DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Food and Drug Administration

Memorandum

Date APR 15 1997

5741 '97 JUN -2 A10 :34

From Acting Director, Division of Programs and Enforcement Policy, Office of Special Nutritionals, HFS-455

Subject 75-Day Premarket Notification for New Dietary Ingredients

To Dockets Management Branch, HFS-305

New Dietary Ingredients:	Flourensia cernua Brickellia cavanillesi Amphipterygium adstringens
Firm:	Malabar Productos Naturales
Date Received by FDA:	March 18, 1997
90-Day Date:	June 19, 1997

In accordance with the requirements of section 413(a)(2) of the Federal Food, Drug, and Cosmetic Act, the attached 75-day premarket notification for the aforementioned new dietary ingredient should be placed on public display in docket number 95S-0316 after June 19, 1997.

Sincerely yours,

Nicholas Dunfor

James Tanner, Ph.D.
Acting Director,
Division of Programs and
Enforcement Policy
Office of Special Nutritionals
Center for Food Safety and
Applied Nutrition

Attachment

cc:
HFS-22, CCO
HFS-450 (r/f, OSN w/control slip:TRAC#51804 & cpy incoming)
HFS-456 (r/f, Latham, Moore)
r/d:HFS-456:JELatham:jel:04/07/97:DocName:#51804.mem:Disc3

95S-0316

RPT 10

MALABAR
productos naturales s.a.de c.v.

March 18, 1997

Victor Fratelli, Ph.D.
Office of Special Nutritionals
Center for Food Safety and Applied Nutrition
Food and Drug Administration
200 C Street HFS-455
Washington, DC 20204

RECEIVED
3/21/97
HFS-456

Dear Dr. Fratelli,

Notice is hereby given pursuant to the requirements to Section 413(a)(2) (21 U.S.C. 350b) of the Federal Food, Drug and Cosmetic Act of three new dietary ingredients wich will be introduced in the dietary supplement Gastrité. These new dietary ingredients have a long history of safe use in Mexico, and published articles support the conclusion that these ingredients are safe in expected use.The new dietary ingredients, and citations to published articles supporting their safety, are:

Tarbush (scientific name *Flourensia cernua*, Mexican name Hoja Sén)
-M. Martinez, *Las Plantas Medicinales de México* **(1944)**, Hoja Sén, pp. 186.
-Selecciones del Reader's Digest, *Plantas Medicinales* **(1987)**, Hoja Sén , pp.226
-M.S. Nicholson and C.B. Arzeni. *The Market Medicinal Plants of Monterrey* **(1993)**, Economic Botany, Vol.47, pp.186.
- M.Gonzalez Elizondo, *Las Plantas Medicinales de Durango.*Inventario Básico**(1984)**, Flourensia cernua, pp.27

Proudigious (scientific name *Brickellia cavanillesi*, Mexican name Prodigiosa)
-M. Martinez, *Las Plantas Medicinales de México* **(1944)**, Atanasia Amarga, pp. 43-44.
-Sociedad Farmacéutica Mexicana. *La Nueva Farmacopea Mexicana***(1952)**, Prodigiosa,pp.349-350
-M.S. Nicholson and C.B. Arzeni. *The Market Medicinal Plants of Monterrey* **(1993)**, Economic Botany, Vol.47, pp.186.

Cuachalalate (scientific name *Amphipterygium adstringens*, Mexican name Cuachalalate)
-E.Estrada Lugo/Universidad Autónoma Chapingo,*Plantas medicinales de México***(1992)**,p.411-418
-M. Martinez, *Las Plantas Medicinales de México* **(1944)**, Cuachalalate, pp. 404.
-H. García Rivas, *Enciclopedia de Plantas Medicinales Mexicanas* **(1982)**, Cuachalalate, pp. 221.
-Journal of Ethnopharmacology, Elsevier Scientific Publishers **(1991)**, Amphipterygium adstringens, pp. 147-154.
-M.Gonzalez Elizondo, *Las Plantas Medicinales de Durango.* Inventario Básico **(1984)**, Amphipterygium adstringens.
-P.C.Standley, *Trees and Shrubs of Mexico* **(1920-1926)**, Amphypterygium, pp.672-673.

