Global Journal of Medical Research: B
Pharma, Drug Discovery, Toxicology & Medicine
Volume 17 Issue 1 Version 1.0 Year 2017
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Phytochemical and Ethnobotanical Study about Tamarisk Gallica in a North Africa South-West of Algeria

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GJMR-B Classification: NLMC Code: QV 19

Strictly as per the compliance and regulations of:

Phytochemical and Ethnobotanical Study about *Tamarisk Gallica* in a North Africa South-West of Algeria

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I. Introduction

The use of medicinal plants as a source of remedy to treat themselves or Prevent diseases is originating in the millennia until the recent Chinese civilization, Indian and the Middle East. It is become certainly. The modern pharmaceuticals industry itself is still supports widely on the diversity of plant secondary metabolites to find new molecules to biological properties unpublished. This source seems inexhaustible since only a small part of the 400000 known plant species have been investigated on plans phytochemical and pharmacological, and that each species may contain up to several thousands of different constituents. Medicinal plants are used mainly in two forms: Complex, containing a broad spectrum of constituents (infusion, essential oils and extracts of the dyes). Pure, chemically defined as active principle. The pure compounds are generally used when the active principles of the plants produce a strong and specific activity or have a low therapeutic index. The Algerian flora with its 3000 species belonging to several botanical families Including 15% endemic, remains very little explored on the phytochemical plan as on the pharmacological plan. The valorization of the Medicinal Plants of the national flora will be a great contribution to the pharmaceutical industry of Algeria and will have an economic impact certain [1][2]. For our part, we have chosen to study the Saharan species *Tamarisk gallica* is part of the family Tamaricaceae, account approximately 50 to 60 species of shrubs to flower in the Tamaricaceae family.

Fig. 1: Tamarisk gallica flowers (side of the Valley of Bechar (south west of Algeria), which located near the district of Djenain Difallah).

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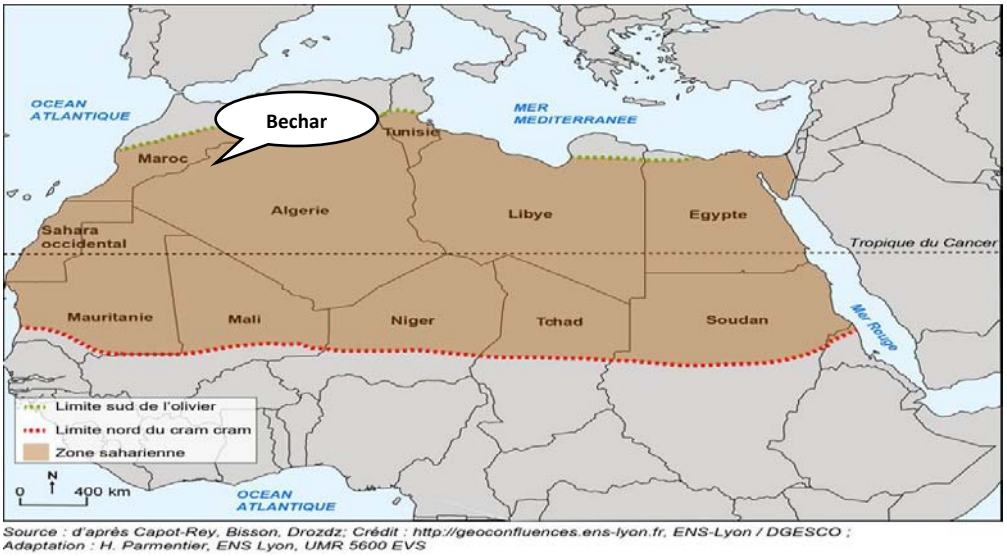
The generic name of origin in Latin is supposed to refer to the river Tamarisk in Spain [3][4]. The Tamarisk are trees or shrubs, frequent in salted land, characterized by small leaves scaly, often nested, and giving the twigs the appearance of those of some junipers.

Fig. 2: Salted land where *Tamarisk gallica* are existing in the west south of Algeria.

The leaves are often punctuated by tiny holes corresponding to funnels at the bottom of which are placed stomata and by where exudes a mucus containing salt and limestone. The roots are in general very developed; their wood contains vessels to large gauge. The flowers are grouped in cylindrical kittens that among some species of genus Tamarisk [5].

Fig. 3: The morphology of leaves and roots of *Tamarisk gallica* shrub of the west south of Algeria.

We know sixty species of Tamarisk capita especially the Mediterranean countries and the South Asia, in dry regions in particular.



Source : d'après Capot-Rey, Bisson, Drozdz; Crédit : http://geoconfluences.ens-lyon.fr, ENS-Lyon / DGESCO ; Adaptation : H. Parmentier, ENS Lyon, UMR 5600 EVS

Fig. 4: The geometrical sites of the existence of *Tamarisk gallica* especially in the north Sahara of Africa.

