

Some Mexican medicinal plants: popular uses and pharmacological evaluation

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INTRODUCTION

In recent years a powerful world impulse movement to traditional medicines has allowed to stimulate its importance within the Health National Systems. Mexico has an abundant folkloric medicine tradition, a considerable number of "curanderos" (people who cure with herbs), plus an abundant variety of plants and herbs.

From this perspective, any contact with the mexican people, even a very brief one, will show that in the heart of the western way of life still beat the ancient and prehispanic customs.

Many kinds of diseases have been treated with plant medications throughout the history of Mexico. Some of these diseases are gastrointestinal disorders. Diarrhoea is an ailment which affects mexican people since many years ago, which has always been one the first causes of diseases and death¹².

Some medicinal plants have been used in Mexico since prehispanic times in cases of uterus problems, in menstruation, to help retraction of the uterus of parturient and like an abortive⁵.

It is essential, from the scientific point of view, to establish the relationship between the empirical use of the plants and the real biological and therapeutic activities.

This work presents the results of:

- a) Historic revision of some Mexican medicinal plants.
- b) A rescue of the therapeutical traditional knowledge.
- c) Pharmacological studies of the plants which are used for the treatment of diarrhoea and with activity on female reproductive system.

EXPERIMENTAL

Antidiarrhoeal activity. For this field of activity, we selected *Brickellia secundiflora* and *Talauma mexicana*.

BRICKELLIA SECUNDIFLORA

In Mexico it is popularly known as Peston, Pexto, Oregano de Cerro³.

It is a member of the *Asteraceae* family, original from America and located in an area that goes from the north western USA, Mexico¹³, Central America and a little part of Bolivia and of the East of Brasil. In the ancient folk medicine of Mexico the *Brickellia* was used to cure gastro-intestinal disorders³. At the present time it is used for treatment of stomach ache, muscular spasms and diarrhoea³. Phytochemical reports about its composition have reported flavonoids and diterpenoids as principal components^{9,10}.

Plant material. It was collected at San Antonio del Rio, Estado de Mexico in september. The dry ground leaves were extracted exhaustively with a mixture of water-ethanol (1:1) submitted to reflux at 80-85 °C with agitation. The extraction was completed until a clear solution was obtained, all the extracts were evaporated together under reduced pressure until elimination of ethanol and the residue was suspended in water to be used in bioassay test.

Preparation and contractility measurement of smooth muscle (*jejunum*). New Zeland male white rabbits weighing 2.5 to 3.0 kg were fasted over night and killed by cervical dislocation. The *jejunum* was removed, cleaned, and some 2 cm segments were obtained and mounted in 10 ml organ baths containing Tyrode solution at pH = 7.4, at 37 °C, bubbled continuously with 98% O₂ -5% CO₂. Their contractions were recorded simultaneously on a four-channel Narco Biosystems physiograph, using the classical in vitro method for their measurement. The linear regression test was applied for statistical analysis.

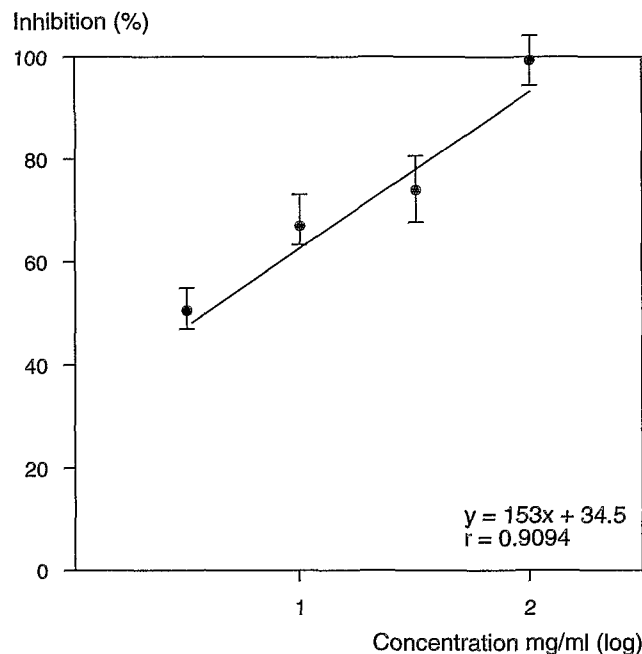
Results and Discussion. The water-alcohol crude extract of *Brickellia secundiflora* leaves inhibited the spontaneous contractility of rabbit *jejunum* as shown in Fig. 1. This blocking effect was concentration-dependent and completely lost after elimination of the extract by washing with Tyrode solution.

TALAUMA MEXICANA

It is popularly known as Yolaxochitl, magnolia mexicana, heart flower. It is a member of *Magnoliaceae* family, native from Mexico and located in the center and the south of the country in Guerrero, Puebla, Morelos, Veracruz, Oaxaca and Chiapas.