Copies of the thirteen articles are enclosed, along with English translations (made by an expert translator) of the nine articles originally in Spanish. These new dietary ingredients will not be marketed in the US for 75 days after your expected receipt of this notice.

Very truly yours,

Malabar Productos Naturales S.A. De C.V.
Natalia Garza Torres / Export Manager

NEW DIETARY INGREDIENTS:

*** Flourensia cernua**

*** Brickellia cavanillesi**

*** Amphipterygium adstringens**

FLOURENSIA CERNUA DC.

A leaf and stem infusion is recommended to treat stomach ache, diarrhea, colics, as well as other stomach diseases (Gonzalez, S. 1979). Lab experiments habe been carried out which show that leafs have purgative properties; this is interesting since a lot of Mexican countrymen use this leaf infusion to treat dysentery. (Johnston, 1979). Another use for leaf infussion is as expectorant. (Gonzalez, S. 1979).

FLURENSIA CERNUA D.C.
COMPOSITAE

This is a resinous bush, as abundant as *"gobernadora"* in plains and hillsides of desert or semi-desert areas of the northern region of Mexico. Sometimes, mile after mile of land is covered with a thicket of these two species, giving the landscape a thrilling monotony. Harmony among members of this vegetal community is so perfect, and betweeen them and their environment, that no alternative is accepted: if thicket is razed, it will regenerate without passing through interim stages of other types of vegetation. Same as *"gobernadora"*, leaves of this plant adapt to barrenness without much modification; they do not bear organs to store water nor smallish leaves or leaves transformed into thorns; neither do they dissappear from surface during drought. Plant waits first rains to bear flowers and in order to remain alive, it segregates a viscous resin which has earned the plant to be known as "tarbush" in the United States.

Species exhales a fragance similar to hop, and has a bitter taste. At outlets of this type of northern states of Mexico it is very common to find leaves and flowers of this plant, which are sold as a remedy for indigestion and "female illness". In central and southeastern Mexico, a product offered as *"sen"* isn't really of the *"Flourensia"* genous, but a *Cassia* species, used as purgative substituting the famous *Cassia Senna*.

Habitat: It is a part of the xerophilus thicket of some desert and semi-desert zones.

Geographic Distribution: native of North America, it extends from southwestern United States to Central Mexico. In Mexico, it grows mainly in the northern states, down to Zacatecas, San Luis Potosí and Hidalgo.

Identification: Resinous bush, 1 to 2 meters high, erect or trailing, very branched. Alternated, full, short-petiole, oval or elliptic leaves, 2 to 2.5 cm. long x 6.5 to 11.5 millimeters, with pointed tip and smooth borders. Yellow flowers, grouped in solitary, terminal corymbs. Fruit is achene, more or less tick, with a two-bristle pappus and, rarely, two scales. It flowers from July on, when the rainy season has begun.

Usage: Common people uses a leave and flower infusion to relief indigestion; which seems to be right in view of the little medical and pharmacological studies made on this plant. Its chemical analysis revels presence of an

SEN

Scientific name: Fluorensia Cernua, D.C. composite family.

Found: Sonora and Nuevo León to Zacatecas, Coahuila and San Luis Potosí.

Features: Small bush, one to two meters high, elliptic-acute leaves up to 2.5 cm long; yellow and solitary heads supported by long axis. Leaves are smelly and bitter. Mr. Ernest Koeler presented a thesis work on this plant in 1944 to the School of Chemistry. He found essential oil in a proportion of 0.864, a glycoside of 0.332% as well as a resin, and said that a cubic centimeter of tincture or infusion of 10 leaflets may be ingested against indigestion, and that tincture should be prepared with 90° alcohol.

"PRODIGIOUS" PLANT

Scientific name: Brickellia cavanillesi, A. Gr.; Composite.

Found: Valley of Mexico, San Luis Potosí, Querétaro, Jalisco, Hidalgo, Oaxaca.

Parts Used: Just the leaves, although vendors present it in boughs.

