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Theme

Characterization of the aqueous extract of *Acacia raddiana* Savi and evolution of the impact statement on its own seeds.

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My sincere thanks also go to Mr. CHAABANA for doing me the honor of reviewing this modest work.

Allow me also to thank from the bottom of my heart all those who, during this time of work, have directed, supported, helped and encouraged me.

Dedication

For my mother, myfather, my daughter Raouane and

her motherAouatif, I dedicate this work.

Abstract

Characterization of the aqueous extract of *Acacia raddiana* Savi and evolution of the impact statement on its own seed.

The study aims to test the allelopathic effects of the acacia tree on the germination of their seeds through different concentrations of the aqueous extracts of the parts of the tree (stem leaves, stem, mixed, and soil solution surrounding the tree where the aqueous extract of the leaves had a very significant stimulating effect.

In what follows, the soil solution soil has a stimulating effect. The extracts of other parts of the plant also have a homogeneous stimulating effect and less than the effect of the previous extracts, and in the latter, we find the effect of aqueous extract of mixed the stimulating effect, but verylittle.

And all these results came between the positive control treatment with sulfur acid and dirty water, respectively.

The presence of germination of the seeds of the acacia tree in all the extracts indicates the presence of chemicals (allopathic) secreted by the parts of the plant and enforce the germination of its seeds and this explains the regeneration of acacia trees in their natural environment.

Key words: *Acacia raddiana*, allelopathic effect, aqueous extract, soil solution and seed germination.

Résumé

Caractérisation de l'extrait aqueux d'*Acacia raddiana* Savi et évolution de la déclaration d'impact sur sa propre semence.

L'étude vise à tester les effets allélopathies de l'*Acacia raddiana sur* la germination de leurs graines à travers différentes concentrations des extraits aqueux des parties de l'arbre (feuilles, rameau, écorce, racine, mélange et solution de sol entourant l'arbre où l'extrait aqueux des feuilles avaient un effet stimulant très important.

Dans ce qui suit, la solution de sol que nous trouvons a également un effet stimulant. Les extraits d'autres parties de la plante ont également un effet stimulant homogène et moins que l'effet des extraits précédents, et dans ces derniers on retrouve l'effet d'extrait aqueux de mélange L'effet stimulant, mais très peu.

Et tous ces résultats se situent entre le traitement témoin positif avec de l'acide sulfurique et de l'eau pure, respectivement.

La présence de la germination des graines de l'*Acacia raddiana dans* tous les extraits indique la présence de substances chimiques (allopathiques) sécrétées par les parties de la plante et renforcent la germination de ses graines et cela explique la régénération des acacias dans leur milieu naturel.

Mots clés : *Acacia raddiana*, effet allélopathie, extrait aqueux, solution de sol et germination des graines.

الملخص

توصيف المستخلص المائي لشجرة السنط وتطور تأثيره على انبات بذورها

تهدف الدراسة إلى اختبار التأثيرات الاليلوباثية تضاد بيوكميائي لشجرة السنط غلى انبات بذوره ا من خلال تراكيز مختلفة للمستخلصات المائية لا جزاء الشجرة (اوراق سيقان صريع جذور والمختلط ومحلول التربة المحيطة بالشجرة حيث كان للمستخلص المائي للأوراقتأثير محفز جد معنويفيما يليه محلول التربة الذي نجده هو الاخر له تأثير محفز

ويكون لمستخلصات أجزاء النبات الأخرىأيضا تأثير محفز متجانس واقل من تأثير المستخلصات السابقة وفي الأخير نجد تأثير مستخلص المائي للمختلطتأثير محفز لكن بنسبة ضئيلة جداوكل هذه النتائج جاءت ما بين الشاهد الايجابي المعالجة بحمض الكبريت والماء المقذر على التوالي .وجود لنمو لبذور شجرة السنط في جميع المستخلصات يدل على وجود مواد كيمائية (الا ليلوباثية) تفرز من طرف أجزاء النبات وتحفز على إنبات بذوره وهذا ما يفسر تجديد أشجار السنطفي موقعها الطبيعي.

الكلمات الافتتاحية: السنط، التأثير الاليلوباثي، المستخلص المائي، محلول التربة وإنبات البذور

Summary

List of figures

Table list

Introduction

Introduction

The Sahra has natural potential that can play an important role in meeting the socioeconomic requirements of local populations (agricultural Agricultural phytotherapy, crafts, firewood and grazing).

The Saharan plant formations present a great structural diversity, generating varying biotopes affecting a good member of plant and animal species. Some are threatened with extinction, under increasingly intense anthropogenic pressure, leading to degradation and regression of these formations. (Elouassis and ***al***., 2005).

The bills of exceptional biological adaptation of these species to the harshest ecological conditions; make it the main instrument in the fight against desertification, long omitted from projects due to the difficulty of their multiplication.

Wadis are considered to be one of the most important desert ecosystems of the Hoggae where most of the vegetation cover is found, in particular trees, shrubs and seeds of these trees they can stay alive long and only germinate after sufficient water, in the presence of inhibitors and the rain leads to attenuate these ponds, the seeds can viable in the soil (Nongonierma, 1978)and the most important of these trees is the *Acacia raddina* is one of the staple plants of these ecosystems due to its socioeconomic interest. It is a tree adapted to natural conditions such as salinity, drought, etc.

But as we move through some wadis where the *acacia raddiana* is found.

A few days after the rain, and we notice a few small newly sprouting Acacia raddiana trees around the mother tree, which we

Leads us to wonder how these trees germinated Is there a substance secreted by the mother tree that promotes the lifting of integumentary dormancy, allelopathy) positive (Elmithaniand***al***;2007).

The present study consists of knowing the effect matter secreted by all the members of the tree as well as the soil on the sprouting of *Acacia raddiana*. What is the impact of allelopathy on the tree itself? the germination of seeds.

Chapter 1: Generality on allelopathy

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I.1.History

The term allelopathy was first introduced by Austrian scientist Hans Molisch in 1937 to describe the harmful and beneficial biochemical interactions between all types of plants including microorganisms. Elroy Leon Rice, in 1984, reinforces this definition in his monograph on allelopathy6 (the first on this subject): "Any direct or indirect, positive or negative effect of a plant (including microorganisms) on another, through biochemical compounds released into the environment (Rice and ***al***;1974).

I.2.Definition

Allelopathy is the set of several direct or indirect biochemical interactions, positive or negative, from one plant to another (microorganisms included) by means of secondary metabolites such as phenolic acids, flavonoids, terpenoids and alkaloids. (Koller, 1970).

These allelochemicals play an important role in competing for environmental resources of water, light and nutrients; in the chemical weapons of plants against their predators, and in intra- and interspecies cooperation. (El- ayeb and ***al***;2013).

The incorporation of these allelopathic substances in the management of agriculture can reduce the use of herbicides, fungicides and insecticides; also decrease the deterioration of the environment.

I.3.Allelopathic compounds

One of the peculiarities of plants is that they form many compounds whose role, at the level of the cell, does not seem necessary while being able to play at the level of the whole plant (Al- hamdani and***al***;2008).

The fact that these compounds are not found in all species indicates that they do not enter the general metabolism and that they do not exercise a direct function at the level of the fundamental activities of the plant organism: they are secondary metabolites.

1-3-1 Phenols

Phenolic acids can interfere with mineral absorption by the plant: salicylic acid (o-hydroxybenzoate) and ferulic acid (4-hydroxy-3-mthoxycinnamate) inhibit the absorption of K + ions in the roots of *Avena sativa*. The degree of inhibition depends on the concentration of phenolic acid and the pH (lowering pH leads to increased absorption of phenolic compounds and therefore inhibition) (Rice and ***al***;1974).

This disturbance is due to the fact that the phenolic acids depolarize the membrane potential of the root cells which modifies the membrane permeability and thus the rate of effluvium of ions, both anions and cations.

The extent of depolarization increases with increasing concentration of phenolic acids, especially with salicylic acid (Rice and ***al***;1974).

1-3-2 Quinones

Quinones generate activated oxygen, responsible for their toxicity. Some substances affect the expression of genes in target organisms. (quinone) emitted by host roots induces the development of parasitic plants by regulating the expression of certain genes involved in the regulation of the cell cycle, the synthesis of actin and tubulin, the extension of plant walls and synthesis of protein (Gomez and ***al***;2008).

1-3-3 Terpenes

Many classes of volatile monoterpenes inhibit plant growth such as 1,8cineole, 1,4cineole, pulegone, alpha and beta pinene. 1,4cineole inhibits the root growth of some herbs by inhibiting synthase at the glutamine binding site (Gomezand ***al***;2008).

I.4.Allelopathy and experimental evidence

It is a complex phenomenon, because it involves, in addition to the two plants, respectively "producer" and "target" of molecules, an intermediate, the soil, whose abiotic and biotic characteristics (in particular the microfauna) are fundamental for the expression of this allelopathic potential. This complexity explains moreover, the many controversies that still exist concerning the ecological importance of these interactions, as well as the difficulty of demonstrating them.

In the rest of the article, on will discuss mainly cases of allelopathy with a negative effect. Traditionally, the observation in the field of the symptoms of an allelopathic phenomenon constitutes the first stage of its demonstration. In a forest environment, this will result in either by the absence or disappearance of young seedlings of a species, or by the modification of a plant community subject to the influence of the canopy (Rice and ***al*.,**1974)

The second phase concerns the identification of the molecules involved in these interactions, by biochemical analysis of leaves, roots, fruits, etc.

Most often in the class of secondary metabolites, that is to say molecules a prior useless to the plant at the cellular level, but involved at the organism level in thecommunication with the environment (pathogens, herbivores, pollinators, etc.).

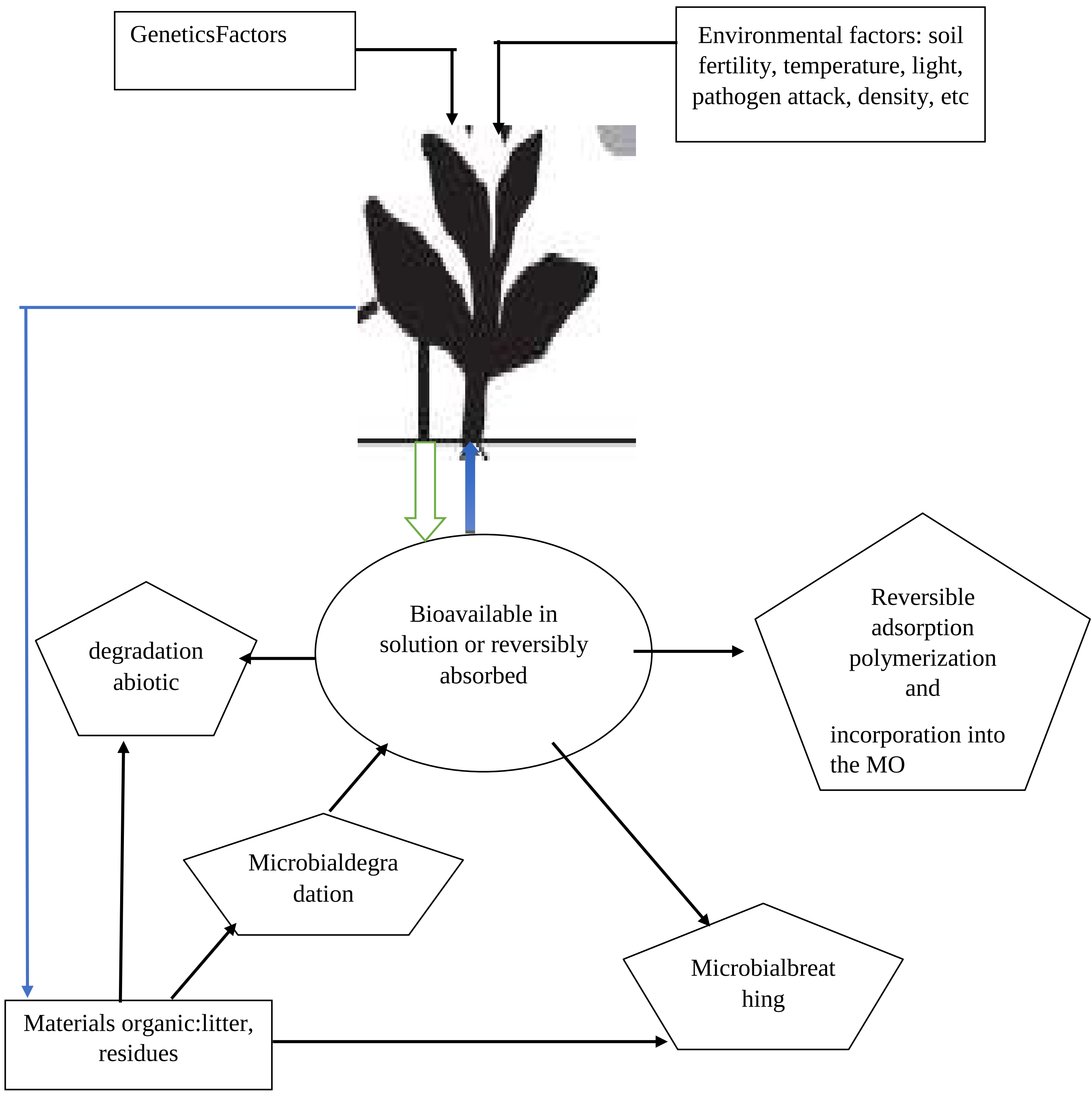


Figure 1: Factorsinfluencingthe synthesis of allelopathic compounds and their evolution of the surficial horizons of the soil the bioavailable fraction for the target plant (in blue) will be the result of the many balances involved in the soil (Christianeand ***al***;2002).