Fig. 1

Effects of a water/alcohol extract of *Brickellia secundiflora* leaves on rabbit jejunum contractility.
Means of 20 experiments/point \pm SE.



In the past, it was used in the treatment of thorax problems, to control fever, spasms and diarrhoea^{3,7} of infectious kind, and sterility. At the present time it is used for treatment of heart problems, gastrointestinal spasms and diarrhoea. Phytochemical reports indicate that it contains p-hydroxyphenone, trimesic acid, d-quercitol and aztequine¹⁴.

Plant material. The leaves were collected in Mexicaltzingo, Estado de Mexico and in Orizaba, Veracruz in September and April. The dry and fresh leaves were extracted exhaustively with a mixture of water-ethanol (1:1) at room temperature. The extract solution was evaporated under reduced pressure until elimination of the ethanol and the residue was suspended in water to be used in bioassay test.

Smooth muscle activity (jejunum). The same experimental procedure as for *Brickellia secundiflora* studies was used for *Talauma mexicana*.

Results and Discussion. The water-alcohol crude extract of *Talauma mexicana* dry and fresh leaves shown an inhibitory effect on jejunum contractility stronger for dry leaves than for fresh ones (Fig. 2). This activity was concentration-dependent and was lost after elimination of the extract. This pharmacological effect supports the popular against diarrhoea.

Effect on female reproductive system. For this effect we selected the following plants: *Dioscorea mexicana* and *Tagetes lucida*.

DIOSCOREA MEXICANA

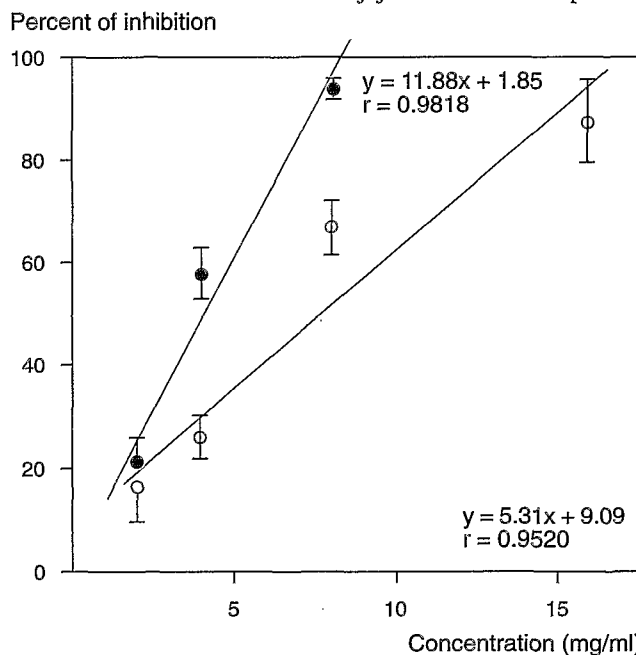
It belongs to the family of the *Dioscoreaceae*, and is distributed in tropical zones in Mexico like Veracruz, Oaxaca, Chiapas, Guerrero and others. Most of the *Dioscoreaceae* existing in Mexico are popular called "barbasco", "barbasquillo". However *Dioscorea mexicana* is commonly known as "cabeza de negro" "name", "yame"³. In the folk ancient medicine it was used for treatment of arthritis. Some ethnobotanical studies indicated that it is used like abortive in some regions of Mexico, though this effect is not as popular for humans than for animals⁶. This plant was used in the 1940's as raw material to obtain sexual hormones¹¹. Phytochemical reports show that this plant contain steroid saponins.

Plant material. Rhizomes of *Dioscorea mexicana* were collected at Orizaba, Veracruz. The fresh rhizomes were washed, miced and extracted exhaustively with methanol at room temperature. The extract was evaporated under reduced pressure, almost dried and some compounds precipitated with water. The precipitate was filtered and suspended in water to be used in bioassay test.

Fig. 2

Dose-response curve of the inhibitory effects of *Talauma mexicana* leaves on the contraction of rabbit jejunum muscle (● dry – ○ fresh).

Values are mean \pm SEM of 6 jejunum muscle strips.



Smooth muscle activity (*in vitro* uterine contraction).

Ovarectomized adult virgin female Wistar rats (150-200 g) were used. 21 days after ovariectomy operation, the animals were killed by cervical dislocation, uterine horns were removed, cleaned and uterine rings were obtained and mounted in 10 ml organ baths containing Krebs solution at 37 °C, pH = 7.4, bubbled continuously with 95% O₂- 5% CO₂. The contractile responses of the uterus were recorded isometrically by a force displacement transducer F-60 connected to a Narco Biosystems Physiograph. The linear regression test was applied for statistical assay.