Description: Cylindrical, scarcely branched, 0.003 to 0.004 mm in diameter, dark to yellowish, finely serrated, velvet haired stems.

Opposite leaves, upper ones are alternate, shortly petiole, egg-shaped, sub-acute, dented, light green and hair covered, mainly at the underneath, which is lighter and presents a reticulate aspect due to protruding nervations that anastomose between them; harsh surface; both central nervation, which is prominent, and secondary ones, are of a dark to yellowish color similar to those of stems. Underneath face presents, when seen at the microscope, fine whitish and brilliant dots that pertain to numerous small glands. Aromatic odor, very bitter taste.

Flowers sometimes found in boughs make up corymbs made up of 20 to 25 flowers, arranged in lengthy panicles; an involucre with lanceolate, acuminate, serrated, erected, scarcely imbricate scales in three or four series; the outer ones are harsh and glandule-bearing hair, as well as peduncles and upper part of stems, slim and bare receptacle, regular, tube-like, slim, with five-teeth corolla, including anthers; elongated, obtuse, sub-claviform stems, serrated achenes, uni-seried pappus with hairy bristles.

Chemical Composition.- This plant contains a glycoside named brikelin, a resin, an essential oil, fat, tannin, coloring material, gum, starch and salts. Main substances are brikelin and resin. The first one crystallizes as fine and silky white needles of bitter taste; it is soluble in water, ether and in a mix of alcohol and ether; it does not contain nitrogen; it precipitates in alkaloid reagents; nitric acid gives it a red color; with sulfuric acid and potassium dichromate a reddish coloration is obtained which changes to greenish black; with hydrochloric acid it provides a canary yellow color which intensifies by increasing "t."

Resin is soft, reddish-dark, soluble in alcohol, ether, alkaline solutions and chloroform.. Hydrochloric acid dissolves it, becoming a greenish-yellow color; sulfuric acid makes it become of a dark red color turning it to black. Nitric acid dissolves it, and it turns into red. It does not have a glycosic function.

Therapeutic properties. It acts as a bitter tonic, which is appropriate against secretory and motor atony of gastric-intestinal tube.

It may be used in cases of hypochlorhydria and stomach dilation, with altered food stagnation as well as to take care of indigestion with putrid eructation; it must be forbidden in cases of hiper-chlorhydria and gastritis. It should be taken three to four hours after meals.

Dose: 5 gr. of leaves per 125 of water. Extract in pill of 0.10 to 0.25 gr. , once

***BRICKELLIA CAVANILESI DC* Family of Composite**

Found: Valley of Mexico, Puebla, San Luis Potosí, State of Mexico, Hidalgo, Querétaro, Oaxaca.

Features: Semi-woody plant, about 2 m high, harsh, hairy reddish stem; opposite leaves, (the upper ones alternate), shortly petiole, oval-lanceolate, merlon-serrated shape, three-nerved, almost wooly underneath and in an ash-like color, with hardly-visible by the naked eye small glands, yellow flowers in hanging heads of about 25 flowers each. Plant blooms from September to December.

Parts Used: Leaves and flowers.

Chemical composition: According to Prof. Francisco Río de la Loza, leaves contain: essential oil, grease, an acid resin, a glycoside named brikelin, coloring material, tannin, chlorophyll, gum, starch and mineral salts. Brikelin crystallizes in silky white needles of bitter taste, soluble in water (even more if hot), in absolute alcohol and in a mix of alcohol and ether. Active principles are resin and glycoside.

Brikelin is prepared as follows: a strong cooking of plant, after filtering it, evaporates to obtain an extract. Such extract depletes by absolute alcohol and extract obtained again through alcohol evaporation, is dissolved in water and ammonium is added to precipitate impure glycoside in a 24 hour setting. It is purified and crystallized by means of absolute alcohol, whether cool or hot.

Physiological action: It does not exercise any general action nor is it venomous. Taste is bitter and induces salivation; increases gastric juice and stimulates movements of stomach; acts as an antiseptic by decreasing or hindering putrid fermentation within stomach. Its teniafuge action seems uncertain.

In Aldama, Gro, cooking of this plant is taken against blood irritation, which does not seem unwise is such blood irritation derives from a bad digestion.