OM: organic matter.

These compounds extremely numerous and diverse include terpenes, nitrogen compounds or alkaloids, as well as phenolic compounds. It is in this last group that we will meet the most often substances capable of exerting an allelopathic action.

Analytical progress of these have enabled the identification and determination of several thousand of these structures (Christianeand ***al***;2002).

Compared to so-called primary metabolites (such as carbohydrates and proteins), these secondary metabolites are synthesized in often low amounts by the plant, but with a very important variability, moreover exploited in chemotaxonomy.

In addition to intra- and interspecific variability, there is a strong environmental influence, which explains the important variations observed in the levels of allelopathic compounds as a function of the age of plants than their spatial location (Figure), below). In particular, their synthesis seems particularly stimulated in stressful conditions (pathogen attack, water stress, deficit fertility. (Fisher, 1987).

The application of the purified molecules to seeds or young seedlings should then allow to reproduce in the laboratory the symptoms observed in the field. The observation on a macroscopic scale of difficulties in germination or of a reduction in growth, elongation root, scalp development must be completed at the physiological level by identifying the cellular targets of allelopathic compounds (mitochondrial respiration, photosynthesis, hormonal regulation, membrane permeability, etc.). Extrapolation to field of results obtained under laboratory conditions, sometimes on different organisms of the natural target, has long been, and still is, one of the major criticisms at against the reality of allelopathic phenomena(Rice,1984).

Finally, the study of the release and circulation of molecules, and their absorption by the target plant constitutes the last (and most delicate) stage of this experimental approach.

One of the reasons for these difficulties is due to the very nature of allelopathic interactions, which do not most of them do not occur through direct and immediate contact between the tissue synthesizing the active molecules and the target (as in the case of plant-herbal interactions), but via the intermediate materials such as litter and soil (Gomezand***al*** ;2008).

The allelopathic activity of a compound will therefore be largely conditioned by its extracellular persistence at timing of leaching, senescence and humidification processes. In relation to the ways of synthesis and storage in plant cells which are now relatively well Known, there are few data on the quantitative and qualitative changes undergone by the various compounds during senescence (Christianeand ***al***;2002).

Tissue death will result in disappearance of cell compartmentalization (rupture of vacuoles) at the origin of reactions between different groups of compounds (creation of tannin-protein complex for example) either the transformation of these molecules (passage from the conjugated form, often inactive, to a free and active form). Likewise, in soil horizons, these molecules can be subjected to reactions of total or partial degradation, adsorption, polymerization, etc (Christianeand ***al***;2002).

The final amount of bioavailable compounds in the soil for the roots of the target plant will be the result of the balance between these different processes, themselves largely dependent on environmental and stationary conditions (figure 1), and will therefore be particularly difficult to determine technically synthesizing the active molecules and the target (as in the case of plant-herbal interactions) (Christianeand ***al***; 2002).

1-5 Influence of environmental factors on the action of compounds

The degree of inhibition may depend on the pH of the medium which more or less facilitates the entry of allelochemicals into the target cells. Poly acetylene and thiophene are more bioactive after exposure to UV-A. Their inhibitory effect is activated by light. Some substances have an impact on target organisms only when exposed to a constant supply of freshly released compounds. Synergistic effects between the different compounds present in plant exudates can be observed. Negative effects on target organisms, for example inhibition, never reach 100% effectiveness in not promoting the emergence of resistance (Rice and ***al***; 1974).

1-6 Ecological interactions

Secondary metabolites are the main tools in plant-living coevolution, which has led to a diversification of these compounds. It is a co-evolution which applies to all levels of organization of living things, from bacteria to mushrooms, from insects to mammals, which is expressed at all stages of plant development. Two areas of coevolution have been favored:

• a first opposition, which can be considered as chemical warfare.

• a second axis, of cooperation, translates into a partnership with animals (Gomez and ***al***;2008).

1-7 Defense against Pathogens and Predators

Because of their immobility, plants must use physical and chemical defenses including toxic metabolites to survive attacks from insects, bacteria and fungi and to compete for light and light. resources with other plants. Allelopathic compounds for defense against predators can be insecticides, anti-fungals, anti-pathogens (phytoalexins).

There are two types:

• direct, which takes place when volatile compounds interact directly with the predator of the plant, ex acacia. (Rice and ***al*;**1974).

• indirect has no direct influence on herbivores but on their predatory enemies and parasitoids.

1-8 Response to soil contamination

Roots exert a selective influence on bacterial communities which is partly plant specific. Plants can increase the removal of contaminants from soils by stimulating degradation microbial activity.

Allelopathic compounds can therefore play a role in phytoremediation thanks to their important activity in the information signals between the bacteria and the plant. (Jalal and ***al***;1983).

1-9 Direct and indirect impacts on biodiversity

Allelopathy partly explains the invasive nature of certain species. Biological invasions are considered by IUCN as the second cause of ecosystem degradation and biodiversity loss.

For example, *Ailanthus altissima* (Japanese False Varnish) interacts in North America with three native species (Acer rubrum, Acer saccharum, Quercus rubra).

Acer rubrum shows a positive response to the presence of the invader whereas young Q. rubra have inhibited growth in its presence. An invasive species can therefore greatly modify the population in which it appears, by inhibiting the development of certain species, and by promoting others. Acer rubrum developed strongly in the United States in the 20th century, perhaps in part due to *Ailanthus altissima* (Gomez and ***al***;2008).

For sustainable agriculture and a reduction in dependence on synthetic chemicals, which cause resistance, increased cost and environmental contamination, the allelopathic potential can be utilized in several ways, for example in use of allelopathic compounds as herbicides or natural pesticides.

Weed management can be accomplished with allelopathic plants used as ground cover, under-seedlings or as a cleaning intercrop. (Rice and ***al***;1974).

This is because the decomposition of allelopathic plant residues can inhibit the germination and growth of weeds while stimulating the growth of cultivated plants.

This decomposition can also be used as pesticides, for example with the decomposition of hairy bean (*Mucuna deeingiana*) which reduces the development of phytopathogenic nematodes of tomato roots by more than 50%.

Natural pesticides, or pesticides derived from natural products, help improve production and conserve the environment by being the target of no organism, effective in controlling pests, less toxic, and biodegradable in same time. They may also be safer than synthetic pesticides (Rice and ***al;***1974).

Chapter 2: presentation of the species

Chapter 2: Presentation of the species

2-1 Taxonomy

Acacias belong to the Fabaceae family (MUGNER, 2000), also called Legumes, which includes about 1300 species these plants are widespread throughout the world.

The Fabaceae family includes dicotyledonous plants and includes species of diverse socioeconomic interest. The common characteristic between the species belonging to this group is the presence of fruit or bivalve pod (Hannani, 2011).

This angiosperm family is the third in number of species after Orchidaceae and Asteraceae, and the second in terms of agricultural and economic importance after Poaceae (Mensous, 2018).

Fabaceae species are cosmopolitan and represented in all biological types.

Legumes in general fall into three families: Mimosaceae, Caesalpiniaceae and Fabaceae, most of which are nitrogen-fixing species (Sahki and ***al***; 2004)

The Mimosaceae subfamily: the Mimosaceae family is a subfamily of Fabaceae it includes about 50 genes made up of a few thousand species.

In principle there are always woody plants.

The flowers are regular with 5 sepals 5 petals. They are more often small, but usually crowded together in compact inflorescences, and have at least 10 stamens in each flower.

The flowers are actinomorphic, possessing several planes of symmetry.

The most important genera, from a representativeness point of view, are those of Acacias and Mimosas (Hannani, 2011).

2-2 The genus Acacia

The genus Acacia posed many problems of classification by its relatively high number of species, 1200 according to (Guinet and Vassal,1971). Different criteria were used for their classification. Cytological observations have made it possible to compare certain refined species, although these species are not well known biochemically. (Guinet ***al***,1971).

Baseditself on the anatomical and semiological criteria by integrating them with the traditional criteria used to complete the data on the classification of Acacia.

The genus acacia comprises about a thousand species (Ozenda, 2000).

The genus of Acacia is thought to be of American origin (Vassal, 1972). These are tropical and subtropical species (Hannani, 2011) would have colonized the Sahara two thousand five hundred years ago when the tropical monsoon moved northwards warming the Sahara, whose previously cold climate (theFloc'h and *al.*, 2003) indicates the existence of 155 spontaneous taxa of the genus Acacia, recognized by (Loc,1989) in thesis of(Hannani, 2011) in Africa. They are essentially adapted to the conditions of the arid and semi-arid environment, especially the water deficit (Hannani ,2011) (Quezel ,1962/63).

2-3 Geographical area

1- Distribution of the genus Acacia in the world:

The majority of species are located in the driest areas of Africa: Morocco, Tunisia, Algeria, Sudan, Mauritania, Senegal, Burkina Faso, Niger, Somalia, Egypt....ect.

Asia: India, Arabia ... etc. which are used for human life, and other species distributed in American areas as well as in Australian areas, in a great desert of Victoria. (Fig 2) (Quezel and ***al***; 1962).

Arid zones Africa (from Senegal to Somalia and South Africa) and the Middle East (South Arabia, Iran). It has been successfully introduced into Israel in Rajasthan, Pakistan and Cape Verde Islands (Fagg; 1991). (figure 2).

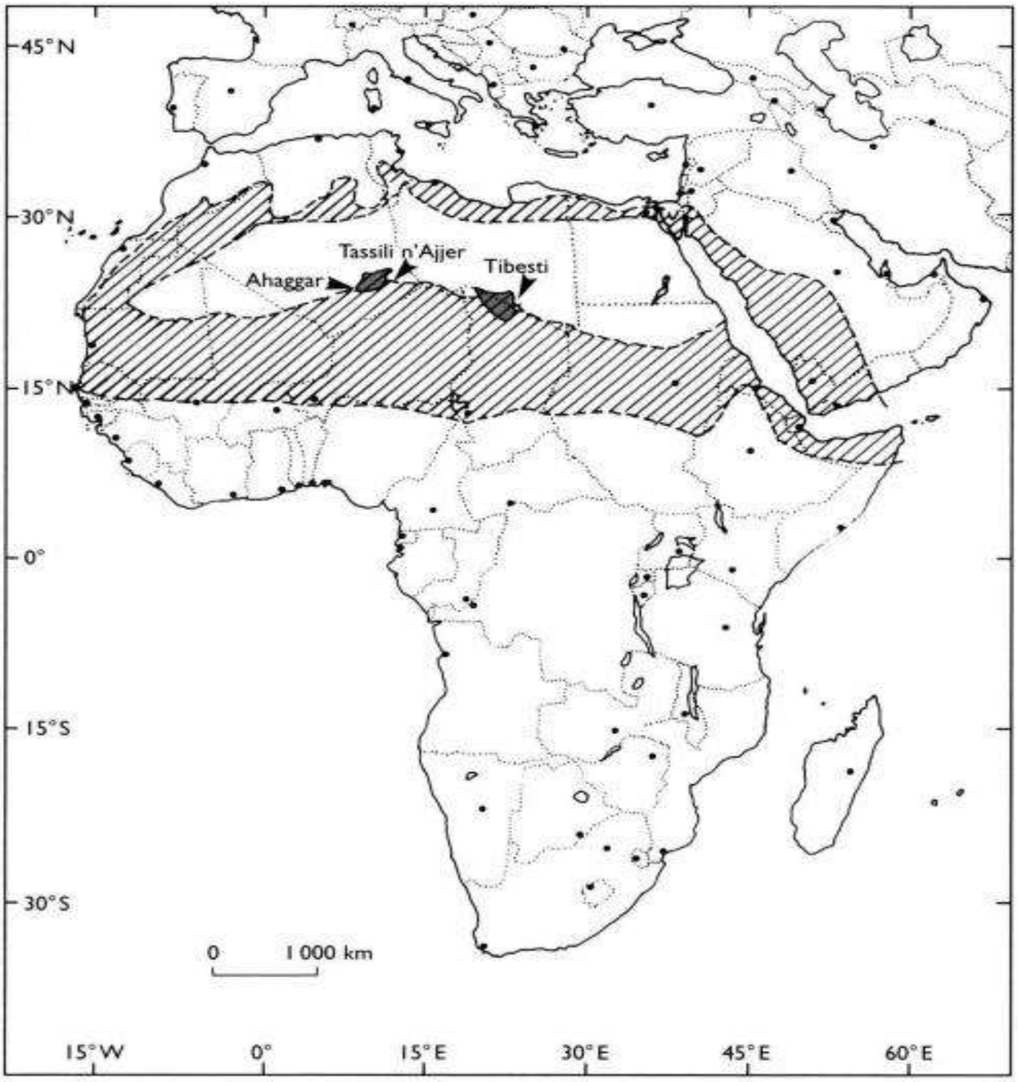


Figure 2: Range of *Acacia tortilis*(Forssk.) Hayne subsp. raddiana (Savi) Brenan (the Floc'h and Grouzis, 2003).

