REPUBLIQUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE
MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE

Université des Frères Mentouri-Constantine

Laboratoire d'Obtention de Substances Thérapeutiques (LOST)

Organise

Les 3èmes Journées Scientifiques LOST 2018

Phytochimie
Activités Biologiques de Plantes Médicinales et Aromatiques

23-24 Janvier

2018

500 Places Tidjani haddam
Constantine
Algérie

Avant-propos

C'est avec un grand plaisir que le Laboratoire d'Obtention de Substances Thérapeutiques (Université des Frères Mentouri-Constantine) organise les 3èmes journées scientifiques-LOST 2018, les 23 et 24 Janvier 2018. Cette manifestation, comprenant 8 conférences plénières, 10 communications orales et 55 communications affichées impliquant 76 chercheurs phytochimistes et biologistes de différentes universités algériennes, est une opportunité pour promouvoir la recherche liée à la valorisaton des plantes médicinales algériennes.

Je remercie vivement tous ceux qui ont contribué pour que ces 3èmes Journées Scientifiques-LOST 2018 aient lieu et souhaite qu'elles soient réussies.

La Présidente du Comité d'Organisation
Pr. Zahia Kabouche

Comité d'organisation

Présidente : Pr. Kabouche Zahia

Membres

Dr. Abderrezak Meriem Khaizourane

Dr. Benmerache Abbes

Mme. Benteldjoune Mounira

Melle. Bouchouka Racha Lydia

Melle. Boudebouz Samira

Dr. Boutaghane Naima

Melle. Foughalia Amina

Dr. Ghorab Hamida

Dr. Lakhal Hichem

Melle. Mouna Ryma

Melle. Ramli Imen

Melle. Sakhri Fatma Zahra

Comité Scientifique

Présidente : Pr. Kabouche Zahia (U. des Frères Mentouri Constantine 1)

Membres

Pr. Ait Kaki Brahim (U. Constantine 3)

Pr. Akkal Salah (U. des Frères Mentouri-Constantine)

Pr. Barkat Malika (U. des Frères Mentouri-Constantine)

Pr. Belkhiri Abdelmalik (U. Constantine 3)

Dr. Benahmed Merzoug (U. Tébessa)

Pr. Benkiniouar Rachid (U. des Frères Mentouri-Constantine)

Dr. Berrehal Djemaa (U. des Frères Mentouri-Constantine)

Dr. Boutaghane Naima (U. des Frères Mentouri-Constantine)

Pr. Haba Hamada (Université de Batna)

Pr. Kabouche Ahmed (U. des Frères Mentouri-Constantine)

Pr. Kharroub Karima (U. des Frères Mentouri-Constantine)

Pr. Mihoubi Ilhem (U. des Frères Mentouri-Constantine)

Pr. Rhouati Salah (U. des Frères Mentouri-Constantine)

Dr. Segueni Narimane (U. Constantine 3)

Pr. Semra Zahia (U. Constantine 3)

Dr. Sobhi Widad (U. Sétif)

Pr. Tebibel Soraya (U. des Frères Mentouri-Constantine)

Pr. Zellagui Amar (U. Oum El-Bouaghi)

Pr. Zerizer Sakina (U. des Frères Mentouri-Constantine)

PROGRAMME

CONFERENCES PLENIERES

CP1- Pr. HABA Hamada: Phytochemical study of *Astragalus* species from Algeria: extraction, isolation and structure elucidation of saponins. (Université de Batna 1).

CP2- Dr. BENAHMED Merzoug: *Elaeoselinum thapsioides* as corrosion inhibitor for carbon steel in acid solution. (Université de Tébessa).

CP3- Pr. BARKAT Malika: Variability factors and biological properties of glucosinolates. (Université des Frères Mentouri-Constantine).

CP4- Pr. KABOUCHE Zahia: Biological potential of Algerian medicinal plants belonging to various families. (Université des Frères Mentouri-Constantine).

CP5- Dr. SOBHI Widad: Therapeutic virtues of *Nigella sativa*, between myth and scientific evidences: conclusions of more than 10 years of work. (Université de Sétif).

CP6- Pr. AKKAL Salah: Phytochemical investigation of aerial parts of an endemic species of Asteraceae family from Algeria. (Université des Frères Mentouri-Constantine).

CP7- Dr. SEGUENI Narimane: Propolis: new and promising source of potential biological compound. (Université Salah Boubnider-Constantine 3).

CP8- Pr. BELKHIRI Abdelmalik: De la controverse autour du R.H.B.à la règlementation des produits naturels à allégation de santé. (Université Salah Boubnider-Constantine 3).

COMMUNICATIONS ORALES

CO1- Mme. BENABDELAZIZ Imen: Isolation and characterization of polyphenols from *Helianthemum sessiliflorum* Pers. (Université de Djelfa).

CO2- Mr. BENDIF Hamdi: Chemotypification of *Thymus munbyanus* subsp. *coloratus* (Boiss. & Reut.) Greuter & Burdet (Lamiaceae) essential-oil. (Université de M'Sila).

CO3- Mme. ZEGHIB Assia: Antioxidant activity and phenolic content of *Artemisia campestris* used in Algerian folk medicine. (Université de Tébessa).

CO4- Mme. GOLEA Lynda: Biological activities and chemical constituents of *Silene arenarioides* Desf. (Université de Khenchela).

CO5- Mme. TOUAFEK Ouassila: Phenolic content and antioxidant activity of the extracts of two medicinal species of Gentianaceae. (Université de Blida).

CO6- Mme. ZOUBIRI Lamia: Physicochemical characterization and *in vitro* evaluation of the antioxidant properties of traditional dried white grapes of the late variety "Debouki" (*Vitis vinifera*) grown in the Tademait-Tizi Ouzou region. (Université des Frères Mentouri-Constantine).

CO7- Mme. MIHOUBI Ilhem: Antifungal and antiaflatoxigenic potential of *Mentha piperita* L. and *Rosmarinus officinalis* L. essential oils (Université des Frères Mentouri-Constantine).

CO8- Mme. HIMED Louiza: Relationship between biological activity and composition of lemon essential oil. (Université des Frères Mentouri-Constantine).

CO9- Mme. RAMLI Imen: Establishment of a combined *in vivo* - *in vitro* model used in studies targeting immunological recent insights in IBD disease. (Université des Frères Mentouri-Constantine).

CO10- Mr. DEROUICHE Tahar: Activité antidépressive et anxiolytique d'une dose sub-sedative de *Tilia cordata*. (Université Salah Boubnider-Constantine 3).

POSTERS

P1- ABDERREZAK Meriem Khaizourane: Phytochemical screening of a *Rutacae* species growing in Algerian Sahara. (Université des Frères Mentouri-Constantine).

P2- AKLIL Badiaa: The hepatoprotective effect of *Argania spinosa* seeds. (Université des Frères Mentouri-Constantine).

P3- BADAOUI Fatima Zohra: Optimization of oil-in-water emulsion stability. (Université de Constantine 3).

P4- BADAOUI Mohamed Ibrahim: Phytochemical and biological study of an Algerian plant belonging to the genus *Atractylis* (Asteraceae). (Université de Batna 1).