This kind plays an important role in North Africa and the northern Sahara, where It account about a dozen species of which two are particularly prevalent: T. articulata and T. gallica, designated in Arabic respectively under the names of "Thlaia" (more. "Ethel") and "Fersig" (more "The Aârich") [6].

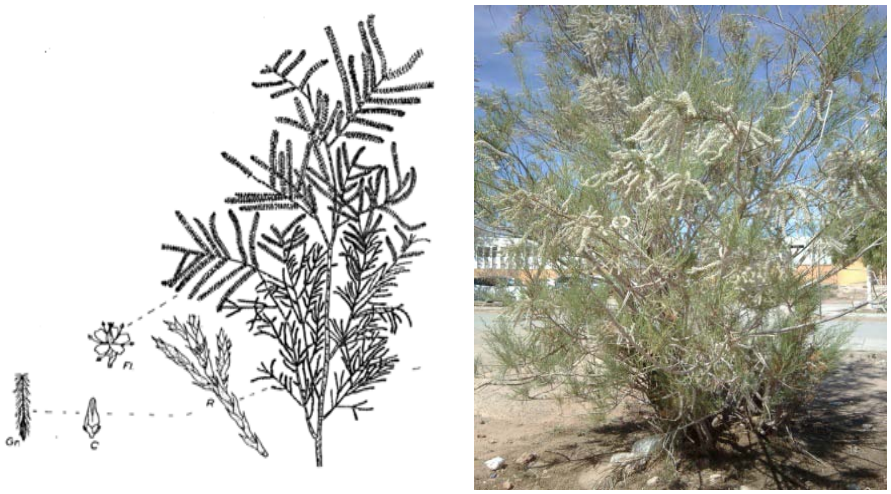


Fig. 5: Morphology of the species *Tamarisk gallica.*

The aim of this work is the identification of the various families of secondary metabolites exist in the aerial part of the species of *Tamarix gallica* following the protocols mentioned below, either by:

- Maceration by using:

1) The diluted hydrochloric acid (5 %) for the identification of flavonoids.
2) Ethanol (70%) for the identification of steroids and sterols unsaturated.
3) Distilled water for the identification of cardenolides.

- Exhaustion by heating by using:

1) Distilled water for the identification of saponosides.
2) Distilled water for the identification of tannins.
3) The chloroform for the identity of the sterols and unsaturated of terpenes.
4) Hydrochloric acid, for the identification of alkaloids.

II. Materials and Method

a) Preparation of plant material

The harvest of the species *Tamarisk gallica* has been carried out the month of February, the 06/02/2015 until 08/02/2015 at the level of the city of Bechar, next to the valley of Bechar, which located near the district of Djenain Difallah. It was the flushing by water ordinal and the drying of the rods with the bark, loads of leaves has been cut away in the dark and dry place for 10-15 days, and thenwe grind them to aid a mill to become in the powder form a little fine, after we retain it in a glass vial well closed.

Fig. 6: The Valley of Djenain Difallah district, Bechar - Algeria (Oued Bechar).

Fig. 7: Leaves and rods grinded of the species *Tamarisk gallica.*

Chemicals: Turnings of magnesium, acetic acid glacial, sulfuric acid, ammonium hydroxide(smoked), chloroform, and ethanol, hydrochloric acid, chloride of iron, methanol, iso-amylic alcohol. Distilled water.

i. *Highlighting of flavonoids (free, glycosides and heterosides)*

The macerate obtained after 48 hours, from a mixture of 10g of plant material and 75 ml HCl (5 %) is filtered.

1.1.1st Test: detection of flavonoids:

– 10 ml of the filtrate is adjusted to pH (9 to 10) with ammonium hydroxide (smoked). The control of pH has been achieved with the indicator paper pH, which turns dark blue.

⇨ The presence of flavonoids is indicated by the appearance of the color yellow.

Fig. 8: The alkalization of medium with the appearance of the yellow color.

1.2.2nd test: detection of glyosidic flavonoids and heterosidiques:

– The basic solution of the 1st test is brought to the evaporation.

– The residue obtained is dissolved in 3 ml of hydrochloride acid (5 %), and then the mixture (acid extract) is heated slightly.

– After cooling, the acid extract was divided into two fractions.

– Has the 1st fraction, a few seeds of Mg have been added.

⇨ The obtaining of the color grenade attests the presence of flavonoids -glyosidic bonds.

– A quantity of 2.5 ml of alcohol iso-amylic has been added to the 2nd fraction of acid extract.

⇨ The development of the yellow color indicates the presence of flavonoids heterosidiques.

Fig. 9: Formation of the pomegranate color according to the addition of Mg.