2-4Stations

Tree characteristic of regions with a dry tropical bioclimate and of the Sahel and the Sahara (Hannani, 2011) and arid and semi-arid bioclimate, it has significant populations on sandy, silty and Perrouxof Oueds soils, spreading areas and stony ravines. Thrives up to 1900 m altitude and climbs exponentially in isolated and bushy feet to 2100 m altitude (Sahki and ***al***; 2004)

2-5*Acacia raddiana* in Algeria and Hoggar

Acacia raddian according to (Bensaid,1996)is present in the region of Béni-Abbés, in Saoura, wilaya of Bechar, a large population of V. tortilis subsp. raddiana is observed in desert savannas and extends to southern Morocco (Hannani, 2011). west of Tindouf, at an altitude of around 900 m, a large group of argan trees along the Bouadhil wadi, associated with V. tortilis subsp. raddiana (Mensous, 2018).

In the central Sahara, in HOGGAR and in Tassilin'Ajjer, the presence of acacias is mainly reported in the altitude below 1800 m (Quézeland *al*; 1962)., The acacias of the central Sahara live mainly in depressions and beds of wadis by constituting the "acacia savannah", even if the density of trees is still low (Mensous, 2018) (figure 3).

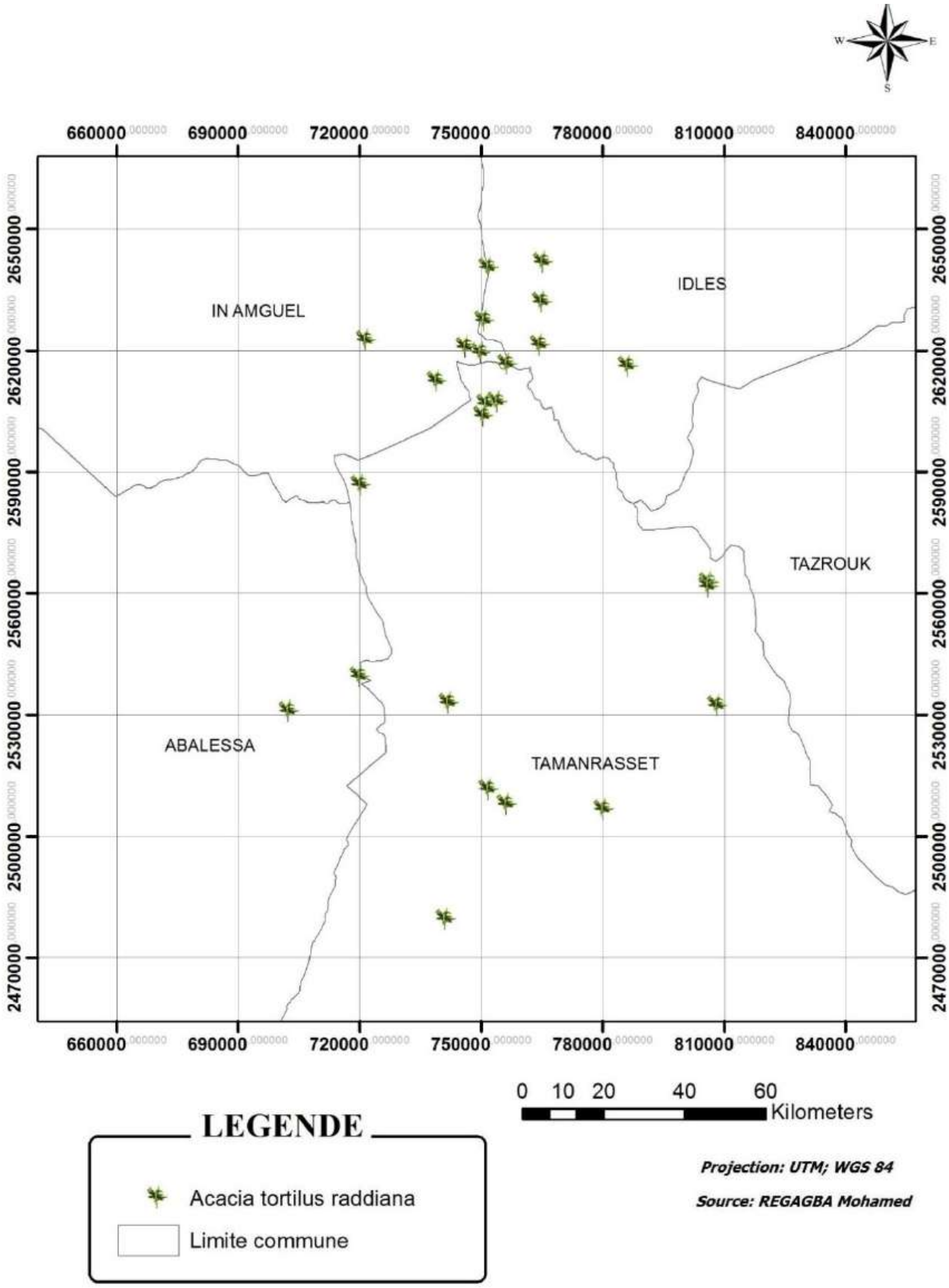


Figure 3: the distribution of *Acacia raddiana* in the municipality of Hoggar (REGAGBA Mohamaed).

2-6Taxonomy of *Acacia raddiana*

Acacia raddiana has posed many classification problems, thus, different names have been attributed to it and the table n1presents the name of Acacia raddiana according to the work on the genus of Acacia in Africa. by women researchers. (Bensaid, 1985) (Mensous ,2018) (table1).

Table 1: Main denomination of *Acacia raddiana*

Authors	Name
DINSNORE, 1932	*Acacia tortilis*
JAHANDIEZ and MAIR, 1932	*Acacia tortilis*
MURAT,1932	*A. tortilismimos*
ROBERTY ,1950	*1950 A. tortilis raddiana* form
BOUDY, 1950	*A. tortilis*
FOURY ,1950	*A. tortilis*
MONOD, 1954	*A. tortilis form spirocarpa mimosa tortilis*
NONGONI ERMA, 1977	*A. mimosa tortilis*
FRELIN, 1980	*A.raddiana var raddiana*
NONGONI ERMA	*A. raddina var raddiana.*
(MASLIN and***al***., 2003) in thesis from (MANSOUSE, 2018)	*Vachelliatortilis subsp raddiana*

Therefore, the taxonomy of the studied species established from the new classification of flowering plants (Mugnier and *al*., 2000), (Maslin and al., 2003), (Mensous,2018) is as follows:

2-6-1 Plant classification

Kingdom: *plant*

Phylum: *spermatophytes*

Subphylum: *Angiosperms*

Class: *Dicotyledons*

Subclass: *Rosids*

Order: *Rosales*

Family: *Fabaceae*

Subfamily*: Mimosaceaes*

Genus: *Vachellia*

Species: *raddiana*

In this study we will keep the name ***Acacia raddiana***

2-7 Botanical description

Medium tree (8-10m, rarely up to 20m) with a hemispherical or spreading crown and hanging branches. Trunk and branch dark brown, in youth reddish brown with light gray lenticels. Axillary spines, in groups of two, straight, white from 2 to 10 cm which is typical for the species, short nonaxillary spines, arching against the trunk, in pairs. (Sahki and ***al***;2004) (Figure 4).

Figure 4: The*Acacia raddiana* tree in their natural environment wadi Tiffouggune.

2-7-1 Leaves

Acacias have bipinnate leaves (twice divided): the central "vein" carries other pairs of lateral veins called pinnae carrying pairs of leaflets. The phyllotaxis of the leaves is of the alternate type (Ozenda, 1991).(Figure 5).

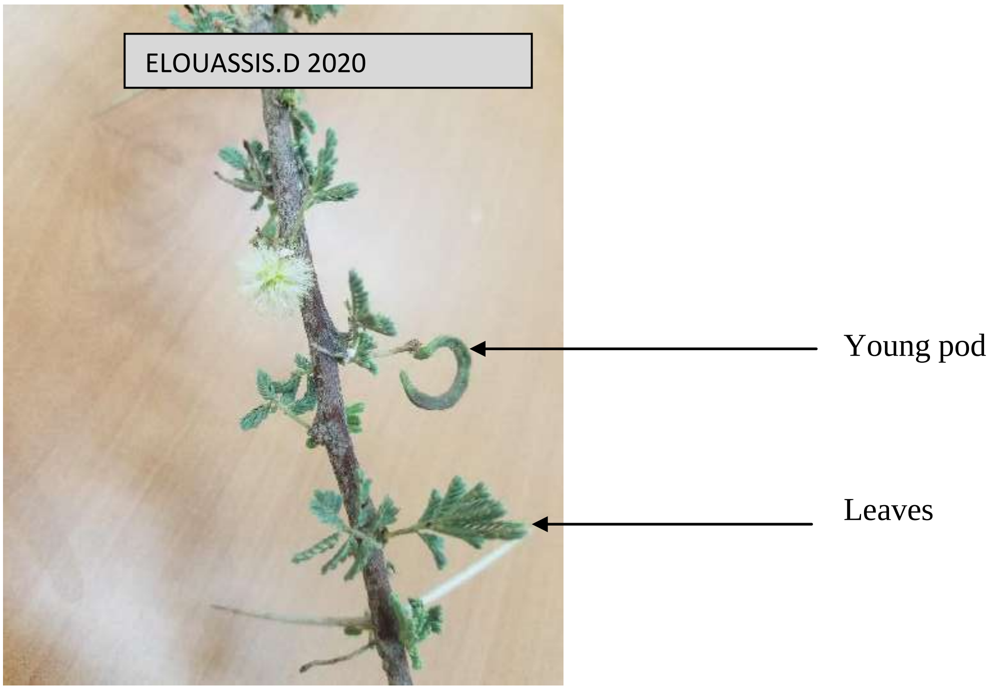


Figure 5:*Acacia raddiana*branch

2-7-2Flowers and inflorescences

In very fragrant whitish to light yellow balls, about 1 cm in diameter, carried by axillary stems. (Elouassis and ***al***; 2005) Inflorescences: in solitary glomeruli (axillary) or fascicles, 0.5 to 2cm in diameter, buds by a peduncle of 0.5 to 2.5 cm long , Figure 6

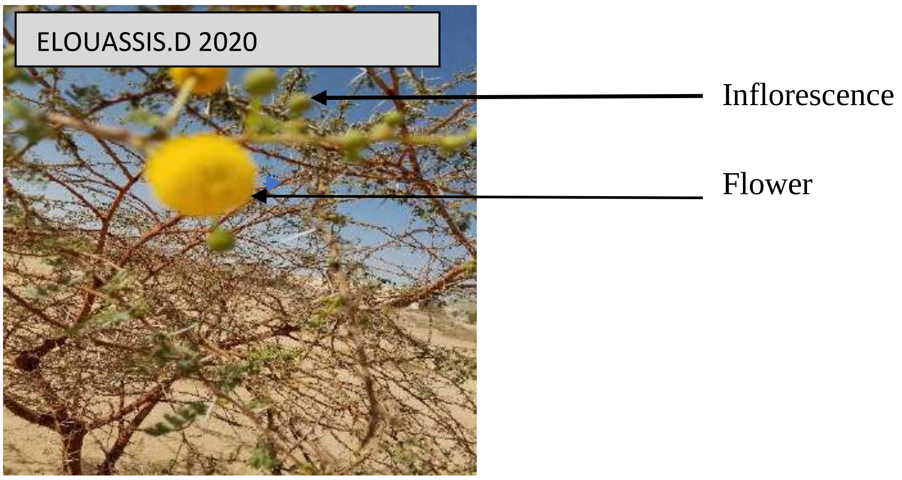


Figure 6: flower and inflorescence of *Acacia raddiana*

2-7-3Fruits

Pods are typically spiral; they are 10 to 15 cm long and 0.5 mm to 1 cm wide, green when young and light brown when ripe. Late dehiscent or indehiscent, non-glandular. They contain up to 10 oval brown seeds. Figure7

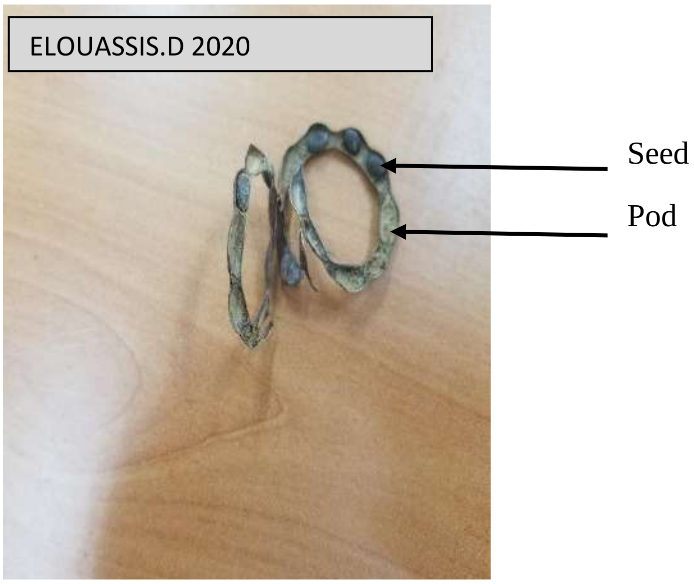


Figure 7: *Acacia raddiana*pod

2-7-4Thorns

The thorns are of two kinds, long, straight axillary white accompanied by non-axillary spines, brownish and curved. It is a very thorny species, the former can reach more than 10 cm, they are arranged in pairs (Hannani ,2011). (Figure8).