P5- BAGHRICHE Ibtissem: Effet of the *n*-butanol extract *Astragalus armatus* on aortic structure in mice induced by hyperhomocysteinemia. (Université des Frères Mentouri-Constantine).

P6- BECHKRI Sara: Antibacterial and antioxidant activities of Algerian *Salvia* species (Lamiaceae). (Université des Frères Mentouri-Constantine).

P7- BENCHADI Wassila: Chemical constituents of the species *Helianthemum hirtum* ssp. *ruficomum* (Cistaceae). (Université de Batna 1).

P8- BENDAMENE Samia: Chemical composition and antiaxydant activities of the methanolic extract of *Scabiosa* species. (Université de Bordj Bou Arréridj).

P9- BENMERACHE Abbes: Antibacterial, antioxidant and tyrosinase inhibitory activities of parts of *Eryngium tricuspidatum*. (Université des Frères Mentouri-Constantine).

P10- BENSOUICI Chawki: Chemical composition and biological activity of *Sedum caeruleum*. (CRBt-Constantine).

P11- BENTELDJOUNE Mounira: Evaluation of the antioxidant potential, phenolic and flavonoid contents of the methanol extract of *Ammoides atlantica*. (Université de Constantine 3).

P12- BOUAROURA Amina: Phytochemical study of Algerian propolis. (Université de Constantine 3).

P13- BOUAROURA Amina: Phenolics content and scavenger ability of Algerian propolis. (Université de Constantine 3).

P14- BOUCHOUKA Racha Lydia: Polyphenols and phytochemical screening of *Asphodelus* species. (Université des Frères Mentouri-Constantine).

P15- BOUDEBOUZ Samira: Protective effect of the plant *Salvia argentea* on Hcy level and the aorta of mice induced by hyperhomocysteinemia. (Université des Frères Mentouri-Constantine).

P16- BOUDIAR Tarek: Antioxidant activity of *Rosmarinus tournefortii* de Noé extracts. (CRBt-Constantine).

P17- BOUDJADA Amina: Dihydrophenanthrenes from *Tamus communis* L. and their antioxidant activities. (Université des Frères Mentouri-Constantine).

P18- BOUGUERRA Ali: Analysis of the volatile compounds of *Rosmarinus officinalis* L. by SPME-GC / MS and study of the antioxidant activity of its essential oils and phenolic extracts. (Université des Frères Mentouri-Constantine).

P19- BOULACEL Ibtissem: Phytochemical study, antibacterial and antioxidant activities of aerial parts of *Ferula lutea* (Poiret) Maire. (Université des Frères Mentouri-Constantine).

P20- BOULECHFAR Safia: *In vitro* study of antioxidant properties of methanolic extract of propolis obtained from Collo. (Université d'Oum El-Bouaghi).

P21- BOURATOUA Aicha: Effect of *Athamanta sicula* oil on inhibition of mild steel corrosion in 1M HCl. (Université des Frères Mentouri-Constantine).

P22- BOUTAGHANE Naima: Chemical constituents of *Genista numidica* Spach aerial parts and their antioxidant activities. (Université des Frères Mentouri-Constantine).

P23- BOUTAGHANE Naima: Phytochemical study and antioxidant activity of the methanolic extract of *Tuberaria*. (Université des Frères Mentouri-Constantine).

P24- BOUTAMINE Yasmine: Pharmacological and toxicogical application of Micronucleus test in mice. (Université de Constantine 3).

P25- CHERCHAR Hanane: Antibacterial activity of *Juniperus* species growing in Algeria (Cupressaceae). (Université des Frères Mentouri-Constantine).

P26- CHIBANI Salih: Flavonoids and antioxidant activity of *Santolina rosmarinifolia* L. from Algeria. (Université des Frères Mentouri-Constantine).

P27- DAIKH Amina: Effect of propolis extracts against Methicill in Resistant *Staphylococcus aureus* (MRSA). (Université des Frères Mentouri-Constantine).

P28- DAIKH Amina: Reducing capacity of propolis. (Université des Frères Mentouri-Constantine).

P29- DERNANE Manel: Interest of computerized behavioral analysis in the screening of anxiolytic and antidepressive activities in mouse. (Université de Constantine 3).

P30- DEROUICHE Kamel: Chemical composition, antimicrobial and antioxydant activities of *Chrysanthemum reboudianum*. (Université d'Oum El-Bouaghi).

P31- DJEBILI Samah: Total phenolic content evaluation and physico-chemical characterization of red pepper mixture. (Université des Frères Mentouri-Constantine).

P32- FERHAT Radia: Effect of extraction solvent on total phenolic and flavonoids content, and antioxidant activities of Algerian pomace olive oil. (Université de Batna 1).

P33- FOUGHALIA Amina: Polyphenols and phytochemical screening of *Cleome* species. (Université des Frères Mentouri-Constantine).

P34- GALI Lynda: Toxicity of the growing wild *Ruta chalepensis* alkaloids assessed by the brine shrimp (*Artemia salina)* bioassay. (CRBt-Constantine).

P35- GHORAB Hamida: Phytochemical study and antioxidant activity of *Traganum nudatum* Del. (Université des Frères Mentouri-Constantine).

P36- GHOUT Agena: HPLC analysis and antioxidant activity of butanolic extract of *Euphorbia helioscopia* growing in Algeria. (Université d'Oum El-Bouaghi).

P37- KHALFALLAH Assia: Flavonoids, cytotoxic and antioxidant activities of *Evax pygmaea*. (Université de Mila).

P38- LAGGOUNE Souheila: Study of the antibacterial activity of the methanolic extract of *Crataegus monogyna* fruit against antibiotic-resistant bacteria. (Université de Jijel).

P39- LAKHAL Hichem: Polyphenols content, antioxidant and antibacterial activities of Algerian C*repis*. (Université de M'Sila).

P40- LEFAHAL Mostefa: Two glycosylated flavonoids from *Limonium thouinii* (Viv.) Kuntze (Plumbaginaceae). (Université des Frères Mentouri-Constantine).

P41- LEHBILI Meryem: Five previously undescribed triterpensponins with fifteen other known compounds from *Calendula stellata* and their antimicrobial and cytotoxic activities. (Université des Frères Mentouri-Constantine).

P42- MAARFIA Sara: Chemical composition, antimicrobial activity of essential oil from Algerian *Bellis sylvestris*. (Université d'Oum El-Bouaghi).

P43- MAKHLOUFI El Hani: Chemical composition and anti-AGEs activities of the extract of Algerian *Daucus aureus* desf. (Apiaceae). (Université des Frères Mentouri-Constantine).

P44- MESSAOUDI Sabar: Effect of extract *Citrillus lanatus* (Cucurbitaceae) seed on lipid profile of *Mus musculus* mice. (Université des Frères Mentouri-Constantine).

P45- MESSAOUDI Sabar: Study of antihyperlipidemic and anti-inflammatory activities of the extract *Crataegus monogyna* (Rosaceae) in obese mice. (Université des Frères Mentouri-Constantine).

P46- MESSAOUDI Sabar: Antihyperlipidemic and anti-inflammatory activities of the extract of *Crataegus azarolus* (Rosaceae). (Université des Frères Mentouri-Constantine).

P47- MOKADDEM Habiba: Antioxidant activities of the ethyl acetate extract of *Asteriscus maritimus*. (Université de Annaba).