Therapeutic application. It has been used, with good results, as a bitter tonic against secretory and motor function atony of gastric-intestinal system. It is recommended in cases of hipochlorhydria and stomach dilation with altered food stagnation.

Doctors Cal and Oliva recommend this plant as febrifugal and tonic. On the other hand, it is not recommended in case of hyperchlorhydric and neurasthenic patients with gastric ailments. In Taxco, Guerrero use this leaf-cooking as an anti-billious anti-malarial agent with a little bit of salt.

Dose: In cases of dyspepsia, a tea-like infusion (5 grams of leaves per 125 of water), should be used after meals or even better, two or three leaves after each meal. Whenever intestine is to be activated, a hydroalcoholic extract, at a dose of 20 to 50 centigrams per day should be used, dividing it in pills. As teniafuge agent, Prof. Urbina recommends the following formulation:

Kousso flowers..... 2 grams
Powdered Brikellia. ..... 5 grams

Soak for 12 hours, strain and serve drink in one taking.

Reference: *Datos para la Materia Médica Mexicana/Data for Mexican Medical Subject, 1st part, page 269, Mexico, 1894.*

Profr. Francisco Carmona. Thesis.

Dr. Leopoldo Flores. Manual Terapéurico de Plantas Mexicanas */Therapeutic Manual of Mexican Plants, Mexico 1907.*

GERMINATION OF TWO MEDICINAL SPECIES:

Cuachalalate and Chaparro Amargoso

Zarate Aquino, M.A.,
López Herrera, A. and
Estrada Lugo, E.

SUMMARY

Cuachalalate (*Amphipterygium adstringens Schiede ex Schlecht* and Chaparro Amargoso (*Castela tortuosa* Liebm), native species of Mexico, are of a relevant importance within traditional medicine of this Country.

To introduce a species to cultivation, it is important to know its germination, that is, to know factors that intervene for such seed to survive in certain environmental conditions.

In the cuachalalate experiment, seeds were collected at the nursery of Tlaucingo, Puebla, on December 1982 and January 1983. Seed were selected as per their size and wing was removed to optimize space in Petri boxes.

Several preliminary tests were conducted to select treatment for the final experiment. Temperatures from 25 to 30°C were used; photo-sensibility of seeds was observed, testing likewise different treatments to disrupt lethargy.

Seeds collected in 1982 showed a good result in full scarification, obtaining 100 per cent germination. With respect to seeds collected in 1983, a good response was obtained with immersion in calcium hypochlorite at 0.4% during 15 minutes, obtaining a 58% of germination.

INTRODUCTION

Use of medicinal plants by mankind going back to times before it settled down, and up to our days, explains the importance they had throughout time.

Even if Mexico has a large amount of medicinal plants, not all of them are available throughout the different seasons. Shortage or non-existence of plants in its natural distribution area or sales places is frequent; for this reason, it is convenient to make available any medicinal plant in any season of the year, in any place and affordable for everyone, specially low income people, thus the importance of introducing medicinal plants for cultivation.

One of the most relevant aspects to consider when introducing a species for cultivation is germination, that is, to know those factors involved, in order to make a seed able germinate. This is an indicator how such species survives under certain environmental conditions.

Cuachalalate (Amphipterygium Adstringens) is a species of interest for our study, due to its importance as a drug and to the fact that its reforestation is

practically null in areas where it is exploited. The other species is Chaparro Amargoso (Castela tortuosa) which, for years, has been successfully used against amoebiasis in Mexico.

The purpose of this work is to increase knowledge about these medicinal plants Mexico, disclosing some aspects of germination of Cuachalalate, *A. adstringens* and Chaparro Amargoso, *C. Tortuosa*

REVIEW OF LITERATURE

Cuachalalate

Cuachalalate A. adstringens pertains to julianiaceae family. It is a tree approximately 8 m. high; its bark is extremely astringent and has a spicy smell. Leaves arranged in an alternate spiral shape, gathered at the tip of branches. Trees of this species shed their leaves during six months; November to May; it is a dioic plant: masculine flowers are panicles agglomerated at the axil of new leaflets. Feminine flowers are solitary at the axil of leaves. It blooms from May to July (Pennington and Sarukhan, 1968). Fruit: a Dry syncarp consisting of an acrescent, engrossed and sub-globous involucre which contains 1-2 hairy, compressed pits, more or less sticked to their wall. Seeds without endosperm. (Cronquist, 1981).