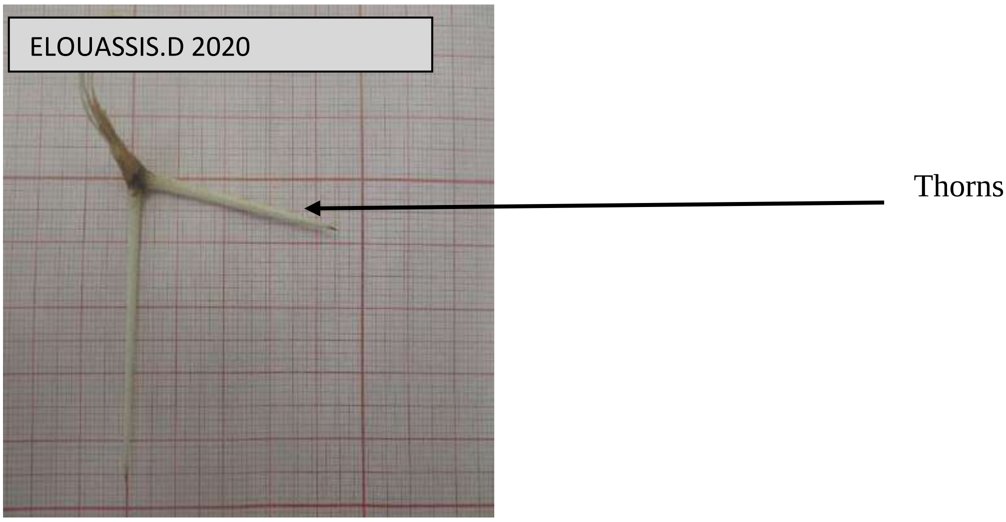


Figure 8:*Acacia raddiana*thorn

2-7-5 The trunk

It can be single or double. The bark is rough and cracked, it is brown to dark brown in color. The species is classified as medium height trees. It is used as a windbreak (Hannani, 2011) Figure 9

Figure 9: the trunk of *Acacia raddiana*

2-7-6 Roots

According to(Hannani, 2011), the taxon is considered to be the most xerophilic of the arborescent angiosperms, mainly by its pivoting and very powerful root system, drawing water in depth going beyond 30 meters. The root system of Acacia raddiana plays a decisive role in controlling the level of internal hydration of the individual (Hannani, 2011).

Rhizobium and microbial symbiosis: *Acacia raddiana* nodulates with fast growing rhizobia (Dommrgues and ***al***; 1995) in it is associated only with endomycorrhizal fungi which have the role of improving the mineral nutrition of the tree and increasing its tolerance to drought. (table2).

Table 2: comparison of the qualitative characteristics of *Acacia raddiana* and other acacias of Hoggare (bark, thorns, inflorescences and pods),

	F. A	*A. N*	*A. E*	*A. R*	*A. S*	*A. L*
Bark	Brown whitish	reddish, cracked, streaked twigs tomentose	Brown, slightly smooth, shinyappearance	Brown, slightly cracked	smooth reddish	Gray to blackish, rough
Thorns	Pairs stipular, straight, slightly recurved, thick at the based	Pairs stipular straight	Pairs stipular, straight and white	Stipular pairs, straight and white	Pairs stipular, straight and white, tough at the based	Treble hooks grouped by 2 or3 (2directed towards the bottom)
Inflores cences	Axillary spikes in the armpit of leaves (flowers yellow creamy)	Glomeruli, axillary to the armpit leaves (flowers yellow)	Glomeruli, axillary to the armpit leaves (flowers yellow	Glomeruli axillary to the armpit leaves in, (flowers white to yellowish))	Glomeruli axillary to the armpit leaves (flowers yellow)	Axillary spikes (White flowers)
Pods	In spirals, oranges, large	Wide, Constrictions between the seeds, pubescen	Narrow, curved, hairless sickle-shaped, red (young)	Slightly narrowed between seeds, inspiral. Green (young), brunettes (maturity).	Flattened, slightly curved, narrow, brown reddish	Glabrous, flattened, beige, wide

F.** **A**: faidherbia albida, A. N: Acacianolitica,* ***A.** **E *Acacia ehrenbergjiana**A.R**Acaciaraddiana, A **S**Acacia seyal and **A.L**. Acacia leata*. (Mensous and***al*** ;2018)

2-8 Multiplication

Good regeneration by stump shoots and by seeds as well the treatment of the seeds with sulfuric acid and scarification gives a better germination rate (Elouassis and***al***;2005).

Formation of nodules: according to the experience carried out by (Elouassis and ***al***; 2005) where they noticed that near the roots the existence of nodules in acacia raddiana after 30 days of sowing.

These nodules have a white spherical shape.

2-9 Use

Acacia raddiana plays a socio-economic role. Indeed, nomadic life is always linked to this stand of acacia raddiana which allows them to have shade, wood and gum ...... etc (Bensaid, 1985).

2-9-1 Wood

It is used as roundwood, it is an excellent fuelwood and the charcoal is of very good quality (Sahki and ***al***;2004)

Reforestation and fight against desertification; In the north of Niger, it is possible, according to (Bensaid, 1985) to carry out forest reforestation by the densification of natural stands, in particular with Acacia raddiana considered to be a very plastic taxon and very resistant to drought.

Note that in India, planted with spacings of 5 x 5 m, this taxon can produce 30 tonnes of firewood after 10 years.

2-9-2 Forage

The pods produced in abundance are rich in protein (12-16%) and are consumed by wild herbivores (Chaou,2017).

Fixing the dunes: this taxon has proven itself as a dune fixative tree.

2-9-3 Human food

The pods are sold in some markets for human consumption and the flowers are the source of good quality honey.

Traditional medicine: the leaves and bark are used as an anthelmintic and against skin diseases, the crushed gum heals wounds and burns (Sahki and ***al***;2004).

2-9-4 Medicinal uses

The uses in folk medicine are also numerous. Thus, reports that gum can be used to heal wounds and burns.

2-9-5 Interest and therapeutic use

The plant has a wide range of therapeutic virtues, in fact it is used as an anti-cancer, anti-tumor, antioxidant, antispasmodic, but also in the treatment of fever, haemorrhages, leucorrhoea, ophthalmia and sclerosis (Saini, 2008)

The species can be considered a promising resource for antibacterial drugs due to its highly active nature. (Mahesh and ***al***; 2008)

The roots, mixed with the bark and taken as an infusion, treat anemia (Ruff,2002). They are generally used as a mouthwash to treat dental caries, mouth and throat ailments. Conjunctivitis, scurvy the extract of *Acacia raddiana*is even said to have antioxidant properties identical to thosevitamin C (Matiga, 2006). Used in fumigation, they are also used in the treatment of cataracts (Malgras, 1992).

2-10 Ecological impact of the species on the environment

Acacia raddiana It plays an important role in improving the microclimatic factors of its ecosystem (Chaou, 2017) which ensures development of the diversity and production of the herbaceous layer. (Abdallah and***al***; 2008). In addition, like all nitrogen-fixing legumes, *Acaciaraddiana* can provide:

• The enrichment and ecological restoration of soil with nitrogen through the decomposition of their roots and their different parts.

• Nitrogen depollution by using them as a substitute for chemical fertilizers.

Currently in Algeria, or in the world, research is directed towards the use of seeds of *Acacia raddiana* for the production of biofuel. This new product can be used, according to this line of research, as an alternative in the fuel industry to reduce the massive exploitation of fossil fuels.

The physicochemical properties of the oil from the seeds of *Acacia raddina* and its methylated fatty acid esters (biodiesel) have an energy value according to the standard procedures of the American society for testing and material (ASTM) of 32.78 MJ / kg, it is considerably higher than that found in the seed of *Acacia nilotica*, which constitutes a promising alternative for the use of foossil energies, thus allowing the possibility of ecological exploitation of this species (Talhi and ***al***;2010).

2-11 Enemies and the Diseases

Weevils often attack seeds, destroying up to 90% the tree is susceptible to beetle attack and rust (Dommrgus and ***al***; 1999). On the other hand, anthropization is characterized by the destruction of branches, all the more so the transformation of charcoal into wood. This practice seems to be verified and unfortunately persist in certain regions of the border of the Sahara, such as at the level of the Ouahallagune natural zone with more and more destructive cutting for firewoodphoto. (Figure 10).

Figure 10: irrational cutting of *Acacia raddiana*tree for firewood (OuedTiffouggune Tamanrasset)

Chapter3:Experimentalstudy

Chapter 3: Experimental study

3-1 Presentation of the study and sampling region

3-1-2 Geographic location

The Hoggar is a mountain range in the Sahara in southern Algeria. It is between 21 ° - 25 ° North latitude and between 3 ° -6 ° East longitude. It is limited:

• To the north by the Tidiest plateau and the Touât,

• To the east by the cliffs of Tassillin'Ajjers,

• To the west by the Tanezrouft plain,

• To the South and South East by the Adrar of Ifoghas.

It covers an area of approximately 554,000 km2 or a quarter of the total surface of Algeria (Figure 11).

Figure 11: Geographical location of the Hoggar

It is crossed in its central part by the Tropic of Cancer at 22° 33° North latitude. Its highest point is at Mount Tahat at an altitude of 3003m. We also have Mount Ilâmane at an altitude of 2789m and the Assekrem plateau at an altitude of 2778m (Sahki and ***al***,2004)(Bouchnebe,1990)

The Hoggar is divided into 21 natural regions representing particular ecological ecosystems in terms of flora, fauna and landscapes. (Sahki and ***al***;2004).

Our study region located in the Ouahlaggane natural zone which spreads out to the south of the city of Tamanrasset composed of mainly tropical and Saharo-Cnidian vegetation such as *Acacia raddiana* and *Acacia leata*and some endemic Saharan species such as our zone of study called ouedTifougguene which is located to the south-east of the municipality of Tam -anrasset, its length is approximately 25km.

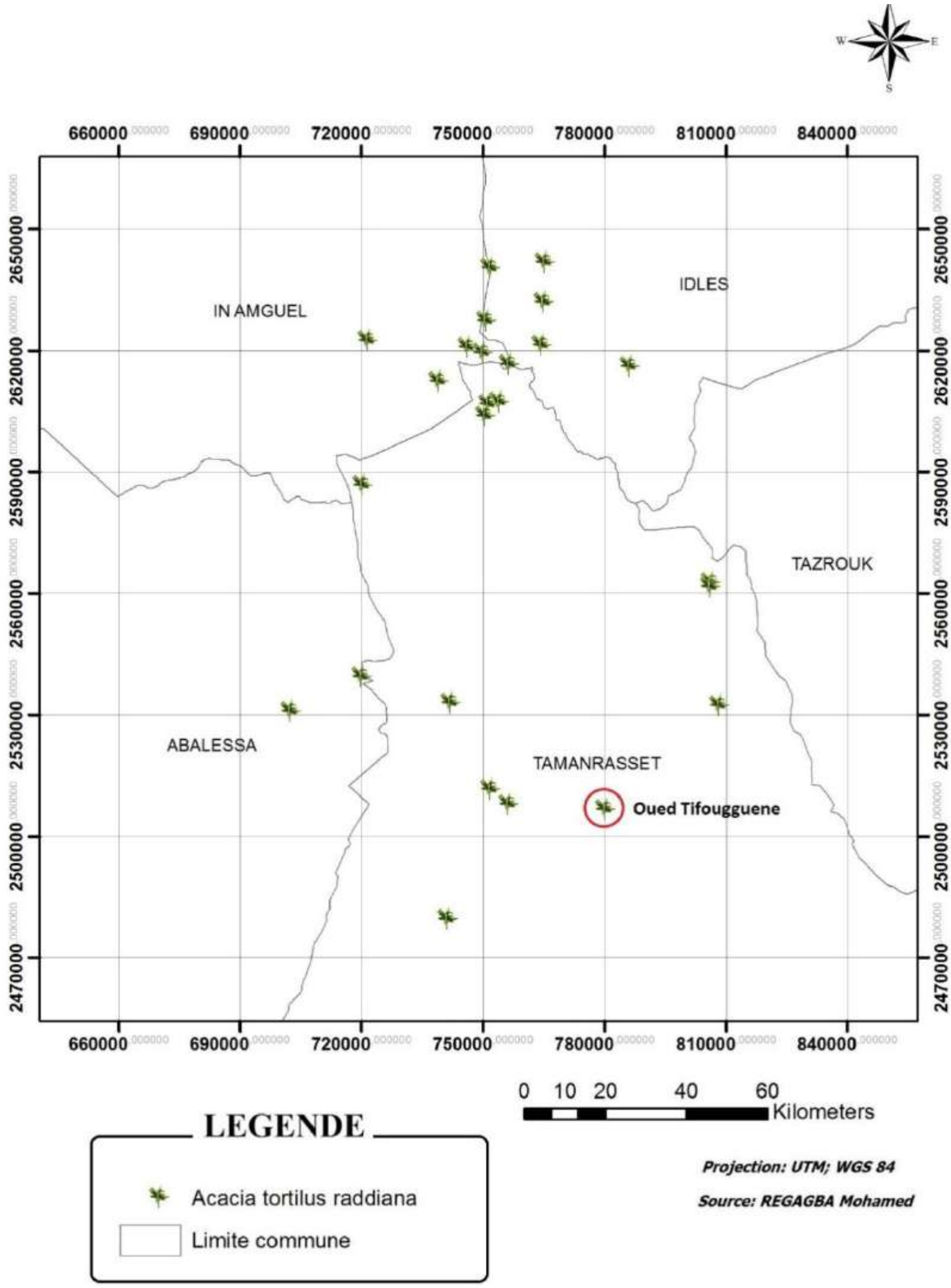


Figure 12: Geographical location of oued Tiffougguene (REGAGBA Mohamed)