P48- MOUNA Ryma: Polyphenols and phytochemical screening of *Linum* species. (Université des Frères Mentouri-Constantine).

P49- REKKAB Seif Eddine: Compositions of essential oils from aerial parts of Aleppo pine (*Pinus halepensis* Mill.). (Université des Frères Mentouri-Constantine).

P50- SAKHRI Fatma Zahra: Evaluation of the antioxidant activity of *Phoenix dactylifera* fruit. (Université des Frères Mentouri-Constantine).

P51- SEMRA Ilhem: Total phenolic content and antioxidant activities of *Mentha rotundifolia* extract from Algeria. (Université des Frères Mentouri-Constantine).

P52- SIFOUANE Sihem: Métabolites secondaires isolés de la plante *Atractylis humilis*. (Université de Batna 1).

P53- SLIMANI Wassila: Evaluation of immunomodulatory activity of dichloromethane extract of *Starchys circinata*. (Université des Frères Mentouri-Constantine).

P54- TADRENT Wafa: Phytochemical study, antioxidant, and anti-tyrosinase activities of *Cotula anthemoides* L. (Université des Frères Mentouri-Constantine).

P55- ZAABAT Nabila: Etude phytochimique et biologique de *Phlomis bovei* De Noé (Lamiaceae). (Université des Frères Mentouri-Constantine).

RESUMES

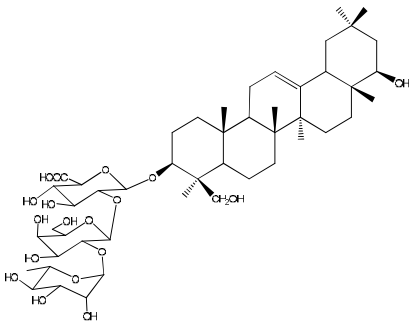
CONFERENCES PLENIERES

Phytochemical study of *Astragalus* species from Algeria: extraction, isolation and structure elucidation of saponins

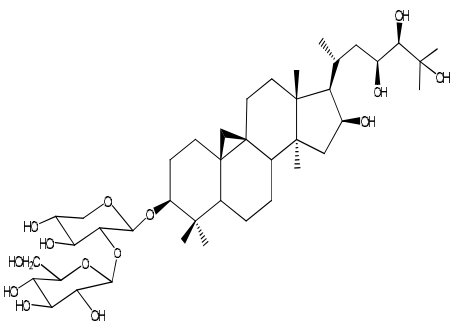
HABA Hamada

Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences de la Matière, Université de Batna-1, Algérie.
E-mail: haba.hamada@yahoo.fr

The genus *Astragalus* is widely distributed throughout the temperate and arid regions of the world, and is principally located in Asia, North and South America, and Europe, but also on mountains in Africa. However, the center of origin and biodiversity of *Astragalus* plants is Eurasia, specially the mountainous parts of South-Western and South-Central Asia. *Astragalus* species growing in North Africa are Mediterranean or Arabian Saharan plants. They are represented by over 50 species delimited in several sections, and 15 of which are found in the Sahara of Algeria. In the flora of North Africa, 10 *Astragalus* species are endemic to Algeria, Morocco and Tunisia. Species of *Astragalus* genus are valued in the folk medicine throughout the world and utilized as medicinal herbs against stomach ulcer, cough, chronic bronchitis, hypertension, gynaecological disorders, diabetes and venomous bites of scorpion. The biologically active constituents of *Astragalus* species are saponin, phenolic and polysaccharide compounds, while the toxic components consist of nitro-toxins, imidazoline alkaloids and selenium derivatives. Many saponins are well-known to be antimicrobial, to inhibit mould, and to protect plants from insect attacks. Saponins have been reported to be highly toxic to fish. They are used extensively in the food industry for both humans and animals. The pharmacological activities of saponins such as their anti-inflammatory, antinociceptive, antitumour, antiexudative, antiulcer, analgesic, antipyretic and immunostimulant effects have been already reported. As a part of our on-going program of research for new bioactive molecules from Algerian plants, we were interested particularly in the isolation and structural elucidation of oleanane- and cycloartane-type triterpene saponins from plants of *Astragalus* genus such as *A. cruciatus, A. caprinus, A. depressus, A. gombo and A. monspessulanus*. Structures of the isolated saponosides were determined mainly by 1-D and 2-D NMR, mass spectrometry ESI-MS and comparison with literature data.



Soyasaponin I



Gomboside A

Keywords: Fabaceae, *Astragalus*, saponins, NMR, ESI.

Elaeoselinum thapsioides as corrosion inhibitor for carbon steel in acid solution

BENAHMED Merzoug[1], AKKAL Salah[2], DJEDDI Nouredine[1] and LAOUER Hocine[3]

[1]*Université de Tébessa, Laboratoire des Molécules Bioactives et Applications, Route de Constantine, 12000 Tébessa, Algérie*

[2]*Université des Frères Mentouri-Constantine, Laboratoire de Phytochimie et Analyses Physicochimiques et Biologiques, Route d'Ain El-Bey, 25000 Constantine, Algérie*

[3]*Université Ferhat Abbas de Sétif, Laboratoire de Valorisation des Ressources Naturelles Biologiques, Département de Biologie, Sétif, Algérie*

E-mail: riad43200@yahoo.fr

Methylene dichloride extract (MDE) and *n*-butanolic extract (BE) of *Elaeoselinum thapsioides* (Apiaceae) were investigated as corrosion inhibitors for carbon steel (CS) in 1.0 M HCl using weight loss and potentiodynamic polarization measurements, electrochemical impedance spectroscopy, and scanning electronmicroscopy techniques. The effect of temperature on the corrosion behavior of CS was studied in the range of 293–323 K. The experimental results show that MDE and BE are good corrosion inhibitors and the protection efficiency increased with increasing concentration of the extracts, but decreased with rise in temperature. The extracts behaved as mixed-type corrosion inhibitors. The adsorption of extracts on the CS surface was found to follow the Langmuir isotherm, and the adsorption mode was found to be physisorption.

Keywords: Corrosion inhibition, plant extracts, gravimetric method, polarization curves, electrochemical impedance spectroscopy.

Variability factors and biological properties of glucosinolates

BARKAT Malika

Laboratoire de Biotechnologie et Qualité des Aliments (BIOQUAL), Département de Biotechnologie, INATAA, UMC1, Constantine, Algérie
E-mail: barkat.inataa@yahoo.fr

Glucosinolates are part of the "bioactive microconstituents of plants". They occur as secondary metabolites of almost all plants of the order Brassicales. To which belong many families which present nutritional interest such as *Brassicaceae, Capparaceae* and *Caricaceae* (Fahey *et al*., 2001). The glucosinolates are stored in the vacuoles where they are in the inactive state but in very small amounts. They are released during digestion by destroying the cell structures where they come into contact with thioglucoside glucohydrolases commonly called myrosinases (Rask *et al.*, 2000). It is this hydrolysis that releases a range of products with some biological activity. Indeed, the glucosinolates content is subject to qualitative fluctuations (mainly related to species, variety, type of compound, etc.) and quantitative fluctuations (plant age, plant part, climatic conditions, etc.) (Lori *et al*., 1990). Many epidemiological and experimental studies have shown an activity against some cancers (Moy *et al*., 2008), against: pathogenic bacteria, food contamination bacteria and cryptogamic mushrooms (Lin *et al*., 2000; Sellam *et al.*, 2007). The objective of this conference is to expose the factors that may have an impact on the quantitative and qualitative variability of these compounds and some biological properties of glucosinolates and their derivatives.

