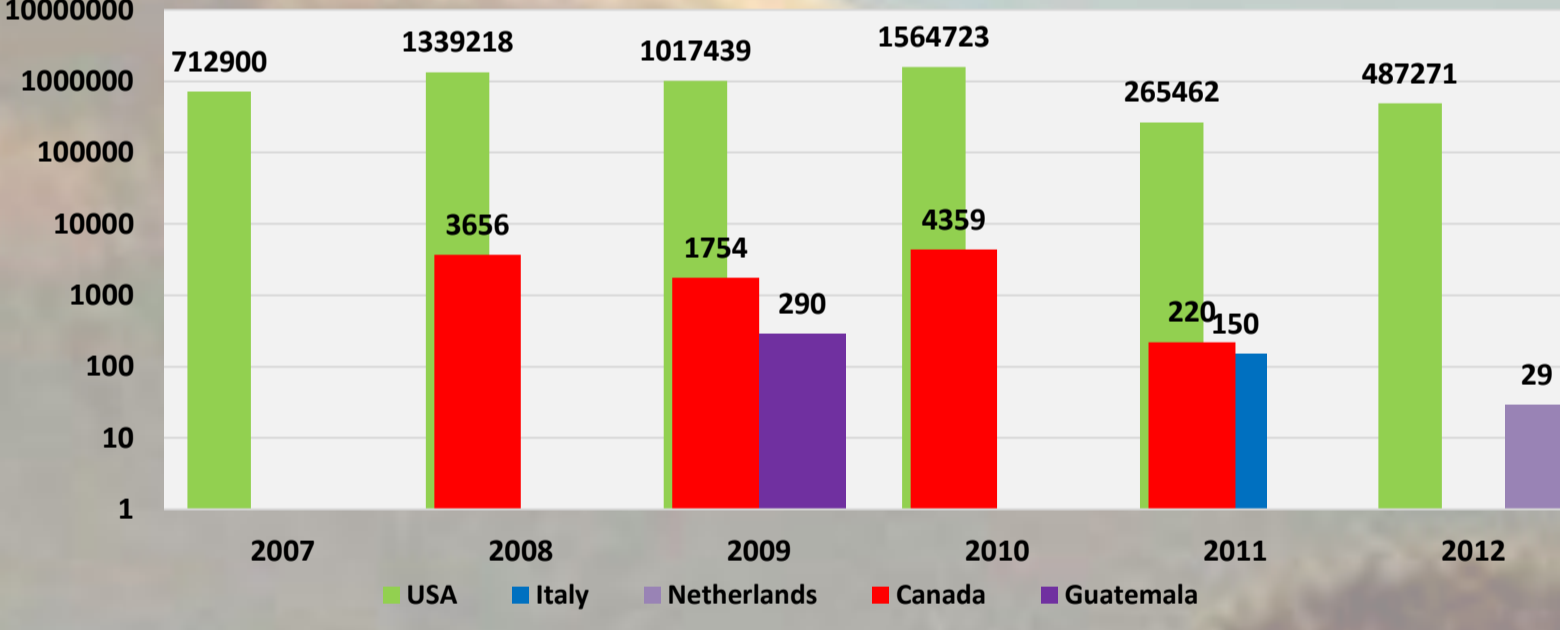


Source: Own elaboration with data from SIAP (1990-2012)

Analyzing the graph constructed with the SIAP data, we observed that a very significant decrease from 2000 to 2001 in sowing of almost 70%, trying to recover in the following two years, but from 2003 comes a fall for both sowing and production. The answer to this decrease in production is because most of the harvest in 2000 was for industry, not for "Día de Muertos". The flower was processed and we obtained dyes that we sold to pharmaceutical and animal feed factories.