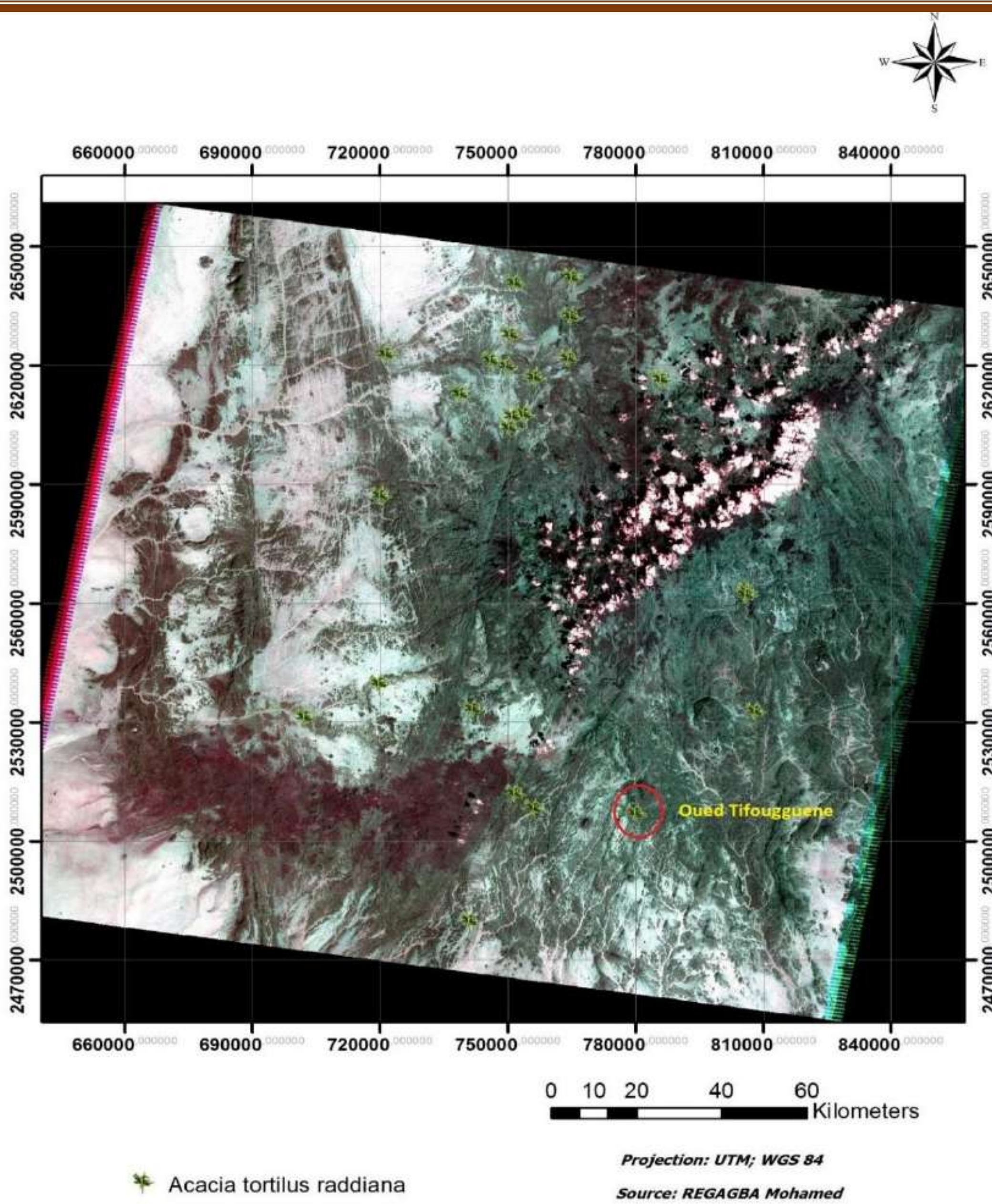


Figure 13: Geographical location of ouedTiffougguene (Satellite image) (REGAGBA Mohamed).

3-2 Climat

(source N.M.O Tamanrasset 2020) the climatic data were provided to us by the Tamanrasset metrological station. Where we got data from 2005 and 2006.

Last year of operation of the Amsel station, which is very close to the study area.

3-2-1 Temperatures

Monthly temperatures in Amsel during the years 2005 and 2006 are reported in the tables.3,4and 5.

3-2-1-1 Average monthly maximum, minimum and monthly temperatures (in 1/10 ° c) inAmsel

Table 3: Average monthly maximum temperatures (in 1/10 ° c)inAmsel

year	Jan	Frv	mas	avr	mai	jun	jul	aou	sep	oct	Nov	dec
2005	200	233	285	333	358	357	376	369	354	319	364	321
2006	211	250	292	330	353	367	369	372	345	315	247	212

Table 4:Average monthly minimum temperatures (in 1/10 ° c) inAmsel.

Year	Jan	frv	mas	avr	mai	jun	jul	aou	Sep	oct	Nov	dec
2005	56	106	144	181	220	233	240	237	220	186	116	80
2006	61	100	127	175	214	238	240	241	226	181	102	66

Table 5:Average monthly temperatures (in 1/10 ° c) inAmsel.

Year	Jan	frv	mas	avr	mai	jun	jul	Aou	Sep	oct	Nov	dec
2005	127	169	217	264	295	296	315	308	288	256	193	157
2006	138	176	214	258	290	308	310	310	280	251	177	193

.

The hottest month during these two years is July with an average temperature of 13.0 and 13.5 ° C respectively for the years 2005 and 2006 (tab5). On the other hand, the coldest month is January with an average temperature of 12.7 and 13.8 ° C; respectively for the year 2005 and 2006 (table 3).

The highest temperatures occur during the months of July, and August with maxima (TM) of 37.6 and 37.2 ° C, on the other hand the coldest months are January and February with minima (Tm) varying from 5.6 to 6.1 ° VS.

3-3 Precipitation (precipitation in 1/10 mm)

Table 3: During 2005, precipitation recorded a cumulative 28.2 mm (and during 2006, precipitation recorded a cumulative 9.6mm. (Table6)

Table 6: Precipitation: precipitation in 1/10 mm in Amsel

year	Jan	Frv	mas	Avr	Mai	jun	jul	Aou	sep	oct	Nov	déc
2005	60	98	0	0	34	286	0	144	202	56	0	0
2006	44	16	0	0	4	32	0	0	0	0	0	0

He distribution of this precipitation is predominated by autumn rain, mainly in June, August and September. An absolute drought is recorded in March, April, November and December. 2006 is almost a year of drought. (table 6).

3-4Pedology

Soil is the weathering product of rocks by various atmospheric (rain, frost, wind) or biological (roots, micro-organisms) agents. The factors of pedogenesis are hardly favourable to the constitution of soils in a desert environment, because of the hardness and the scarcity of these factors (irregular rain, very important thermal variations, scarcity of vegetation) (Ozenda, 1991)its soil is sandy because it a valley and outside the valley is volcanic soil because it is surrounded by mountain.

3-5 Hydrography

The Hoggar is divided into 3 distinct areas:

North Zone: which includes the Tidikelt, rich in water resources due to the presence of the large continental intercalary water table called: Albian nappe which has a mobilizable volume that reaches 60,000 milliard de m^3(Benkhalifa ,2005).

Central zone (central Hoggar): This is the poorest zone in terms of water resources; it is supplied from the infiltration table: alluvial table dependent on the floods of the wadis.

South Zone: this is the area that is with the Algerian-Nigerian borders, which also has a significant water table; it is the Combro-Ordovician water table (H.R.D, 2020).

3-6 Geology

The center of the Hoggar massif is essentially crystalline, made up of very old rocks, of antecambrian age, already partly leveled during the Tassilian transgression.

In the tertiary sector, a rejuvenation of the relief takes place as a result of powerful volcanism. This basic crystalline set is at an altitude of 2600m in the center of the massif, it drops at the periphery to close the ditch separating the Atakor from the Tassilis (Blanguernon, 1976).

3-7 Geomorphology

The Hoggar offers contrasting landscapes:

- The ergs.

- The regs.

- Mountains.

- The wadis.

- The nebkas.

- Hamadas: The tallest hamadas are called Tassilis and can reach an altitude of 2000 m.

- Gueltas: are pools of water, shallow or deep. The most important that are found in Hoggar are Afilal and Issakarassen.

3-8 Flora and vegetation of central Sahara

Following numerous climatic changes that occurred in the Quaternary era, the flora of the Hoggar, in addition to the endemic species specific to the central Sahara, includes plant species of various biogeographical origin: Saharo-Sindian (Persia, India, Egypt, Arabia, Palestine), Mediterranean (Mediterranean Basin) and Sudano-Decanian (Sudan, Angola) (Sahki and ***al***.,2004). There are three types of vegetation according to the geomorphological units.

3-8-1 The vegetation of the Oued

Floristically, the central Sahara (high mountains excluded) is characterized by the relatively important development of flora of Sahelian origin where thorny trees and shrubs play a leading role: *Acacia raddiana*, *Acacia seyal*, *Maeruacrassifolia*, *Balanites aegyptiaca* and *Calotropisprocera*, *Tamarix articulata* and *Panicum turgidum* are added (Quezel, 1965).

3-8-2 The vegetation of the high mountains

The mountains high enough in the Sahara are not very numerous; these are mainly the Hoggar and its annexes (Tefedest, Immider, TassiliN'ajar, and Tibesti).He adds the culminating islands of the northernmost links of the Air massif (Quezel, 1965).

The distinctly Saharan vegetation that exists in these mountains is relatively rich, represented by species of endemic of the Sahara central: *Olea laperrini*, *Myrtusnivellei*, *Lavandula sp*, *Teucruimpoluim* (Maire, 1940), (Ozenda, 1983).

3-8-3 The vegetation of the water points

- In the gueltas, large plant formations can develop such as *Typha elephantina* generally associated with *Neruim oleander*, there are many species of herbaceous plants, the most representative of which are *Erianthusravennae*, *juncus* maritimus, *Equisetum ramosissimum*, *Cyperus laevigatus* (Master, 1971).

3-9Biological types

Biological types have been distinguished according to their adaptation to the cold or dry season.

According to the classification of (Raunkiaer,1905), biological types are defined according to the morphology and biological rhythm of the plant. It is in principle from the buds that it bears; we can distinguish 5 biological types:

- Phanerophytes: The buds are located above the ground at 50cm.
- Chamaephytes or dawarf-shrub: The buds are located less than 50cm above the ground.
- The hemi cryptophytes: The buds are located at ground level.
- The Cryptophytes: The buds are in the soil or water.

The Therophytes: Are ephemeral plants (Lacost and ***al***.,2001).

3- 10 Germination study

Acacia raddiana seeds have a hard seed coat that can delay germination for months and years; this hardness translates into impermeability to water and oxygen. (Werker,1981) - Integument impermeable to water: this is the case of the hard seeds of Fabaceae (the embryo cannot imbibe). (Come, 1993).

-Integument impermeable to oxygen circulates more difficult because the integument is not very porous and thick. (Werker,1981).

Presence of one or more inhibitors: Different chemicals in the seed coat prevent germination. The phenolic components are often found in the envelope. (Elouassis and***al***.,2005) Regarding the laboratory experiment, the breaking of dormancy (elimination of integumentary inhibitions) and to know the effect of certain chemicals in the organs of *Acacia raddiana* on germination.

3-10-1 Materials and methods

3-10-1-1 Biological material

The seeds of acacia raddiana that are the subject of this study were collected under natural conditions in Hoggar or come from experimental station wadi Tifougguene where acacia raddiana grows naturally. (Figure14).

Figure 14:*Acacia raddiana* seeds

3-10-1-2 Representing the harvesting station

Table 7: Representing harvesting station.

species	Date of harvest	Loction of harvest	Longitude	Latitude	Altitude (m)
Acacia raddiana	*07/05/2020*	Tifouggruene	22°49 39.3'N	005°42.46.3' E	1439

The different parts of the *Acacia raddiana* tree (leaves, bark, branches and roots). Figure15, (Figure16)and(Figure17).

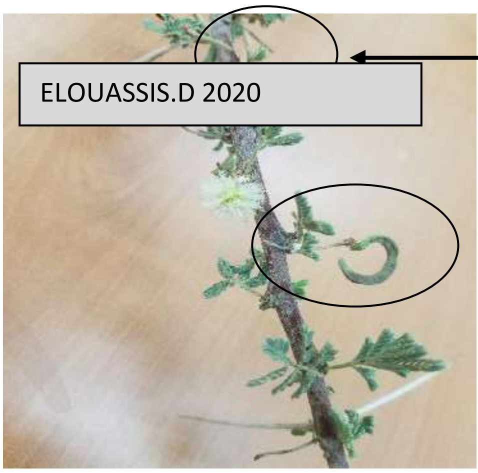
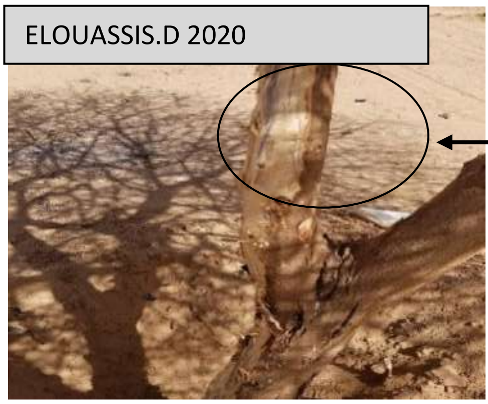
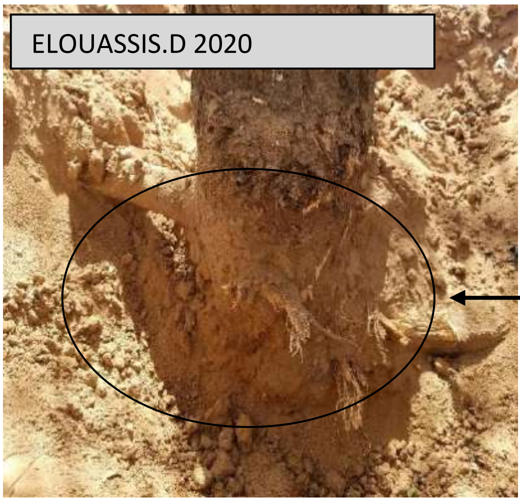


Figure 15: Branch of *Acacia raddiana*



Acacia raddiana bark

Figure 16:*Acacia raddiana* bark



Acacia raddiana root

Figure 17:*Acacia raddiana* root

3-11- Laboratory equipment

-Like any manipulation, the work required different materials that are

-The oven, hotplate, glassblowers (beakers, squeeze bottle, petri dishes

and reception)

-Chemicals (H2SO4 at 96°)

-various syringes, forceps, filter paper, thermometer, 0.5- and 2-mm diameter sieve and mortar.