Keywords: biological properties, glucosinolates, variability.

References

Fahey J. W., Zalcmann A. T. and Talalay. P. (**2001**). The chemical diversity and distribution of glucosinolates and glucosinolates among plants. *Phytochemestry, 56:* 5-51.
Lin C. M., Kim J., Du W. X. and Wei C. I. (**2000**). Bactericidal activity of isothiocyanate against pathogens on fresh produce. *Journal of Food Protection 174, 63:* 25-30.
Moy K.A., Yuan J.M., Chung F.L., Van Den Berg D., Wang R., Gao Y.T. and Yu MC. (**2008**). Urinary total isothiocyanate and colorectal cancer: a prospective study of men in Shangai, China. *Cancer Epidemiol Biomarkers Prev, 17(6):* 1354-1359.
Rask L., Andréasson E., Ekbom B., Eriksson S., Pontoppidan B. and Meijer J. (**2000**). Myrosinase: gene family evolution and herbivore defense in *Brassicacea*e. *Plant Mol Biol, 42:* 93-113.

Biological potential of Algerian medicinal plants belonging to various families

KABOUCHE Zahia

Université des Frères Mentouri-Constantine, Département de chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria
E-mail: zahiakabouche@umc.edu.dz

Algerian flora is rich with more than 4000 species. During two decades, we have studied various species belonging to different families (Lamiaceae, Asteraceae, Apiaceae, Resedaceae, Euphorbiaceae, Pinaceae…). *Salvia* and *Stachys* species (Lamiaceae) were the most investigated for their composition and biological effects. We have recently reported the antioxidant and antityrosinase activity of *Cotula anthemoides* (Asteraceae), collected from Tiguentourine. We have investigated the *in vitro* antimicrobial activity of terpenoids, isolated from *Cedrus atlantica* (Pinaceae), collected from Khenchela. Cardenolides have been isolated from *Salsola tetragona* (Amaranthaceae ex. Chenopodiaceae), grown at Ghardaia. We have reported the chemical composition, antibacterial, antioxidant and tyrosinase inhibitory activities from aerial parts of *Eryngium tricuspidatum* L. (Apiaceae) collected from Constantine and the composition and antioxidant and anticholinesterase activities of flavonoids isolated from *Ferula longipes* (Apiaceae) grown at Bejaia.

Keywords: Lamiaceae, Asteraceae, Pinaceae, Amaranthaceae, Apiaceae.

Therapeutic virtues of *Nigella sativa*, between myth and scientific evidences: conclusions of more than 10 years of work

SOBHI Widad

Laboratoire de biochimie Appliquée, Faculté des Sciences de la Nature et de la Vie, Université Ferhat Abbas Sétif 1, 19000 Sétif, Algérie
Centre de Recherche en Biotechnologie, Ali-Mendjli, Constantine, Algérie
E-mail: sobhiwidad@yahoo.fr

Nigella sativa is undoubtedly one of the most studied medicinal plants in the world. Its history is closely linked to that of man. Since the pharaohs of ancient Egypt, until today, through the islamic civilization; it has always aroused the interest of the people. Overtime, miraculous virtues have been attributed rightly and wrongly to its essences. Technological development and the emergence of modern medicine have not tainted its brilliance and mystery, hundreds of scientific articles continue to feed the history of this plant. Our team, from the Laboratory of Applied Biochemistry at Ferhat Abbas Setif University1, has contributed in recent years to more than 20 scientific publications. The work reveals that the various compounds have anti-inflammatory, anti-tumor, antimicrobial, antioxidant and hepatoprotective effects. The products of *Nigella sativa* also show effects against dyslipidemia, diabetes, asthma and lung diseases and many other effects.

Keywords: *Nigella sativa*, Therapeutic virtues , scientific evidences.

Phytochemical investigation of aerial parts of an endemic species of Asteraceae family from Algeria

AKKAL Salah

Department of Chemistry, Faculty of exacts Sciences, University of Constantine 1, 25000 Constantine, Algeria
Department of Ecology and Vegetal Biology, Faculty of Natural and life Sciences, University of Setif 1, 19000 Setif, Algeria
E-mail: salah4dz@yahoo.fr

The Asteraceae family is represented in Algeria by 28 genus and 146 species. Among this family, many plants of the genus are widely used in local herbal medicine, as they show a wide range of pharmacological activities. Many species of Asteraceae were used in folk medicine, as spices in cookery, but also as official medicinal drugs. Thus, they account as a well-known source of essential oils and important herbal products. They are included in various pharmacopoeias as antiseptic, expectorant, diuretic, carminative, vasodilator, or spasmolytic agents. The purpose of this research concerns the phytochemical and the biological study of some genus of the Algerian flora's medicinal plants known as Centaurea, Chrysanthemum, Senecio and Scorzonera. The diverse methods of separation and purification of the methanolic extract of these plants to obtain many constituents. Many compounds belonging to different classes of secondary metabolites were isolated for the first time from the aerial parts of some species. These include flavonoids, coumarines and terpenoides which contributed to the diversity of natural products in the species. Structure elucidations of the phytoconstituents were achieved using various spectroscopic methods such as 1D (1H, 13C) and 2D (COSY, HMQC, HMBC, NOESY) NMR, MS, IR and UV-Vis and by comparison of their data with those of published compounds. Analyses of the extracts by gas chromatography and GC-mass spectrometry (GC-MS) tentatively identified many compounds, the various extracts and isolated compounds of this species were studied for their antioxidant and antimicrobial activities. The isolation of these biological active compounds showed the real importance to investigate plants that can be sources of new compounds with clinical activities.

Keywords: *Asteraceae*, phytochemical study, essential oils, antimicrobial and antioxidant activity.

Propolis: new and promising source of potential biological compound

SEGUENI Narimane

Université des Frères Mentouri-Constantine, Département de chimie, Laboratoire de produits naturels d'origine végétale et de synthèse organique, 25000 Constantine, Algeria
E-mail: segueninarimane@yahoo.fr

Propolis is a honeybee product, composed mainly of wax and resin. This product found numerous uses in the beehive. It is used by bees as sealer and as a natural biocide (Bankova *et al.*, 2000). Propolis (bee glue) has been used in folk medicine for centuries. However, the rational use of this extremely interesting product on the basis of scientific research started in last century. Research on the chemical composition of propolis lead to the identification of more than 300 compounds such as coumarins, sesquiterpenes, stilbenes, lignanes, phenylpropanoids and flavonoids (Huang *et al.*, 2014). The chemical diversity of propolis is mainly due to plant source, geographical location and bee species (Bankova *et al.*, 2000). Propolis is nowadays well recognized as an efficient therapeutical remedy used in dermatological treatment, neurodegenerative diseases and wound healing (Kuropatnicki *et al.*, 2013). There is only few researchs focused on Algerian propolis and its chemical compositon and eventual therapeutically activities. Further research may lead to new discoveries and help to establish the possible application of Algerian propolis.