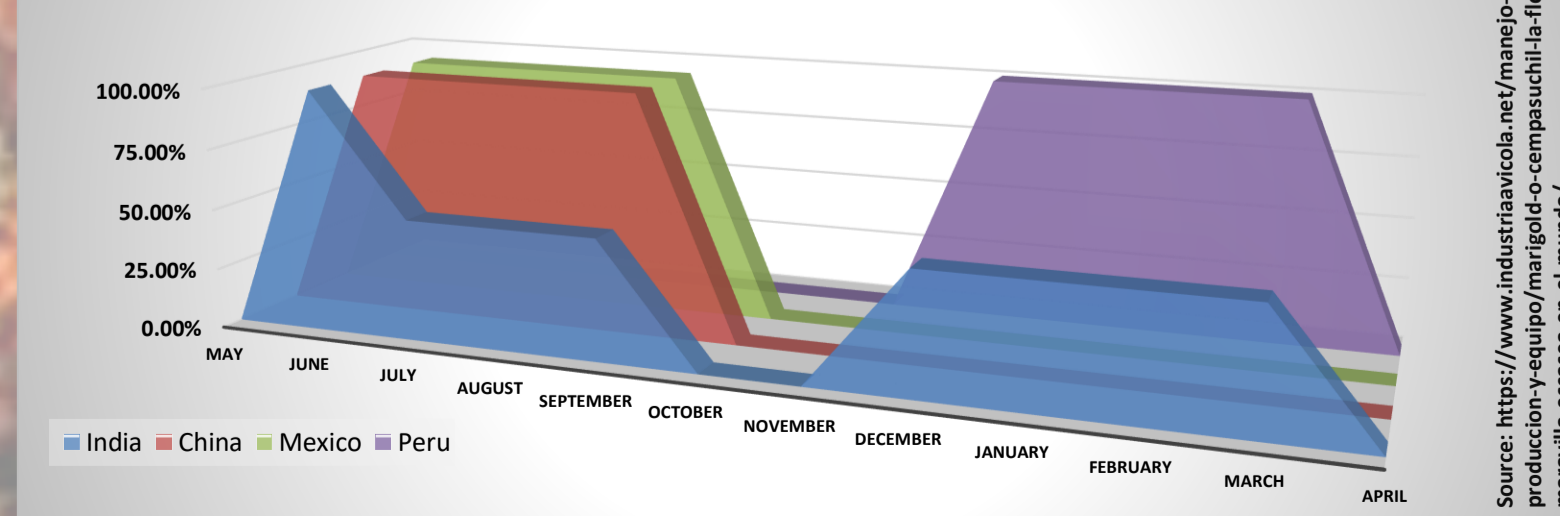
Mexico exported for many countries, but if we see, after 2010 the exported reduced 17% for EUA and 5% for Canada, we also see the impact of not taking advantage of the economic benefits of the flower other than seeing it primarily as an ornamental flower.

Exports from Mexico to the World



The "cempasúchil" crop has a short duration of 110 to 120 days. Flowering begins 60 to 70 days after sowing and they are harvested by hand by workers between days 60 and 120. The cultivation requires a lot of labor, that is why the climate and labor must be considered for the flower can be commercially profitable. Therefore, today the flower supply chain depends mainly on a single country: China, where cultivation is limited to a single season. China sows from June to September, obtaining the first place in production and export. Although in India "cempasúchil" can be grown during three seasons (summer, monsoon and winter), but cultivation during monsoon and winter is not profitable.

Sowing of Cempasuchil



Source: https://www.industriaavícola.net/manejo-produccion-y-equipos-marigold-o-cempasuchil-la-flor-maravilla-escasa-en-el-mundo/

As a medicinal use, it has been used since our ancestors and is currently of great importance to the pharmaceutical industry, as the flower can relieve stomach ailments, liver disorders, eliminate scabies and treat eye diseases. It also serves to soothe pain, remedy coughs, flu and bronchitis and prevents neurodegenerative and cardiac processes, among others.

Finally, studies of the flower have continued, such as the one conducted in 2018 in Mexico by the UNAM at the high school level by CCH Oriente, which consisted of a study on the "cempasúchil" flower and the possibility of used it as an adjuvant in an antibacterial gel, which had favorable results.

CONCLUSION

The "cempasúchil" flower is present in several parts of the world, however, the lack of support in scientific research, as well as the increase in the cost of cultivation and the lack of cheap labor, made it impossible for Mexico to compete against other "cempasúchil" producing countries, which knew how to take advantage of their benefits and competitive advantages the of the flower.

In the decade 2000-2010 the world witnessed that China became the leader in "cempasúchil" production, however, being a single season planting country, a bad season can negatively affect the balance of supply and demand worldwide, since 2010 China exports 75% of the world's "cempasúchil".

Currently the main worldwide uses of the flower are 85% to meet the demand for food coloring, most of which is to feed poultry, which makes the yolks of eggs and chicken meat look better. And on the other hand in the pharmaceutical industry, which continues to use and investigate the possible uses of this flower.

In the area of research, the flower continues to be talked about, since the benefits of the flower continue to be discovered, the most recent being that of the UNAM as an adjuvant in an antibacterial gel, which in these times of pandemic, the antibacterial gel is continuously used worldwide.

PROPOSAL

The "cempasúchil" flower has unique properties, which makes it a flower of great industrial use, however, we cannot depend on a country to export "cempasúchil", so we must disseminate more uses of the flower so that governments decide to invest in the cultivation of the same, since the worldwide demand for "cempasúchil" has grown by 5% annually in recent years. It is interesting how in recent years has been resuming the consumption of products free of chemical additives, however, the areas of cultivation have been reduced, which is why we invite everyone who reads our poster not only to raise awareness of the benefits of the flower but also see the impact of industries entering and leaving a country.

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Title images: flower <https://cut.ly/0j73G6M> garland <https://cut.ly/0j73G6M> world <https://cut.ly/Mj2TKv>

16th century: In the Florentine Codex appears for the first time documented the existence and it was noted

The "cempasúchil" crop begins to move to China and India.

2008: The celebration of the "Día de Muertos" was recognized by UNESCO as Intangible

Mexico is no longer the leading producer of the "cempasúchil" flower from which it originates.

2010: The economic spill of "cempasúchil" was halved, 9 billion pesos, due to

2011: The UNAM gives positive results of "cempasúchil" as an adjuvant in an antibacterial gel.

2020: The economic spill of "cempasúchil" was halved, 9 billion pesos, due to