3-12-Methods

3-12-1 Seed viability test

Before the experiment the seeds are put in a container of water (the light seeds emerge on the surface; they are either immature or dead). Seeds that fall to the bottom are considered ripe. Only the latter are used for the germination study

The seeds are sterilized beforehand with bleach (sodium hypochlorite diluted 10 times for 5 minutes).

3-12-2Preparation of the 2% aqueous extracts

We remove different parts of the *Acacia raddiana* tree (leaves, bark, branches and roots)

- put it in the shade to dry.

The organs of the tree were removed and dehydrated after grinding to 0.5mm, they were

grind it and sift it with a sieve of 0.5 diameter one by one

In the end, we get the powder from each part of the tree Figures 18,19,20 and 21

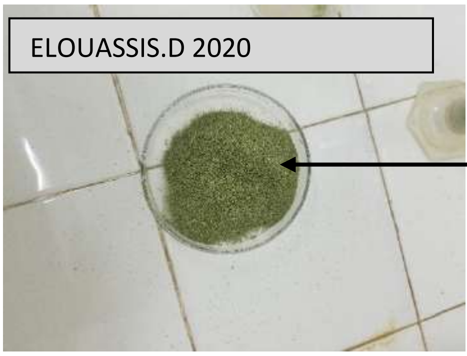
Figure 18: Bark powder

*Acacia raddiana*brakpowder

Figure 19: Branch powder

Acacia raddiana root powder

Figure 20: Root powder



*Acacia raddiana*leafpowder

Figure 21: Leaf powder

3-13 preparation the soil solutions

For the soil we take the soil around the roots and put it to dry and sift it with a sieve of 2mm in diameter Figures 22

Figure 22: The soil 2 mm

We weigh 2g of each powder obtained previously and we put it in a beaker and adjusted to it with distilled water at a temperature of 40c until it reaches 100ml and we shake the stirrer well and we obtain aqueous extracts of every part of the tree.

For the mixture we weigh 2g of each sample and put them in a beaker and adjust it to distilled water at a temperature of 40 ° C to obtain an aqueous extract of the mixture.

3-13-1 Preparation of dilutions of 0%, 0.25 %%, 0.5% and 1%

3-13-1-1 0% equals 2% aqueous extract of the leaf

-dilution 1% we take one ml of the 2% aqueous extract from it using a syringe in a beaker and add it to distilled water at a temperature of 40c°

3-13-1-2- 0.5% dilution

we take 0.5 ml of the 2% aqueous extract of the leaf with a syring in a beaker and add it to distilled water at a temperature of 40 ° C.

3-13-1-3 dilution 0.25%

We take 0.25 ml of the 2% aqueous extract from the leaf using a syring in a beaker and add it to distilled water at a temperature of 40 ° C. It is the same sample with decreasing dilution

3-13-2Preparation of soil solutions

Preparation of the 2% solution: we take 2g of soil and put it in a beaker and adjust it to distilled water until it reaches 100ml at a temperature of 40c ° and from the 2% solution, the solutions of 1%, 0.5% and 0.25% are prepared, just take with a syringe of 1%, 0.5% and 0.25% respectively and each time we just had it with distilled water at a T of 40c finally obtained the required solutions.

3-14The positive control

Treatment with 96 ° sulfuric acid: the solution of pure sulfuric acid is prepared in a glass receptacle and the seeds are left in the acid for a period of 120 minutes

The seeds are drained and rinsed with plenty of water.

3-15The negative control

we use distilled water to study the germination the seeds are put in kneaded dishes 6cm in diameter and lined with filter paper and the solutions are put in kneaded dishes containing 20 seeds with 5 repetitions (batch of 100 seeds for each solution).

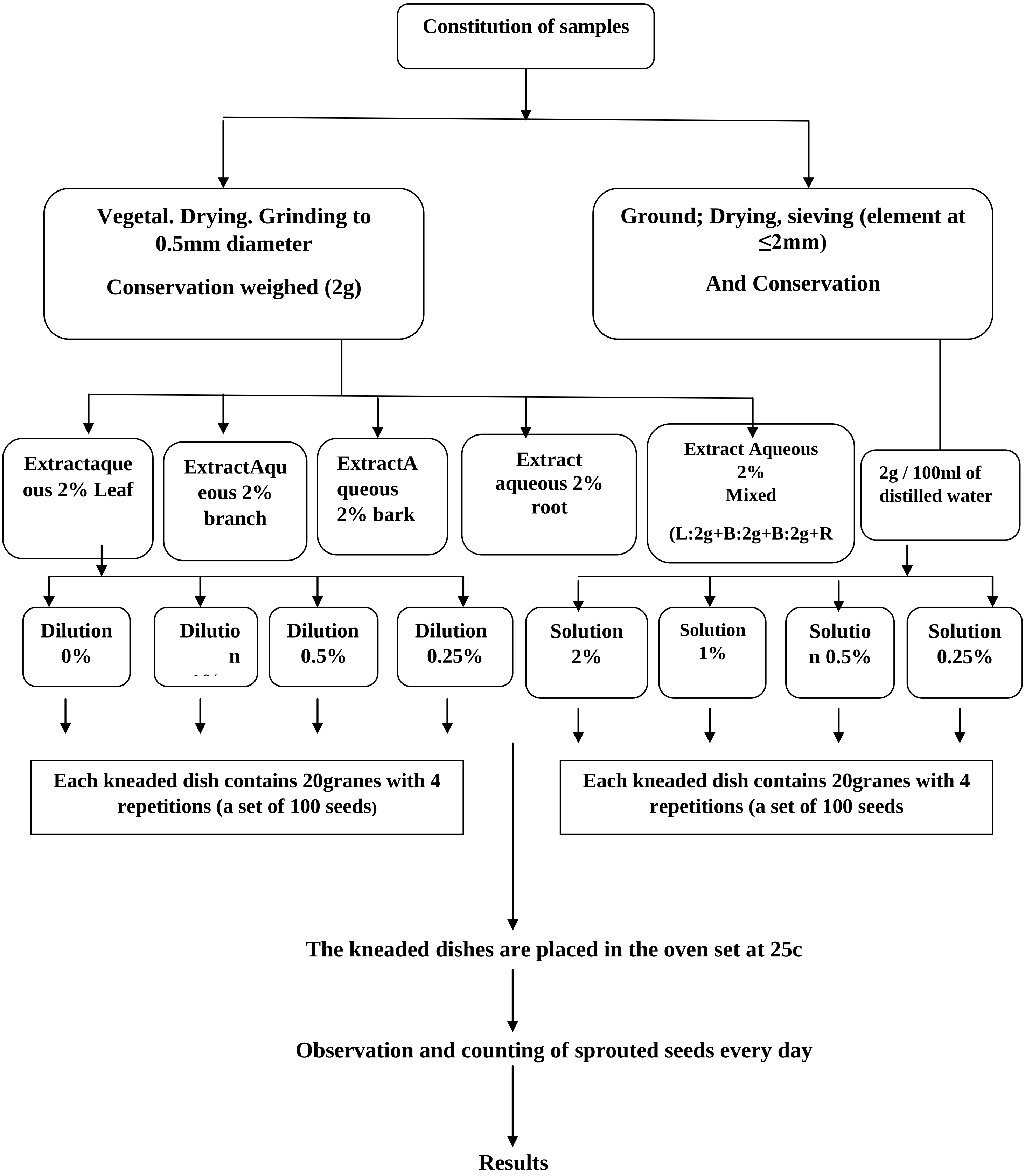
Treatments of *Acacia raddiana* seeds with aqueous extract of *Acacia raddiana*

20 seeds / Petri dish

The seed is considered germinated once the radicle pierces the seed coat

The number of germinated seeds is counted each day and reported.

The oven was maintained at a temperature of 25c°for the duration of the experiences.


Constitution of samples
Vegetal. Drying. Grinding to 0.5mm diameter
Conservation weighed (2g)
Ground; Drying, sieving (element at ≤2mm)
And Conservation
Extractaqueous 2% Leaf
ExtractAqueous 2% branch
ExtractAqueous 2% bark
Extract aqueous 2% root
Extract Aqueous 2% Mixed
(L:2g+B:2g+B:2g+R
2g / 100ml of distilled water
Dilution 0%
Dilution
Dilution 0.5%
Dilution 0.25%
Solution 2%
Solution 1%
Solution 0.5%
Solution 0.25%
Each kneaded dish contains 20granes with 4 repetitions (a set of 100 seeds)
Each kneaded dish contains 20granes with 4 repetitions (a set of 100 seeds
The kneaded dishes are placed in the oven set at 25c
Observation and counting of sprouted seeds every day
Results

Chapter 4:

Results and discussions

Chapter 4: Results and discussions

Two parameters were selected to highlight the action of the plant part and the soil on the germination of *Acacia raddina* seeds. These parameters are the aqueous extracts of the plant part and the soil solution.

The temperature is constant throughout the experiment at 25 ° C because this is the optimum temperature for the germination of *Acacia raddiana* (Bensaid, 1985) ;(Elouassis and *al*., 2005).

4-1The action of the plant part

Aqueous solutions the results of the different concentrations showed that the aqueous extract of the leaves of the acacia plant shown in(Figure23).

Regarding the 2% aqueous extracts of the diluted leaves (0%, 0.25%, 0.5% and 1%), we note that the germination rate is between 27% and41% and these percentages are close and these rates of germination were between the positive control 90%and the negative control and there is no variation in the effect of leaf extract on germination of *Acacia raddiana* seeds ,there is no contrast relationship significant between the dosage of the extracts leaf hence, the extract of the leaves of *Acacia raddiana* have a stimulating effect on the germination of the seeds.

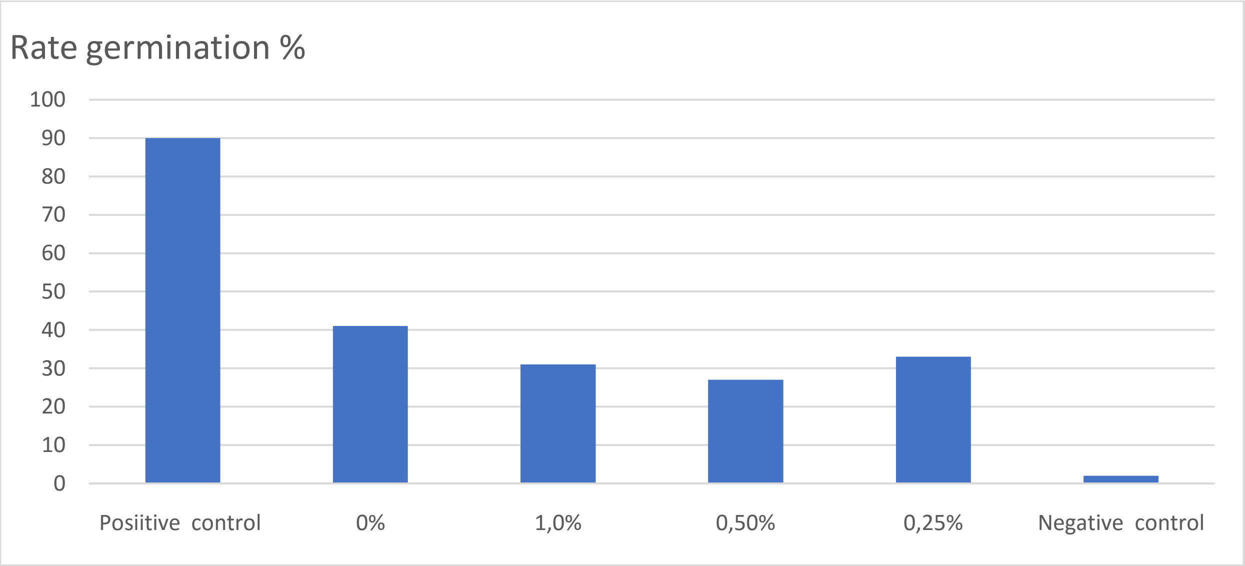


Figure 23 : The effect of the leaves aqueous extracts on the germination of *Acaciaraddiana* seeds.