1.3.3rd test: detection of free flavonoids:

– Has 10 ml of the filtrate, add 5 ml of alcohol iso-Amylic, the appearance of the color indicates the presence of flavonoids free.

Fig.10: Detection of free flavonoids by the appearance of yellow color.

b) Highlighting of steroids and unsaturated sterols

– The filtrate of the macerate obtained, after 48 h from 3 g of plant material and 20 ml of And ethanol (70 %) is evaporated to sec.

– The residue obtained is dissolved in 15 ml of chloroform.

– The filtrate (the chloroform phase) is subsequently divided into two fractions.

– Has the 1st fraction, it is added up gently on the walls of the tube, an equal volume of sulfuric acid.

⇨ The turning of the color toward the red brick at the bottom of test tube indicates the presence of steroids.

– Has the 2nd fraction of filtrate, was successively added 1 ml of acetic acid and 1 ml of sulfuric acid.

⇨ The persistence (non-disappearance) of the color green indicates the presence of unsaturated sterols.

c) Highlighting of the cardenolides

– A maceration of 24 h, obtained from 3g of plant material and 20 ml of distilled water is filtered. Then 10 ml of filtrate is added to 10 ml of chloroform (liquid-liquid extraction).

– Subsequently, the organic phase is evaporated and the residue obtained is dissolved in 3 ml of acetic acid glacial and then it adds 3 drops of chloride of iron (1 %) and more than 3 ml of sulfuric acid.

⇨ The appearance of the color green-bluish in the acetic phase indicates the presence of cardenolides.

d) Highlighting the saponins

– 3 g of plant material is dissolved in 20 ml of distilled water; the mixture is heated to for 30 minutes at 40°C. After filtration and cooling to ambient temperature, a fraction of the filtrate is introduced in a test tube; this last is agitated manually for 1 minute.

⇨ After 10 seconds of rest, the formation of the foam indicates the presence of the substances saponins. The height of the foam then is measured.

Fig. 11: Formation the foaming layer which indicates the presence of saponosides.

e) Highlighting of tannins

– A mixture of 3 g of plant material with 50 ml of distilled water is heated to 100 °C. The extract is filtered after cooling to ambient temperature.

– The filtrate taken in a test tube adds 3 drops of an aqueous solution of chloride of iron (1 %).

⇨ A cornering of color toward blue-black precipitate indicates the presence of tannins.

Fig. 12: The blue-black precipitate which detects the presence of tannins.

f) Highlighting of the sterols and unsaturated terpenes

– 3g of vegetable matter in the presence of 20 ml of chloroform is heated for 30 min at 40°C. The extract is filtered after cooling to ambient temperature.

– The filtrate taken in a test tube is added slowly to the wall of the tube 1 ml of sulfuric acid.

⇨ The emergence of an intersection of the two phases of green color, which turns into red, reveals the presence of sterols and unsaturated terpenes [7] [8] [9].

g) Highlighting of condensed tannins

Has 5 ml of infused (5g of powder in 100 ml of boiling distilled water); we added 5 ml of concentrated

hydrochloride acid. The assembly has been brought to the boil for 15 minutes and then filter on filter paper of «Watt man ".

⇨ In the presence of tannins catechiques, it will form a red precipitate soluble in alcohol iso-amylic [10].

Fig. 13: The red precipitate which detects the presence of catechic tannins.

h) Highlighting of alkaloids

– A maceration of 2 g of plant material with 20 ml of methanol for 30 minutes.
– The filtrate is evaporated to sec.
– The residue dissolved in 6 ml of chloroform.
– Has the chloroform extract been added a few drops of Reagent of Wagner or Mayer.

⇨ The formation of a turbidity / red precipitate brown indicated the presence of alkaloids [11] [12] [13].

III. Results and Discussion

Table 1: Phytochemical constituents of *Tamarisk gallica*.

Aerial part		
The secondary metabolites	The leaves	The rods
Tannins and condensed tannins	+++	+++
Flavonoids	+++	-
Glycosides flavonoids	++	-
Heterosidiques flavonoids	++	-
Saponins	+	++
Cardinolides	-	-
Sterols and unsatured terpenes	+	+
Steroids and unsatured sterols	-	+
Alkaloids	-	-

'+' Presence, '++' Medium Presence, '+++' Strong Presence, '-'Absent

N.B: the rate of the presence depends on the speed of precipitation

a) Tests of flavonoid (free, heterosidiques and glyosidic)

– The obtaining of a yellow color for the extract of leaves indicated the presence of flavonoids in a part of the plant studied (1st test).
– The obtaining of a yellow color, which thinning passing of sheets, means that there is now of flavonoids heterosidiques (2ndtest).
– Obtaining a color Granada for the extract of sheets indicated the presence of flavonoids -glyosidic (2nd test).
– Obtaining a yellow color of the alcohol phase, for the leaves, which involve the presence of flavonoids free (3rd test).