Keywords: propolis, chemical composition, therapeutical remedy.

References

Bankova V., De Castro S. L. and Marcucci M. C. (**2000**). *Apidologie, 31:* 3-15.
Huang S., Zhang C. P., Wang K., George Q. Li and Hu F. L. (**2014**). *Molecule, 19:* 19610-19632.
Kuropatnicki A. K., Szliszka E. and Krol W. (**2013**). *Evidence-Based Complementary and Alternative Medicine. Vol. 2013, Article ID 964149:* 11.

De la controverse autour du R.H.B. à la règlementation des produits naturels à allégation de santé

BELKHIRI Abdelmalik

Laboratoire de pharmacognosie, Département de Pharmacie. Université Salah Boubnider Constantine 3, Algérie
E-mail: belkhiri_abdelmalik@yahoo.fr

La définition officielle des compléments alimentaires, indique qu'il s'agit d'une denrée alimentaire qui constitue une source concentrée de nutriments ou d'autres substances ayant un effet nutritionnel ou physiologique. De part cette définition, les compléments alimentaires peuvent être composés de vitamines, minéraux, de produits d'animaux (gelée royale, cartilage de requin, etc.), de plantes et préparations à base de plantes et d'autres substances pures à visée nutritionnel ou physiologique (caféine, lycopène, glucosamine, chitosane). Les compléments alimentaires peuvent intégrer dans leur composition des substances innovantes, issues de la biotechnologie, et qui font l'objet de plus en plus d'études scientifiques parues dans des revues spécialisées. Les plantes et leurs extraits sont parmi les ingrédients les plus communs dans les compléments alimentaires. Sont exclues de ce cadre les plantes ou leurs préparations possédant des propriétés pharmacologiques et destinées à un usage exclusivement thérapeutique. Les compléments alimentaires, qui ne sont pas des médicaments, sont légalement bien encadrés sous d'autres cieux. Dans beaucoup de pays, des procédures préalables à la mise sur le marché des compléments alimentaires permettent notamment d'examiner leur composition et de leur allégation, et d'écarter les produits susceptibles de présenter des risques pour le consommateur. Ainsi, le produit R.H.B. n'aurait pas obtenu son statut de complément alimentaire après un simple examen de l'allégation de santé prônée et de sa composition. Cette conférence a pour objet de donner un aperçu rapide sur la situation en Algérie des produits naturels dits de « santé », et de la manière par laquelle d'autres pays réglementent les produits d'herboristerie, les compléments alimentaires et les phytomédicaments.

Mots clés : compléments alimentaires, produit R.H.B, allégation de santé.

COMMUNICATIONS ORALES

Isolation and characterization of polyphenols from *Helianthemum sessiliflorum* Pers.

BENABDELAZIZ Imane[1], HABA Hamada[1], BENKHALED Mohammed[1], LAVAUD Catherine[2], HARAKAT Dominique[2], MARCOURT Laurence[3] and WOLFENDER Jean-Luc[3]

[1]*Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences, Université de Batna, 05000 Batna, Algérie*
[2]*Laboratoire de pharmacognosie, Institut de Chimie Moléculaire de Reims, CNRS UMR 6229, BP 1039, 51097 Reims Cedex 2, France*
[3]*Phytochemistry and Bioactive Natural Products, School of Pharmaceutical Science, EPGL, University of Geneva, Geneva, Switzerland*
Email: i.benabdelaziz@yahoo.fr

Helianthemum is a genus of plants including around 110 species belonging to the Cistaceae family also known as rock rose. This genus is growing in America, Europe and Northern Africa. However, the Mediterranean region is considered its center of diversity (Mabberly, 1997). *Helianthemum sessiliflorum* Pers. is one of species of this genus that showed previously anti-inflammatory and analgesic activities. In addition, the aerial parts of this plant are recommended in folk medicine in case of cutaneous lesion. The phytochemical investigation of the EtOAc and *n*-BuOH extracts of the aerial parts of *H. sessiliflorum* resulted in the characterization of one new lignan named 1-*O*-acetyl prinsepiol, together with twenty seven known bioactive compounds (Benabdelaziz *et al.*, 2015). Furthermore, the antioxidant and antibacterial activities of different extracts of *H. sessiliflorum* were assessed (Benabdelaziz *et al.*, 2017).

Keywords: *Helianthemum sessiliflorum*, Cistaceae, lignans, phenolics, NMR.

References

Benabdelaziz I., Haba H., Lavaud C., Harakat D. and Benkhaled M. (**2015**). *Records of Natural Products, 9:* 342-348.
Benabdelaziz I., Haba H., Marcourt L., Wolfender J.L. and Benkhaled M. (**2017**). *Natural Product Research, 31:* 686-690.
Mabberly D.J. (**1997**). The plant book. *Cambridge university press*, Cambridge.

Chemotypification of *Thymus munbyanus* subsp. *coloratus* (Boiss. & Reut.) Greuter & Burdet (Lamiaceae) essential-oil

BENDIF Hamdi[1,2], MIARA Mohamed Djamel[3],BOUDJAADA Amina[4], SOUILAH Nabila[5] and MAGGI Filippo[6]

[1]*Laboratory of Ethnobotany and Natural Substances, Department of Natural Sciences, Ecole Normale Supérieure (ENS), Kouba, B.P N92 Kouba, 16308 Algiers, Algeria*
[2]*Natural and Life Sciences Department, Faculty of Sciences, Mohamed Boudiaf University, BP 166 M'sila, 28000 M'sila, Algeria*
[3]*Département de biologie. Université d'Ibn Khaldounde Tiaret. 14000 Tiaret, Algeria*
[4]*Laboratory of natural products from vegetal and organic synthesis, Department of Chemistry, University of Frères Mentouri-Constantine, Route Ain El-Bey, 25000 Constantine, Algeria*
[5]*Université de 20 Aout 1955-Skikda, Algeria*
[6]*School of Pharmacy, University of Camerino, via S. Agostino 1, IT-62032 Camerino, Italy.*
E-mail: bendif_hamdi@yahoo.fr

Thymus munbyanus subsp. *coloratus* (Boiss. & Reut.) Greuter & Burdet (Lamiaceae) is a small shrub endemic to Algeria and Morocco where it's found in lawns, rockeries and mountainous regions. From a phytochemical point of view this taxon has never been characterized. In this work we have analyzed the chemical compositions of the essential oils obtained from inflorescences and vegetative parts of *Thymus munbyanus* subsp. *coloratus* from Algeria by GC/MS. A total of 109 volatile components were identified in the two samples (103 in stems and leaves, 102 in inflorescences) accounting for 98.4 – 98.7% of the total compositions. Overall, they showed similar chemical profiles. The two essential oils were dominated by oxygenated monoterpenes (68.2% in flowers and 59.4% in vegetative parts), followed by monoterpene hydrocarbons (12.1% and 24.4%, respectively), sesquiterpene hydrocarbons (11.0% and 8.5%, respectively) and oxygenated sesquiterpenes (6.7% and 4.9%, respectively). The major oil constituent was borneol accounting for 44.8% and 31.2% of flowers and aerial parts essential oils, respectively. A new chemotype, i.e. borneol-chemotype, was characterized for the first time in the species.