4-2 The action of aqueous extracts 2% of branch, bark, root and mixture

The results shown in(Figure24) were that the aqueous extract of branch, bark, root and mixture of acacia plant had a stimulating effect on the germination of its seeds where do we find the same remark the germination rate varies between 28% for the aqueous extract 2% of the branch and for the aqueous extract 2% of the bark, 26% and for the root extract 25% and from the mixture 17% had a inhibitory effect on the germination of its seeds, we find a weak percentage compared to the result of other extract these results are close to each other ,and it comes between the positive control and the negative control 90%figure and 2% respectively and from these results we can say that there is an effect on germination, but it is weak, but it ispositive because there is a germination. And there is no contrast relationship significant between the dosage of the extracts (branch, bark, root and mixture).

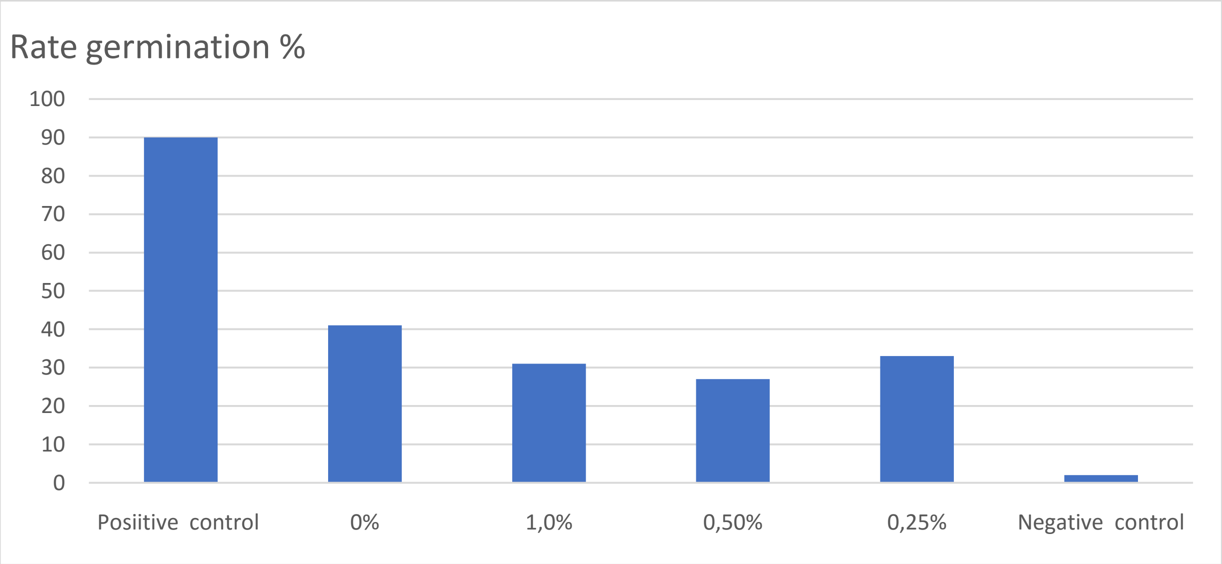


Figure 24: The effect of 2% aqueous extracts of the branch, bark, roots and mixture on the germination of*Acacia raddiana*

4-3 The action of soil solution (0%, 0.25%, 0.5% and 1%)

The results shown in(Figure25) that the soil solution 0. 5% the germination rate is 25% and for the 0.05% solution the germination rate was 24%, and with a lower percentage for each of the solutions diluted to 1% and 2% the germination rate was 18% and 1% respectively So soil solutions have an had a inhibitory effect on germination of*Acacia raddiana* seeds, which was less than effect of sulfuric acid and better thane distilled water. And negative control, which indicates that there is an effect of these extracts.

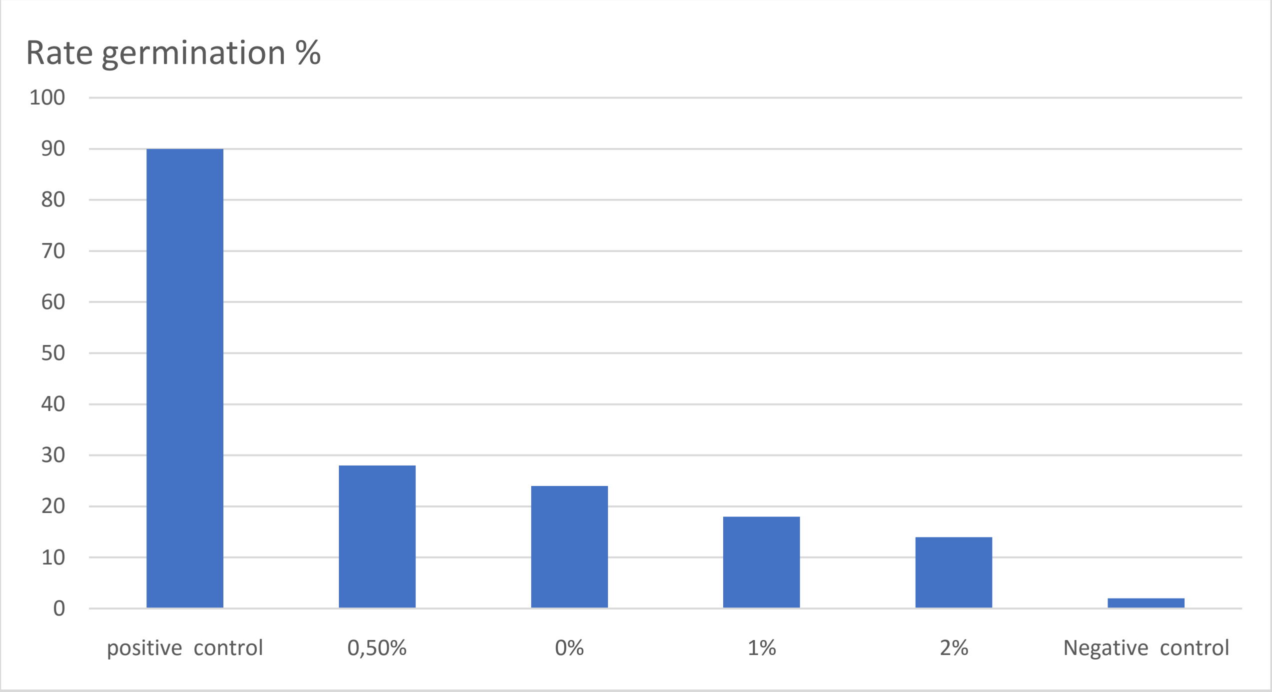


Figure 25 : The soil solutions effect on the germination of *Acacia raddiana*

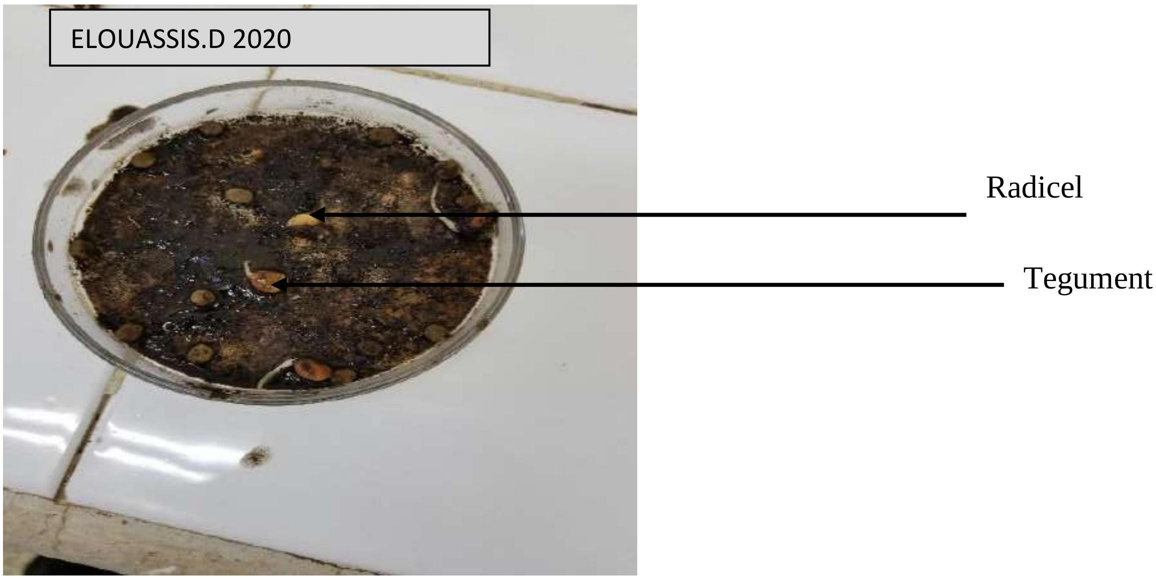


Figure 26: *Acacia raddiana*seeds aqueous extract of mix

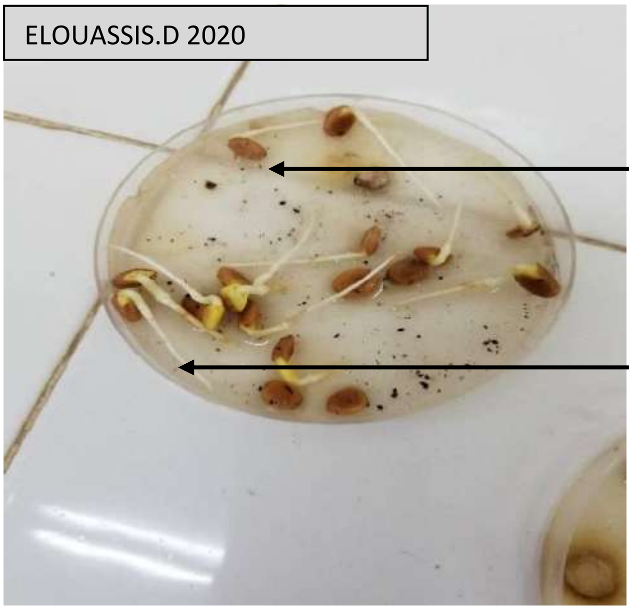


Figure 27: *Acacia raddiana*seed positive control

While doing experiments in the laboratory, we noticed a lot of contamination in petri dishes which contain 2% aqueous extracts of leaf, branch, bark and root and these extracts are very sticky, which prevents them from its diffusion in the petridish and the filter paper does not stay wet for 24 hours and this negatively affects the results and as well as the emergence of some pollution in the kneaded dishes, which negatively affects the results. (figure 28).

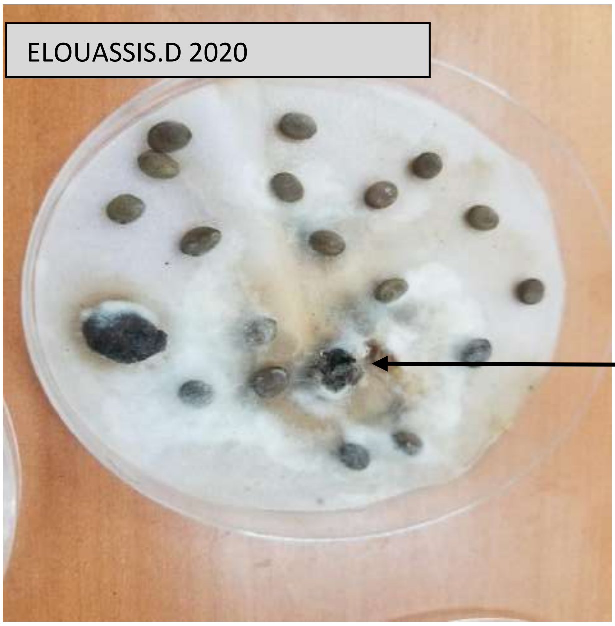


Figure 28: Contaminated *Acacia raddiana* seeds

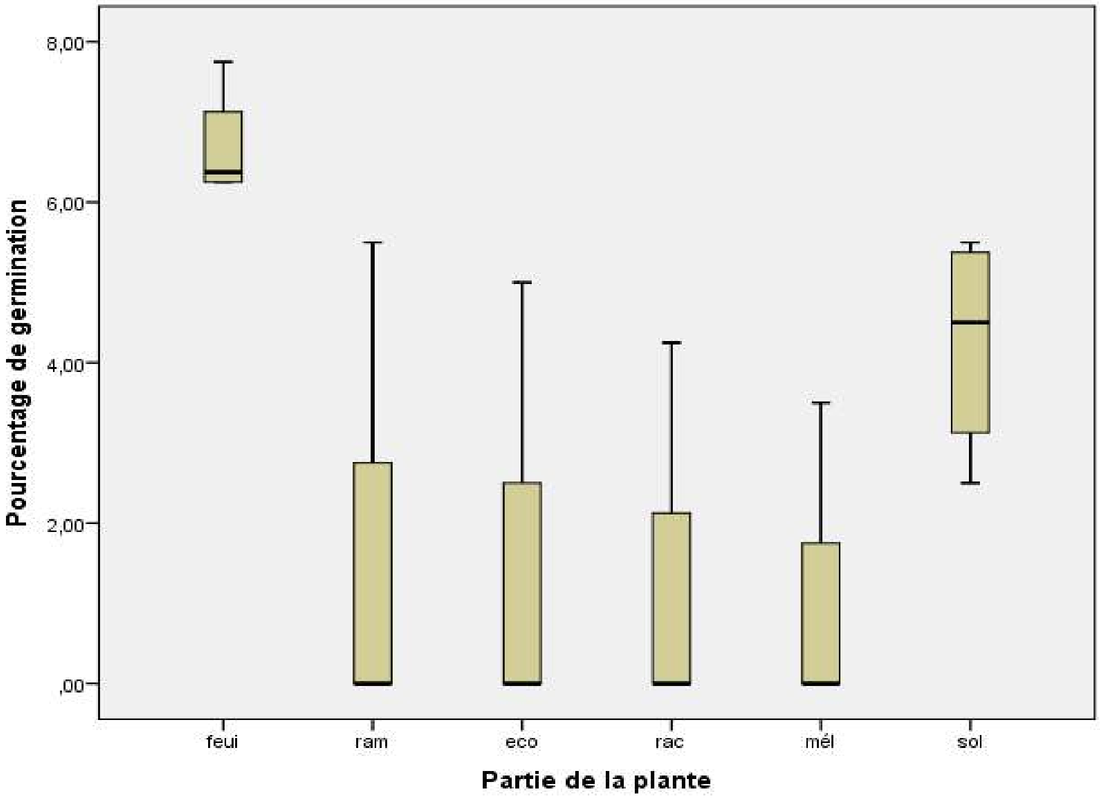


Figure 29: the relationship between dosage of extracts and seed germination

4-5 Statistical analysis

The results were analysed statistically using the tukey test (Figure 29) According to the resultsobtained, there are threehomogeneous groups, as wefind the effect of each of the aqueousextract of the roots, the aqueousextract of the, bark, branches and roots almost have a stimulatingeffect on the germination seed of *Acacia raddiana*

On the other hand, wefind the aqueousextract of leaf has a verysignificant impact on the germination of acacia seeds, whirlwind the soil solution also has a significant stimulating effect compared to the homogeneous aqueous extracts, and in the end, wefind the effect of mixed extract has a verylittlestimulatingeffectcompared to the previousextracts.