b) Tests of steroids and unsaturated sterols

– For the leaves, no shift toward red Brown has been found. While the color change yellow to red Brown has been well note for the rods, these variations of color indicates the presence of steroids.
– The disappearance of the dark green color and the appearance of the transparent color, indicate the absence of unsaturated sterols in the leaves. Whereas, the persistence of the green color shows the presence of unsaturated sterols which is significant quantity in the part of the rods.

c) Test of cardenolides

– The obtaining of the red color after the addition of acetic acid glacial to the two parties of the shrub shows the absence of cardenolides.

d) Test of saponins

– In a test tube with a diameter of 1.5 cm, it has measured foam of 2 cm thickness for the part of the rods, by against for the portion of the leaves we noted therefore 1 cm of the foam, which indicates the presence of saponosides.

e) Test of tannins

– A rapid color change toward blue-black follows a precipitate was noted for the two parties' leaves and rods of the shrub this identifies the tannins in all parties. In addition, obtaining a red precipitate in the test of condensed tannins indicates their presence.

f) Test of sterol and unsaturated terpenes

– This test has shown the presence of sterols and unsaturated terpenes. By comparing the two parties. It has been observed, for the leaves the appearance of a layer interphase of color Granada (red-brown) of low thickness. While the rods have shown a strong layer interphase of Grenade color (red-brown).

g) Test of alkaloids

– The test of alkaloids has shown no precipitate for the two parts of the shrub. There are no alkaloids in *Tamarix gallica.*

IV. Conclusion

In view of all these severalresults of phytochemical screening associated with these compounds found in the aerial part of *Tamarix gallica*extract, we recommend further research on this shrub leaves to quantify the concentration of these bioactive compounds per known amount for industrial use. We believe these bioactive compounds in *Tamarix gallica* aerial part shown us could be helpful for pharmaceutical industry and medicinal sciences utilization.

V. Acknowledgments

This research work would not have been possible without the support of many people. The author wishes to express her gratitude to her supervisor, with her assistant who was abundantly helpful and offered invaluable assistance, support and guidance. Special thank also to Faculty of Exact Sciences Laboratory of Tahri Mohammed university bechar, Algeria No. 08000.

References Références Referencias

1. P. Ozenda. Flore and vegetation of the Sahara, 3rd Edition, Editions of the national center of scientific research Paris, 2004, pp. 342-344.
2. P. Ozenda. Flore and vegetation of the Sahara. 3rd Edition, Editions of the national center of scientific research Paris, 2004, pp. 345-349.
3. Y. Belhadjadji. MSc thesis, University of Tahri Mohammed, Bechar, Algeria, 2005, pp. 72-75.
4. Sabri Fatima Zohra, Belarbi Meriem, Sabri Samira, Alsayadi Muneer M.S. J. Nat. Prod. Plant Resour, 2(4), 2012, pp. 512-516.
5. O. O. Aiyelaagbe, Paul M Osamudiamen. Plant Sciences Research, 2(1), 2009, 11-13.
6. H. O. Edeoga, D. E. Okwu, B. O. Mbaebie. African Journal of Biotechnology, 4(7), 2005, pp. 685-688.
7. V. Alagarsamy. Pharmaceutical chemistry of naturel products, 1st Edition, India Elselvier, India, 2012, pp.156.
8. Mehta Kavit, Patel B. N, Jain B. K. Research Journal of Recent Sciences, 2(2), 2013, 12-15.
9. Mehta Kavit1, Patel B.N.1 and Jain B.K. Phytochemical analysis of leaf extract of *Phyllanthus fraternus*, *Res. J. Recent. Sci.,* 2(ISC-2012), 2013, 12-15.
10. Morabandza C.J., Ongoka R.P., Matini L., Epa C, Nkounkou L.C. and Abena A.A., Chemical composition of the Mesocarp of Garcinia kola Heckel (Clusiaceae) Fruit, *Res. J. Recent Sci.,* 2(1), 2013, 53-58.
11. Victor Njoku O. and Chidi Obi, Phytochemical constituents of some selected medicinal plants, African Journal of Pure and Applied Chemistry, 3(11), 2009, 228-233.
12. Ismaila Y. Sudi, Denban M. Ksgbiya1 and Emmanuel K. Muluh, Nutritional and phytochemical screening of *Senna obtusifolia* indigenous to Mubinigeria, Advances in *Applied Science Research,* 2(3), 2011, 432-437.
13. Ali, N.A.A., Julich, W.D., Kusnick, C., Lindequist, U. Screening of Yemeni medicinal plants for antibacterial and cytotoxic activities. Journal of Ethnopharmacology, 74, 2001, 173–179.