Plant pertains to the following type of vegetation: folliage perishable tropical forest (Rzedowski, 1978) or folliage perishable low forest (Miranda and Hernández X, 1963) or folliage perishable thornless low forest (Pennington and Sarukhan, 1968).

It is restricted to the Pacific basin, from Nayarit to Oaxaca, including the Balsas Basin, generally associated to several species of Bursera Pseudosmodingium peerniciosum. It may grow fairly well in zones subject to periodical fires (Ridley, 1930, and Good, 1974).

Following uses appear in Díaz's compilation (1976): Martínez (1969) states that is an anti-cancerous, anti-malarial, astringent agent, and against typhoid fever; Hernández (1942) as an anti-malarial, anti-tumors, astringent agents and to cure wounds; Anonimous (1952) as an astringent agent; Navarrete (1982) reports it to be hypocholesterolemiant agent.

Chaparro Amargoso

Chaparro amargoso, C. tortuosa, pertains to Simaroubaceae family.

It is a small bush that may grow up to 2 m high, with a grayish, intensely bitter bark. It has alternate thorns in branches and stems. Alternate leaves or in groups up to four, located near thorns. They are sessile, long, narrow and border turned backward. Blooms are solitary, of a saffron-red color, with four petals and four sepals. Fruit is a small, bright red drupe, sub-globous, slightly compressed (Correl and Johnson, 1970, Martínez, 1969).

A native species of Mexico (García *et al,* 1961). It pertains to the following type of vegetation: xerofilous thicket (Rzedowski, 1978) or thorny thicket with

terminal thorns, although it may be found in thorny low forest and pastureland (Miranda and Hernandez X, 1963).

According to Miranda and Hernández X, 1963, chaparro amargoso presents its best development in arid zones of the northern Mexico.

Cronquist (1944) set forth that *Castela Nicholsoni* Torret Gray and *Castella Texana* Rose should be included within the Castella tortuosa Liebm species.

MATERIALS AND METHODS

Cuachalalate

Experiment was carried out in seeds laboratory of Department of Botanics of Universidad Autónoma Chapingo, in 1983 and 1984.

Source of seeds

Fruits of cuachalalate were collected in the nursery of Tlaucingo, Puebla, which pertains to said village; nursery was created through the COPLAMAR program with the purpose of reforesting the region with native species, cuachalalate among others.

Due to a change in the program, the nursery is currently used to produce vegetables.

Features of seeds

Before experiments were carried out, seed test for tetrazollium feasability was performed; in each of the two repetitions, 20 seeds were placed without head, within a tetrazollium solution, letting it settle for three hours. Coloration of seeds was observed, obtaining 80% of feasibility.

Preliminary Experiments

Tests under constant conditions of light and darkness were conducted in order observe if seed was sensible to light, besides different temperatures and treatments to break up interior latency, such as: potassium nitrate, giberelic acid, low temperature, alternation of temperature, soaking in warm water, soaking in water at room temperature.

Based on preliminary test results, the following treatments for the final experiment were chosen:

Treatment 1 Alternation of temperature, 8 days
Treatment 2 Alternation of temperature, 4 days
Treatment 3 Soaking, 96 hours at room temperature
Treatment 4 Soaking, 72 hours at room temperature
Treatment 5 Soaking, 48 hours at room temperature
Treatment 6 Soaking, 24 hours at room temperature
Treatment 7 Control

With respect to seed with alternation of temperature, fruits without wings were

20.23 gr. in average); alternation of temperature was 14 hours at 5°C and 10 hours at 30°C; for soaking purposes, seeds were put in glass jars with distilled water.

Before mounting experiment, disinfection technique was used as explained below.