We can say that the aqueous solution of the paper has a verysignificantstimulatingeffect on the plant of the roots of acacia, and also the soil solution has a stimulatingeffect for the germination of the acacia seeds.

The mixed aqueousextractshaves a stimulatingeffect but in a verysmall percentage.

All of these extracts have a stimulating effect less than the positive control (sulfuric acid) and much greater than the negative control (distilled water)(Table 08)

Plant part	N	Sub set for alpha = 0.05	
		1	2
Mix	4	,8750	
Roo	4	1,0625	
Bar	4	1,2500	
Bra	4	1,3750	
Soil	4	4,2500	4,2500
Lea	4		6,6875
Sig.		,210	,532

The homogeneous subset group means are displayed

a. the simple size of the hormonic mean = 4,000.

Table 8*:*Significant difference form Tukey

Conclusion

Conclusion

The *Acacia raddiana* plant is considered one of the main and important trees in desert ecosystems in general and in desert valley systems in the study area and Wadi Tifougguene in particular, as the *Acacia raddiana* trees contain a large living mass and thus have high expected effects in the production of allelopathic materials although there is little study on this topic and through the study We conducted the presence of allelopathic effects of the components of the *Acacia raddiana* tree on the germination of its seeds, and it became clear that the severity of these effects depends on the type of extract (aqueous extract of plant parts or a solution of the soil surrounding the tree).

The aqueous extracts of leaves had a significant stimulating effect on the germination of its seeds and it was the most influential, as the percentage of germination reached 41 and it came between treatment with sulfur acid and distilled water. This stimulation is lower in relation to the soil solution and begins to decrease for each of the aqueous extracts of bark, branches and roots. This effect is a catalyst, but very little for a mixed aqueous solution

Through these results, we find that all the aqueous extracts of the parts of the plant have a stimulating effect on the germination of *Acacia raddiana*seeds, even if it is uneven. This leads us to the possibility of saying that there is the production of allelopathic substances by the parts of the *Acaciaraddiana* tree that stimulates the germination of its seeds, and we expect that these results will be used as a natural treatment for the seeds of the acacia plant, as an alternative to treatment with sulfuric acid, which despite its results, we find it very expensive and dangerous and not accessible to everyone, especially in Desert areas

As well as helping to re-afforest the Alexia tree in its natural midst, especially for these endangered species due to humans and animals.

We wish to study the allelopathy of the other types of acacia present in the depletion, as well as to know the extent of its impact on the germination of other types of plants in an attempt to find a solution to weeds.

As well as a biochemical study to find out the type of these substances secreted from the shedding of the parts of the acacia plant.

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Annexes

Annexes

Alkaloids are molecules with nitrogenous bases, most often heterocyclic, overwhelmingly of plant origin.

A secondary metabolite: is a molecule which, by exclusion, does not belong to the primary metabolism. The latter is essential for nutrition, it ensures the growth and development of an organism.

phenols: are aromatic chemical compounds bearing an —OH hydroxyl function. The derivatives bearing several hydroxyl functions are called polyphenols

Flavonoids (or bioflavonoids): are secondary metabolites of plants, all sharing the same basic structure formed by two aromatic rings linked by three carbons: C6-C3-C6, a chain often closed in a hexa- or pentagonal oxygenated heterocycle.

Terpenoids: sometimes referred to as isoprenoids, form a large and diverse class of organic compounds found in nature, similar to terpenes, derived from isoprene units with five carbon atoms assembled and modified in thousands of ways.

Herbivore: the term herbivore is more often used for vertebrates, that of phytophage for invertebrates), is, in the field of zoology, an animal (mammal, insect, fish, etc

Anthropogenic: All phenomena which may be the result of the presence or the action of human beings are qualified as anthropic.

Phytoalexins: are low molecular weight phytochemicals synthesized de novo in response generally to biotic stress, sometimes to an abiotic and accumulated by certain plant tissues at the site of the fungal or bacterial infection, or at the site of imposition. Stress

H_2SO_4: acid sulfuric

NaClO: sodium hypochlorite

F. A*: faidherbiaalbida, A.*N*: Acacianolitica,*A.E Acacia *ehrenbergjiana,*A.R*Acaica raddiana,*A. S *Acacia seyal et* A.L *Acacia leata*

Arabic Name: السنط

French name: red gum tree, Acacia de Cayenne, Acacia d'Arabie, acacia a gomme;

English name: prickly acacia, Egyptian thorn, babul acacia, Arabic gum tree (Malviya and***al***; 2011).

Tamhak: Absagh

Organization

O.N.M, 2005: Office national météorologique.

IUCN: International Union for Conservation of Nature

H.R.D: Hydraulic Resource Directorate.

INRF: Natinal Forest Reseache Institute

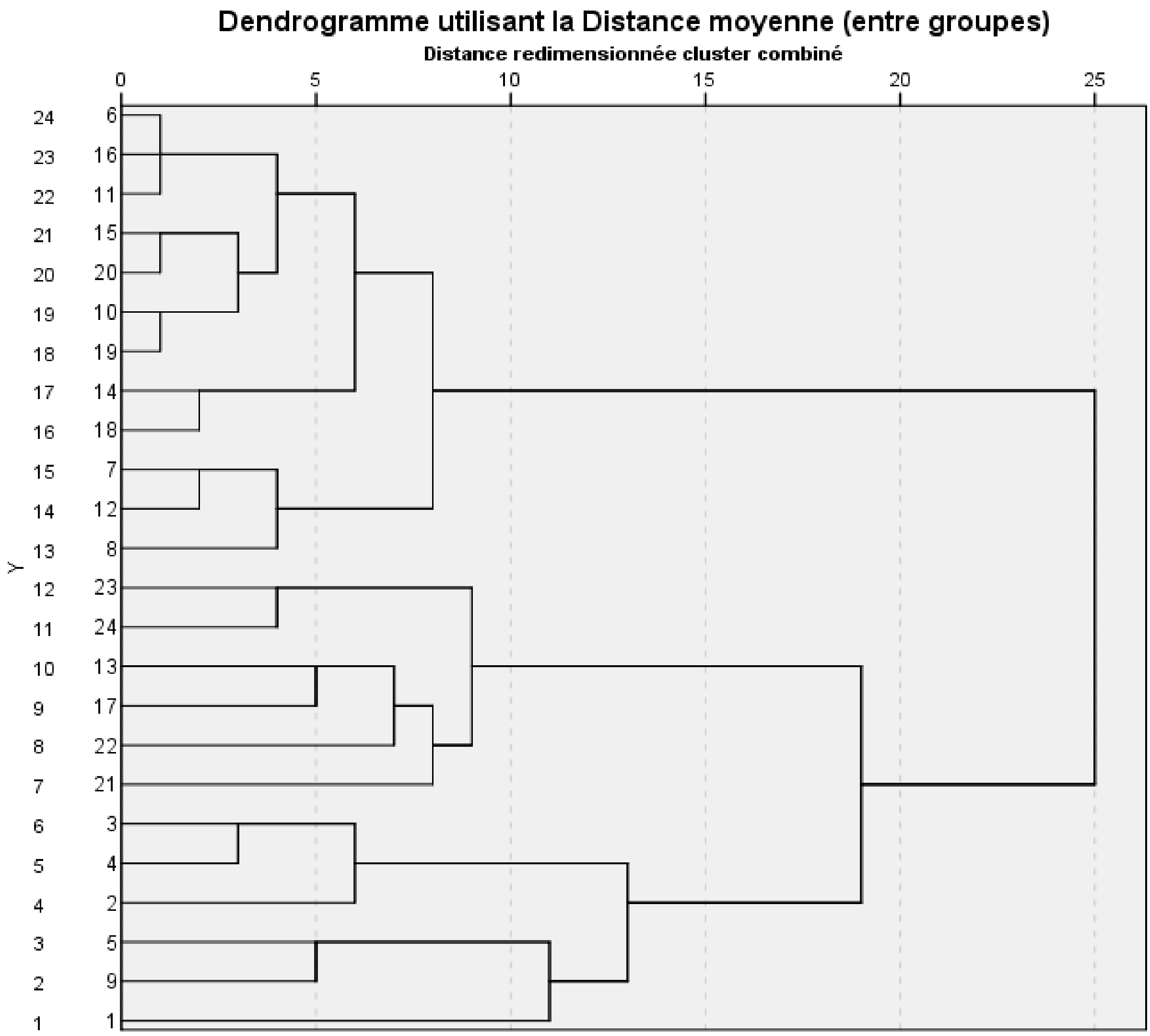

Figure 30:Dendrogram using mean distance (between group) resized distance combined cluster

Figure 31: preparation step of aqueous extract.

Figure 32: *Acacia raddiana* seeds ready for use

Figure 33: aqueous extracts ready to use

Figure 34: counting sprouted seeds

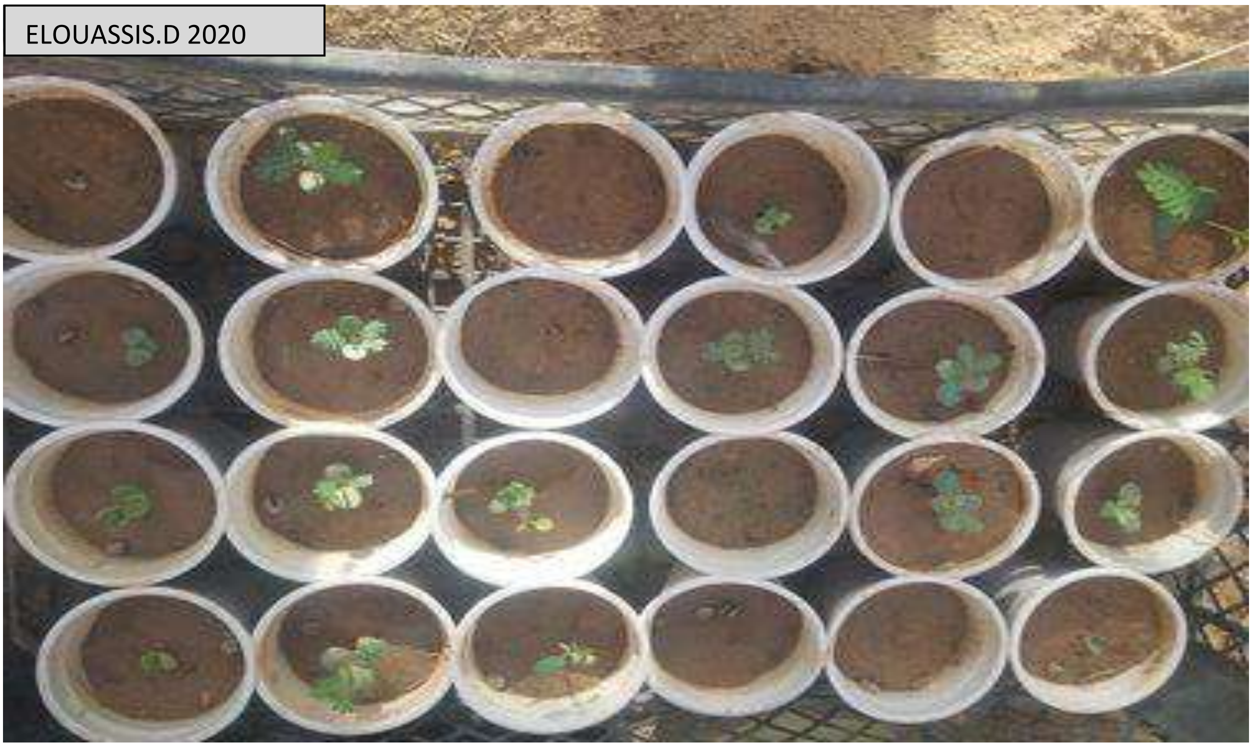

Figure 35:*Acacia raddiana* seeds treated with the aqueousleaf extract 2% after 19days of sowing (INRF nursery)

Figure 35: *Acacia raddiana* station (ouedFotasHoggar)