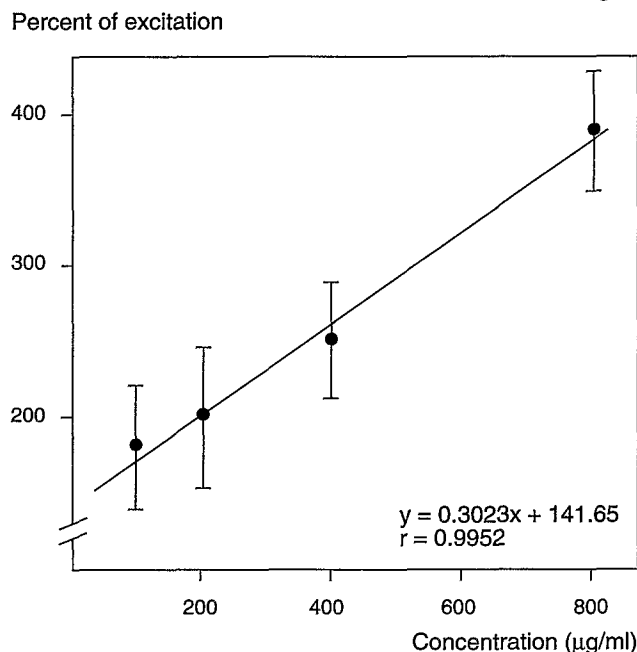
Results and discussion. The methanolic crude extract of *Dioscorea mexicana* rhizomes brings an effect of excitation of the spontaneous contraction of ovarectomized uterus (Fig. 3.), in a concentration-dependent manner, and it was lost after elimination of the extract. This response is similar to the effect obtained with oxytocin.

TAGETES LUCIDA

This wild plant native to Mexico is distributed in luke-warm zones. It is a member of *Asteraceae* (*Compositae*) family and it is known in central zones with the names of "pericon", "Santa Maria" and in North as "Yerbanis"¹³. This species has been considered since ancient times as a medicinal plant and was used for the treatment of stomach problems, to vomit,

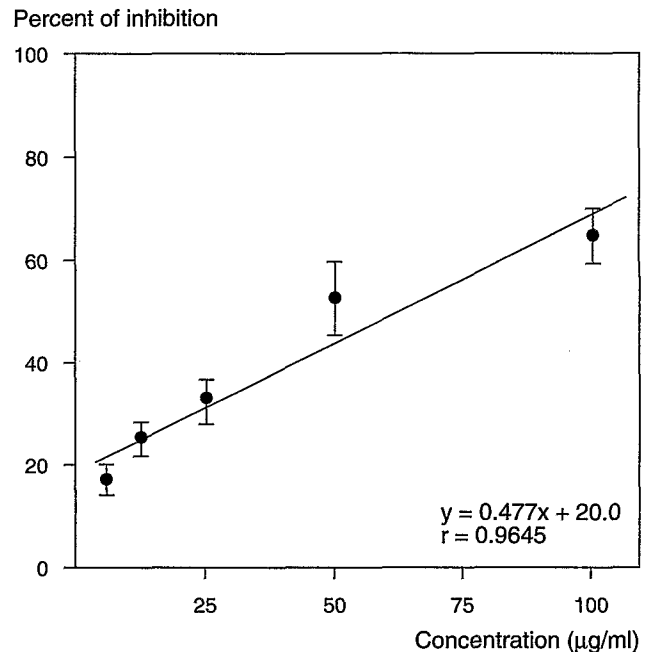
Fig. 3

Concentration-response of the exciting effects of *Dioscorea mexicana* extract on the contraction of ovarectomized rat uterus muscle. Values are means ±SEM of 6 uterus rings.

**Fig. 4**

Inhibitory effect of *Tagetes lucida* leaves extract on the concentration of ovarectomized rat uterus muscle.

Values are means ±SEM of 10 uterus rings.



"empacho", for menstruation control, as an abortive and for some uterus problems⁵. At the present time, it is recommended on the market for treatment of diarrhoea, for stomach pain, spasms and to "to help retracted the parturients uterus"⁵. The chemical contents of this plant has been investigated and among the compounds which have been isolated are new coumarin derivatives¹⁵ which can be related to the spasmodic effect.

Plant material. It was collected between August and September in Morelos State. The leaves of *Tagetes lucida* were dried and then boiled in water during 5 min, and filtrated. This solution was used for the bioassay test.

Smooth muscle activity (*in vitro* uterine contraction). The experimental procedure for this test was the same as for *Dioscorea mexicana* studies.

Results and discussion. The aqueous extract of *Tagetes lucida* produces an inhibitory effect on the spontaneous uterus contraction of rat (Fig. 4).

This inhibition is dose-dependent and the muscle recuperated after elimination of the extract by washing.

These preliminary results show a good correlation between traditional medicine and pharmacological studies which in some way support the use of this plants popular, and may be considered as an encouragement for further study.

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