Experiment was a totally random design with four repetitions of 100 seeds each; each repetition had four experimental units of 25 seeds in each 15 cm diameter Petri box. Experiment had a constant temperature of 25 - 27°C as well as constant light. Data reading was as follows:

- Percentage of germination, every two days during 28 days, considering plantlets fully out of the seed as germinated, each of them with plumule, hypocotyl, radicle and other cotyledons exposed.
- Size of plantlets, every two days during 28 days. Size of hypocotyl and radicle was measured in a maximum of 10 plantlets in each repetition.
- Dry weight, every three days during 28 days. Radicle,hypocotyl and cotyledons were weighed on a separate basis, and the maximum of 10 plantlets was considered in each repetition.
- Number of non-germinated seeds. Experiment lasted 28 days.

Chaparro Amargoso

Experiment was carried out in seeds laboratory of Department of Botanics of Universidad Autónoma Chapingo, in 1983 and 1984.

Source of seeds

Chaparro Amargoso seeds were collected in Valle de Tehuacán, Puebla, near Zapotitlán de las Salinas. Collection was made up of wild plants, selecting fruits that presented a vivid red color. Collection were carried out en December 1982 and December 1983.

Features of Seeds

Tetrazollium test to seed was conducted before experiments for feasability purposes; in each of the two repetitions, 20 headless seeds were put within the tetrazollium solution, allowing settlement for three hours. Feasibility of 100% was obtained from both seeds collected in 1982 and 1983.

One hundred seeds of this plant weigh 6.5 grams in average.

Preliminary experiments

Seeds were homogenized in size, using those of an intermediate size since they were more.

For final treatment selection purposes, preliminary tests were conducted beginning with seeds of 1982, but since they depleted, the following tests were conducted with 1983 seeds.

Tests of constant light and darkness were conducted, in order to observe if the seed was sensible to light, besides different temperatures and forms of scarification such as: manual scarification, whether total and partial, with sulfuric acid, calcium hypoclorite.

Combination of both treatments abov, with seeds collected in 1983, was deemed as final experiment.

Treatment 1 Sulfuric acid (10%) during 5 minutes and calcium hypoclorite during 15 minutes
Treatment 2 Sulfuric acid (5%) during 5 minutes and calcium hypoclorite during 15 minutes
Treatment 3 Sulfuric acid (10%) during 5 minutes and potassium nitrate 0.6%
Treatment 4 Sulfuric acid (5%) during 5 minutes and potassium nitrate 0.6%
Treatment 5 Calcium hypoclorite during 15 minutes and potassium nitrate 0.6%
Treatment 6 Control

Experiment was a totally random design with two repetitions of 100 seeds each; each repetition had two experimental units of 50 seeds in each 9 cm diameter Petri box. Experiment lasted 20 days without germination results.

RESULTS

Results of final experiment of cuachalalate may be summarized as follows. (Table 1)

1. Control or treatment with a temperature 25 - 27°C and constant light during 28 days had the highest germination percentage (37%).
2. Soaking treatment in distilled water during 96, 72, 48, and 28-hour periods had germination percentages between 25-29%.
3. Treatment of temperature alternation (14 hours at 5°C and 10 hours at 30°C) during 8 days had the least germination percentage (12%).
4. Treatment with temperature alternation (14 hours at 5°C and 10 hours at 30°C) had the highest radicle emergence (38%) with respect to all other treatments.
5. All treatments present relevant differences with respect to radicle emergence and final number of plantlets; in all cases, final number of non-germinated seeds was very high.
6. Top degree of germination is between sixth and twelfth days.
7. Radicle emergence with temperature alternation showed differences (14 hours at 5°C and 10 hours at 30°C, during 8 and 4 days). Number of radicles were 128 and 43, respectively, on the second day, with respect to all other treatments that had two up to 12 radicles.
8. Out of all treatments, those of temperature alternation were the ones that began germination first.

With respect to variance analysis, there is not any relevant difference for germination percentage (number of complete plantlets).

With respect to size of plantlet variable, there was not any meaningful difference in variance analysis. Likewise, with respect to the dry weight

Results of experiment of chaparro amargoso may be summarized as follows:

Seeds collected in 1982

1. A higher percentage of germination (100%) was obtained with total scaryfication, temperature of 20°C and constant light.
2. Percentage of germination with constant light controls was of 45 - 50%.