Keywords: *Thymus munbyanus* subsp. *coloratus,* Essential oil, Borneol, oxygenated monoterpenes.

Antioxidant activity and phenolic content of *Artemisia campestris* used in Algerian folk medicine

ZEGHIB Assia[1,2], DAROUI-MOKADDEM Habiba[1], ZEGHIB Fouad[3], FRADJ Khouloud[2], MOUSSAOUI Amel[2], HIOUN Soraya[4], DJABRI Belgacem[5] and KABOUCHE Zahia[1]

[1]*Université des frères Mentouri-Constantine, Département de chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
[2]*Université Larbi Tébessi-Tébessa, Département de Biologie Appliquée, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, 12000 Tébessa, Algérie*
[3]*Université Larbi Tébessi-Tébessa, Laboratoire d'Eau et Environnement (LEE), 12000 Tébessa, Algérie*
[4]*Université Larbi Tébessi-Tébessa, Département des Etres Vivants, Faculté des Sciences Exactes et des Sciences de la Nature et de la Vie, 12000 Tébessa, Algérie*
[5]*Université Larbi Tébessi-Tébessa, Département de Biologie Appliquée, Laboratoire des Molécules Bioctives et Applications (LMBAA), 12000 Tébessa, Algérie*
E-mail: zeghib_assia@hotmail.fr

The aim of this study is to determine the total phenolic content and the antioxidant potential of *Artemisia campestris* (Asteraceae), a medicinal plant widely used in Algerian folk medicine. The air-dried and powdered aerial parts of *Artemisia campestris*, harvested from the area of Tébessa (North-Eastern Algeria), were extracted by percolation using solvents with increasing polarity, successively: petroleum ether (PE), dichloromethane (DM), ethyl acetate (EA) and methanol (ME), to yield dry extracts. The capacity of the obtained extracts to inhibit the free radical 1,1-diphenyl-2-picrylhydrazyl (DPPH) was measured according to the method of Loo *et al.* (2008). Total phenolic content was estimated as gallic acid equivalents per milligram of dried plant extract, according to the Folin-Ciocalteu phenol reagent method (Li *et al.*, 2007).
The DM, EA and ME extracts exhibited nearly the same DPPH inhibition percentage, at test-concentration, which was 4.4, 4.3 and 4.5-fold higher than that of PE extract, respectively. That is in accordance with their high total phenolic content. The EA extract exhibited the lowest extraction yield. *Artemisia campestris* may be suggested as a new potential source of natural antioxidant justifying the Algerian folk medicine use of this plant. Further investigations are necessary in order to refine its antioxidant potential and to determine its phytochemical composition.

Keywords: *Artemisia campestris*, percolation, extracts, antioxidant, phenolic content.

References

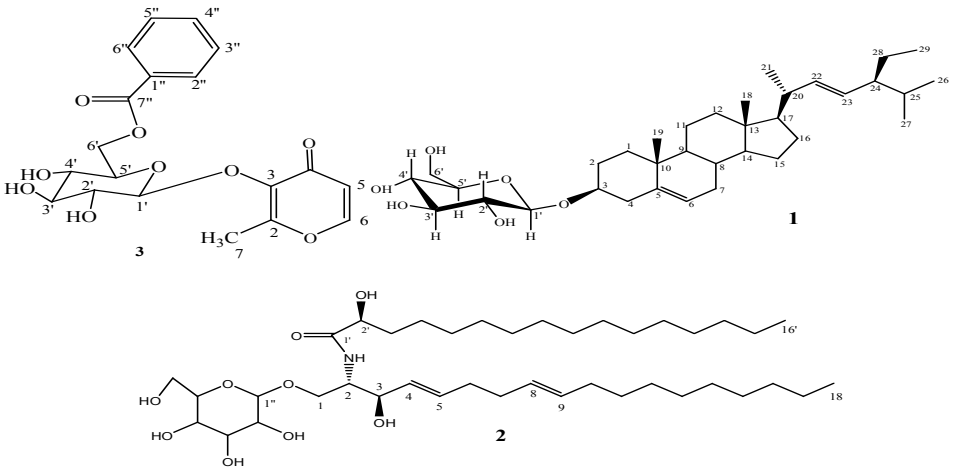
Li H.B., Cheng K.W., Wong C.C., Fan K.W., Chen F. and Jiang Y. (**2007**). *Food Chemistry, 102:* 771-776.
Loo A.Y., Jain K. and Darah I. (**2008**). *Food Chemistry, 107:* 1151-1160.

Biological activities and chemical constituents of *Silene arenarioids* Desf.

GOLEA Lynda[1,2], HABA Hamada[1], LAVAUD Catherine[3] and BENKHALED Mohammed[1]

[1]*Département des Sciences de la Matière, Université de Khenchela, 40000 Khenchela, Algérie*
[2]*Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences de la Matière, Université de Batna, 05000 Batna, Algérie*
[3]*UMR CNRS 6229, Institut de Chimie Moléculaire de Reims, BP 1039, 51097 Reims Cedex 2, France.*
E-mail: haba.hamada@yahoo.fr

Caryophyllaceae family is known for its rich content in secondary metabolites. Saponins (Lacaille-Dubois *et al.*, 1995), flavonoids and flavonoids glycosides, phytoecdysones, oligosaccharides have been isolated and identified. *Silene* genus is represented by about 700 species in the temperate region of the word; the main concentration of species is Europe, Asia and North Africa (Quezel and Santa, 1963). Three known compounds (**1-3**) were isolated from the aerial parts of *Silene arenarioides* Desf. by using different chromatographic methods. The structures of the isolated compounds were determined as stigmasterol glycoside (**1**), Soyacerebroside (**2**), maltol glycoside (**3**). The structures of the isolated compounds were determined by using the NMR techniques (^{1}H-NMR, ^{13}C-NMR, COSY, HSQC and HMBC) and mass spectrometry. The antimicrobial and antioxidant activities of the different extracts and compound (**3**) have been reported.



Keywords: Caryophyllaceae, flavonoids, saponins, NMR.

References

Lacaille-Dubois M.A., Hanquet B., Cui Z.H., Lou Z.C., and Wagner H. (**1995**). *Phytochemistry*, *40 :* 509-514.
Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS,* Paris, France.

Phenolic content and antioxidant activity of the extracts of two medicinal species of Gentianaceae

TOUAFEK Ouassila[1] and EL HATTAB M.[1]

[1]*Université Saad Dahlab-Blida, Département de chimie, Laboratoire de Chimie des Substances Naturelles et de BioMolécules (LCSNBioM), 9000 Blida, Algérie*
E-mail: wass_touafek@yahoo.fr

Antioxidants are involved in the defense mechanism of the organism against the pathologies associated to the attack of free radicals. Recently, wide investigations have been done for identification of plants with antioxidant activity that may be used for treatment of various diseases in human. The aim of this study is to investigate the total phenolic contents and antioxidant activity in extracts of two plants belonging to the family of Gentianaceae family (*Centaurium erythraea* and *Blackstonia perfoliata*), grown in the region of Blida. Centaury (*Centaurium erythraea*) is one of the most important pharmaceutical species from the Gentianaceae family. Its aerial parts have been used since the ancient times for the regulation of digestion issues, against gastric troubles and as a tonic for digestive system purging. Centaury extract possesses sedative, antipyretic, anti-inflammatory, analgesic, diuretic and antidiabetic properties (Berkan *et al.*, 1991; Haloui *et al.*, 2000 and Hamza *et al.*, 2011). The total phenol content (TPC) was determined by using Folin–Ciocalteau Reagent. The antioxidant activity was evaluated by using DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenging method. The results of the experiments showed that all analyzed extracts demonstrated significant antioxidant effects.

Keywords: Antioxidant activity, DPPH, Phenolic compounds, *Centaurium erythraea*, *Blackstonia perfoliata*.

References

Berkan T., Ustunes L., Lermioglu F. and Ozer A. (**1991**). Antiinflammatory, analgesic and antipyretic effects of an aqueous extract of *Erythraea centaurium*. *Planta Med, 57:* 34-37.
Haloui M., Louedec L., Michel J.B. and Lyoussi B. (**2000**). Experimental diuretic effects of *Rosmarinus officinalis* and *Centaurium erythraea*. *J. Ethnopharmacol, 71:* 465-472.
Hamza N., Berke B., Cheze C., Le Garrec R., Lassalle R., Agli A.N., Robinson P., Gin H. and Moore N. (**2011**). Treatment of high fat diet induced type 2 diabetes in C57BL/6J mice by two medicinal plants used in traditional treatment of diabetes in the east of Algeria. *J. Ethnopharmacol, 133:* 931-933.

Physicochemical characterization and *in vitro* evaluation of the antioxidant properties of traditional dried white grapes of the late variety "Debouki" (*Vitis vinifera*) grown in the Tademait-Tizi Ouzou region.

ZOUBIRI Lamia[1], ÇAPANOGLU Esra[2] and BARKAT Malika[1]

[1]*Department of Biotechnology, Laboratory of biotechnologie and food quality (BIQUAL), Institute of food technologies (I.N.A.T.A.A.), University of Frères Mentouri-Constantine, Constantine, Algeria.*
[2]*Faculty of Chemical and Metallurgical Engineering, Food Engineering Department, Istanbul Technical University, Maslak, 34469 Istanbul, Turkey*
E-mail: lamiabiotech@gmail.com

The present study is a plea for the purposes of the valorization of grapes of low market value from "Debouki", a late variety of white grapes (*Vitis venifera*) grown in Tizi Ouzou. Methanolic crude extracts of sun-dried white grape berries were subjected to physicochemical characterization, studying moisture, total minerals, soluble total dry matter, acidity, total flavonoids and phenolic compounds. The spectrophotometric analyzes carried out concern total phenolic compounds and flavonoids, reducing compounds with antoxidant properties (Dewanto *et al.*, 2002; Spanos and Wrolstad, 1990). These antioxidant properties have been evaluated *in vitro* by four different chemical methods (DPPH, CUPRAC, ABTS and FRAP) (Miller and Rice-Evans, 1997). The results showed that dried white grapes have considerable levels of total minerals and soluble total dry matter, total phenolic compounds and flavonoids; these latter appear to be responsible for registered antioxidant properties which deserve to be valued by an organization of the traditional drying activity of grapes in the region of Tadmait-Tizi Ouzou.

Keywords: Traditional dried grapes, Polyphenols, Flavonoid, Antioxidant power, *Vitis vinifera.*

References

Dewanto V., Wu X., Adom K.K. and Liu R.H. (**2002**). Thermal Processing Enhances the Nutritional Value of Tomatoes by Increasing Total Antioxidant Activity. *Journal of Agricultural and Food Chem., 50:* 3010-3014.
Miller and Rice-Evans (**1997**). Factors influencing the antioxidant activity determined by the ABTS + radical cation assay. *Free Radical Research, 26:* 195-199.
Spanos G.A. and Wrolstad R.E. (**1990**). Influence of Processing and Storage on the Phenolic Composition of Thompson Seedless Grape Juice. *Journal of Agricultural and Food Chem., 38:* 1565-1571.

Antifungal and antiaflatoxigenic potential of *Mentha piperita* L. and *Rosmarinus officinalis L.* of essential oils

MIHOUBI Ilhem[1], MANA Imene[1] and BENMAHDI Selam[1]

[1]*Université des frères Mentouri - Constantine, Département de Microbiologie, Laboratoire de Mycologie, Biotechnologie et de l'Activité Microbienne (LaMyBAM), 25000 Constantine, Algeria*
E-mail: mihoubi97@gmail.com

Phytotherapy, according to the WHO, is considered as a traditional medicine and is massively used in some countries, including developing countries. It is an unconventional medicine because of the absence of clinical studies (Azalenko, 2005). In phytotherapy and aromatherapy, essential oils are used in the treatment of many infectious diseases. The antimicrobial effect of essential oils on a broad category of microorganisms (bacteria, yeasts, molds) has been reported by an important international bibliography. This antimicrobial activity is due, in whole or in part, to the essences contained in these aromatic plants (Akgul and Kivanc, 1988). In this context, the essential oils of *Mentha piperita* L. and *Rosmarinus officinalis* L. plants were extracted by hydrodistillation and their antifungal and antiaflatoxinogenic powers, against *Aspergillus flavus* strain, were highlighted. It emerges that the antifungal effect of mint and rosemary oils is very important with a minimum inhibitory concentration of 30 µl and 50 µl respectively. This activity is characterized by a fungistatic action. The decrease in the production of aflatoxin B observed on CCM and reducing amount of AFB1 determined experimentally let hope for an antiaflatoxigenic effect linked to the use of *Mentha piperita* and *Rosmarinus officinalis* essential oil.

Keywords: *Mentha piperita*, *Rosmarinus officinalis*, Antifungal activity.

References

Akgul and Kivanc (**1988**). Inhibitory effects of selected Turkish spices and oregano components on some food borne fungi. *Internation Journal of Food Microbiology, 6(3):* 263-268.
Azalenko K. (**2005**). Contribution à la détermination des chemotypes d'une plante à huile essentielle du Togo *Lippia mutiflora*. *Mémoire d'Ingénieur de travaux, ESTBA,Univ. Lomé.*

Relationship between biological activity and composition of lemon essential oil

HIMED Louiza[1], MERNIZ Salah[2] and BARKAT Malika[1]

[1]*Laboratoire de Biotechnologie et Qualité des Aliments (BIOQUAL), INATAA, Université des Frères Mentouri-Constantine. 25000 Constantine, Algérie*
[2]***Université de Batna 2****53, Route de Constantine, 05078 Batna, Algérie.*
E-mail: himed.louiza@hotmail.fr

The present study evaluates the chemical composition, antioxidant and antimicrobial activities of essential oil of *Citrus limon* extracted by hydrodistillation. The composition of this oil was analyzed by GC/MS and 30 constituents, which accounted for 96.04% of the oil, were identified. The main components were Limonene (66.29%) followed by β-Pinene (7.09%), α-Citral (4.25%) and α-Tripinene (3.11%). Antioxidant activity of the *Citrus limon* essential oil was evaluated by using DPPH radical scavenging and test of ABTS. In both tests, the oil showed antioxidant activity close to the positive control (α-tocopherol). The essential oil was tested against nine bacteria (two Gram+ : *Bacillus cereus*, *Staphylococcus aureus* ATCC 29213 and seven Gram- : *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Salmonella enterica, Klebsiella pneumoniae, Enterobacter aerogenes, Serratia marescens, Proteus mirabilis*) by using disc diffusion and microdilution methods. *Citrus limon* essential oil showed antimicrobial effect against all microorganisms tested.