Seeds collected in 1983

1. Temperature of 25-27°C and constant light achieved a 10 - 72% of germination.
2. Constant temperatures of 25-27°C and constant darkness achieved 15 - 60% of germination.

REMARKS

Cuachalalate

With respect to results of experiment with this plant, in general terms, no relevant difference was observed in percentage of germination among different treatments. However, it could be observed that the alternation of temperature treatment (14 hours at 5°C and 10 hours at 30°C) for 8 days, almost equaled the control results in number of radicles that emerged (Table 1), and there was a difference in time interval in which radicles were present with alternation of temperature, with respect to all other treatments. It may be said that pace in radicle emergence, derived from application of alternation of temperature (14 hours at 5°C and 10 hours at 30°C) 8 and 4 days.

Difference in number of emerging radicles and final number of plantlets in treatment of alternation of temperature during 8 days, derives from the fact that upon mounting experiment we already had 100 seeds with a radicle. Such seeds germinated when the alternation of temperature was being conducted and due to a bad management, they did not become complete plantlets, thus reducing the number of final plantlets; said 100 seeds with radicle were not considered for analysis of the other variables, and were just considered for emerged radicle purposes.

Table 1
Total number of seeds, number of radicles, % of radicles, number of plantlets, % of germination and non-germinated seeds in the Cuachalalate (Amphypterygium adstringens) experiment

Treatment	Total No. of Seeds	No. of Radicles	Percentage of Radicles	Number of Plantlets	Percentage of Germination	Non-Germinated Seeds
1 Alternation of temperature 8 days *	400	152	38	49	12	248
2 Alternation of temperature 4 days *	400	110	27	101	25	290
3 Soaking 96 hours	400	129	32	100	25	271
4 Soaking 72 hours	400	133	33	118	29	267
5 Soaking 48 hours**	400	112	28	101	25	288
6 Soaking 24 hours**	400	114	28	100	25	286

- 14 hours at 5°C and 10 hours at 30°C

**** Soak in distilled water at room temperature**

Control and other treatments were maintained at constant temperatures between 25-27°C and with constant light during 28 days.

Some issues that help in interpreting results are that: a number of repetitions were considered for standard tests, since there were no more seeds available and probably the number of seeds (fruits) per experimental unit was not appropriate to detect the real response trend to treatments, since, as stated above, it was a very variable batch.

The manner to store fruits since their gathering might not have been appropriate , since they were stored in jute sacks outdoors in the nursery, and after bringing them they were kept within the seeds laboratory in white plastic bags inside a wood cabinet, which might have caused a deterioration in seeds.

Seeds harvest was probably from several trees, without any selection made, besides environmental conditions to which seeds were exposed since they fell from the tree until they were collected.

The time interval from collection of seeds until conducting experiment, might have caused a decrease in feasability and germination capacity of seed.

The large variety in size of fruits of the same plant was due to their wild feature and to cross-pollination, whether by wind or insects, since plant is dioic.

With respect to initial tests, there is not any clear indication that cuachalalate seeds are photosensitive, it seems to be irrelevant to such factor. Results obtained in such tests were for some variables, both in light and darkness, thus this solely strengthens the idea of the large variability of the batch and that perhaps homogenization by size was not appropriate and it would have been better if such homogenization had been done by weight.

Chaparro amargoso

With respect to results of the seed batch collected in 1982, seeds respond to any escarification treatment, specially to total scarification, which may indicate that the seeds is fully mature and in germination condition.

With respect to seeds of lot collected in 1983, a large difference in results is observed, which may be explained, perhaps, by the fact that the seeds had just been collected and bore growth inhibitors.

Comparing controls to the constant conditions, response shown by controls was similar to that of 1982 and this may derive from the fact that by such date batch seeds were fully ripe and thus, they reacted to any treatment, unlike seeds of 1983 which presented a larger diversity in response, which might indicate that not all seeds were physiologically adequate to germinate.

Different results among batches may be explained by the fact that when seeds settle, they germinate in a larger percentage, since they shed their latency, which is apparently endogenous of a morphologic type (Nikolaeva, 1967), and

this is presented by an unripe embryo, together with a mechanic exogenous latency which, according to results, is of a minor importance.

CONCLUSIONS

Based on tests above and final experiments of this research, the following conclusions were made:

Cuachalalate

1. With respect to Amphipterygium adstringens, the largest percentage of germination, 37%, was achieved by applying constant light and a temperature of 25-27°C; number of days to germinate is reduced with an alternation of temperature of 14 hours at 5°C and 10 hours at 30°C during 4 and 8 days.

Chaparro amargoso

1. Castela tortuosa presents an endogenous latency combined with a mechanical exogenous latency; the first one may be eliminated through a storing period (six months or more) or through chemical stimulants for growth and the second one, through a total manual escarification and a temperature of 20°C and constant light.

CUACHALALATE (Amphyterigium adstringens)

A Mexican bush, 4 to 6 m high, composite leaves with five serrated sessile leaflets of roundish teeth, almost all of them egg-shaped and a crib-like base. A 2 to 5 cm winged fruit which can be found mainly in Michoacán, Morelos, Puebla and Oaxaca. According to research by Dr. Leopoldo Hernández Chávez, if it very effective against stomach and intestines cancer and against typhoid fever, since it gives a reaction of 100, which is the maximum in an electronic scale. A favorable reaction of 70 against typhus was also detected.

APPLICATIONS AND USE

Against old wounds and weak gums. Wounds and gums are washed with a tea made with 50 grams of cuachalalate bark per 1 liter of water.

In animal wounds, wash and apply bark powder.

CUACHALALATE

Juliania adstringens Schl.

Found from Michoacán to Morelos, Puebla and Oaxaca

A 6 or more meters high tree with five serrated sessile leaflets of roundish teeth composite leaves, almost all of them egg-shaped and a crib-like base; a winged fruit of 2.5 to 5 cm.

Common use: Cooking of 50 grams of bark is used to harden gums and wash old wounds. Said to be good against intermittent problems. Powdered bark is applied to animal wounds after washing. Same cooking is used against cancer. There are many evidences about this, but I do not know if it is really cancer.

According to research by Dr. Leopoldo Hernández Chávez, "Cuachalala" is extremely effective against stomach and intestines cancer and against typhoid fever, since it gives a reaction of 100, which is the maximum in an electronic scale. A favorable reaction of 70 against typhus was also detected.

Miss Elodia Acevez Álvarez, presented a thesis work in Guadalajara in 1943 on this plant, and recently, Mr. J. E. Tempesta has been studying it and has found a glycoside? that at a dose of 0.15 to 0.20 grams kills rats.

Reference: P.C. Standley, Contribution from NS. Nat Herb. 23, part 3, Page. 673. Washington, D.C. 1923.

Farmacopea Mexicana

JULIANACEAE

Amphypterygium adstringens (Schlecht.) Schelede*

Bark has astringent properties; its cooking is used to harden gums, cure wounds and as a remedy to cure malaria (Standley, 1920, 1926)

BAJO PROTESTA DE DECIR VERDAD, EL SUSCRITO ARTURO MAY MIJARES, PERITO TRADUCTOR AUTORIZADO POR EL TRIBUNAL SUPERIOR DE JUSTICIA DEL ESTADO DE NUEVO LEON MEDIANTE OFICIO No. 413/80 DE FECHA 26 DE MAYO DE 1980. CERTIFICA Y DA FE QUE LA ANTERIOR TRADUCCION DEL ESPAÑOL AL INGLES QUE CONSTA DE 16 FOJAS, ES FIEL Y CORRECTA, SIN OMISIONES NI AGREGADOS, LA CUAL CORRESPONDE AL DOCUMENTO TAMBIEN ANEXO REDACTADO EN IDIOMA ESPAÑOL INTEGRADO POR 18 FOJAS EXPEDIDA EN MONTERREY, N. L., A 10 DE Marzo DE 1997.-CONSTA.

EL C. ARTURO MAY MIJARES
PERITO TRADUCTOR
R. F. C. MAMA-441224.