Keywords: *Citrus limon*, essential oil, hydrodistillation, antioxidant activity, antibacterial activity.

Establishment of a combined *in vivo* - *in vitro* model used in studies targeting immunological recent insights in IBD disease.

RAMLI Imen[1,2], Zerizer Sakina[1,2] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, 25000 Constantine, Algérie*
[2]*Université des Frères Mentouri-Constantine, Département de chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
Email: imenramli@yahoo.fr

Ulcerative colitis (UC) and Crohn's disease (CD), collectively referred to as inflammatory bowel disease (IBD), are chronic, relapsing immune mediated disorders affecting the gastrointestinal tract. The etiology of IBD remains an enigma, but increasing evidence suggests that the development of IBD may be triggered by a disturbance in the tightly regulated balance between gut commensal bacteria and host response in the intestinal mucosa in genetically susceptible individual (Strober *et al.*, 2007). Some dysfunctions of the mucosa like impaired Fatty acids metabolism and altered innate immunity have been implicated in the development of IBD. Accordingly, several studies report that hyperhomocysteinemia is an independent risk factor during inflammation. In the other hand, many previous and recent studies in IBD have been conducted on experimental models that depends on cells presenting similar tissue properties (Models that depends on only mucosal cells alone, or immune cells alone; based on inflammation biomarkers and pathways).There seem to be an obvious need to establish new models that can combine a range of cell types implicated in physiological and immunological interactions during an IBD condition. The assessment of convenient models (Co-culture cells; organoids), to better evaluate studies on *in vivo* models (animal model with artificial induced inflammation pathways); can serve also to investigate new potent anti-inflammatory natural compounds on IBD disease. The aim of this current study , is to discuss possible combined *in vitro* (organoids-immune cells co-culture), and *in vivo* (Mice with a dietary hyperhomocysteinemia due to methionine intake) models in order to evaluate recent immunological insights, and describe the interplay between potent anti-inflammatory effect of natural compounds derived from medicinal plants and mucosa layer cells molecular behavior focussing on the reduction of the inflammatory state and the impaired gastro-intestinal barrier function in IBD.

Keywords: Experimental models, IBD disease, Hyperhomocysteinemia, *in vivo*, *in vitro*.

References

Strober W., Fuss I. and Mannon P. (**2007**). The fundamental basis of inflammatory bowel disease. *J Clin Invest, 117:* 514-21.

Activité antidépressive et anxiolytique d'une dose sub-sedative de *Tilia cordata*

DEROUICHE Mohamed Taha[1], ABDENNOUR S[2], Dalia Farid[3] and BELKHIRI Abdelmalik[3]

[1]*Laboratoire de Pharmacologie, Faculté de Médecine, Université Constantine 3, Algérie*
[2]*Laboratoire de Toxicologie, Faculté de Médecine, Université Constantine 3, Algérie*
[3]*Laboratoire de pharmacognosie, Faculté de Médecine, Université Constantine 3, Algérie*
E-mail: derouiche_taha@yahoo.fr

Le but de ce travail est d'apprécier l'effet antidépresseur et anxiolytique de la même dose de deux extraits ; hydro-alcoolique et aqueux, issus des sommités fleuries de tilleul après indentification pharmacognosique (macroscopique, microscopique et chromatographique) de l'espèce. L'étude de l'activité antidépressive s'est faite au moyen des tests de la nage forcée (FST) et de la suspension caudale (TST) (tests de réduction de comportement de désespoir) chez la souris albinos de souche swiss, hautement prédictives d'un effet antidépresseur chez l'Homme, validés par l'étude d'un placebo d'une dose de fluoxetine (antidépresseur de référence, classe des IRSS) 20 mg/kg. L'effet anxiolytique a été évalué grâce à un dispositif de type « Open field » ainsi que le test du labyrinthe surélevé vs une dose de 1 mg/Kg de Diazépam (classe des benzodiazépines) (en plus d'un placebo), permettant aussi l'évaluation simultanée de l'activité psychomotrice chez la même espèce animale précédemment citée. Les extraits ont fait l'objet d'une analyse CCM avec lecture à 300 nm. Les résultats montrent une validation des quatre protocoles utilisés par les lots de témoins positifs et négatifs et qu'une dose de 200 mg de l'extrait hydro-alcoolique possède des effets antidépresseur et anxiolytique significatifs (vs lot placebo) (Test de Student, p inf. 0.05) contrairement à l'extrait aqueux qui n'a révélé aucun effet anxiolytique. Les résultats de la CCM ont montré des différences marquées entre les deux extraits. Ces résultats démontrent une efficacité potentielle de l'extrait hydro-alcoolique de *Tilia cordata* de notre préparation dans le traitement de la pathologie dépressive à composante anxieuse, mais une étude phytochimique plus poussée de nos extraits doit être menée pour identifier les fractions les plus impliquées dans l'effet antidépresseur.

Mots clés : activité antidépressive, activité anxiolytique, *Tilia cordata*.

POSTERS

Phytochemical screening of a *Rutacae* species growing in Algerian Sahara

ABDERREZAK Meriem Khaizourane[1] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Chabat Ersas, 25000 Constantine, Algeria*
E-mail: abderrezakmk@gmail.com

Rutaceae family, commonly known as the « rue » or *Citrus* family, generally known for the flowers divided into four or five parts and strong scents, is of great economic importance in warm temperate and sub-tropical climates for its numerous edible fruits (Sharma *et al.*, 2006). *Ruta tuberculata*, growing in the Algerian desert, is used to treat bone and joint pain, infertility in women, anaemia and headache (Hammiche *et al.*, 2006). The phytochemical screening of *Ruta tuberculata* revealed that it contains several natural products such as alkaloids, coumarins and flavonoids. The results are in agreement with the content of reported *Rutacae* species (Kuzovkina *et al.*, 2004).

Keywords: Rutaceae, *Ruta tuberculata*, alkaloids, coumarins, flavonoids.

References

Hammiche V. and Maiza K. (**2006**). *Journal of Ethnopharmacology, 105:* 358-367.
Kuzovkina I., Al'terman I. and Schneider B. (**2004**). *Phytochemistry, 65:* 1095-100.
Sharma N. and Tripathi A. (**2006**).*World Journal of Microbiology and Biotechnology, 22:* 587-593.

The hepatoprotective effect of *Argania spinosa* seeds

AKLIL Badiaa[1], ZERIZER Sakina[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: physioaklil@gmail.com

Argania spinosa is a tropical tree that belongs to the Sapotaceae family (Chaussod *et al.*, 2005). This plant is endemic to South Western Algeria and Morocco (Msanda *et al.*, 2005). The therapeutic benefits of *A. spinosa* have been claimed by previous studies which have confirmed that *A. spinosa* have several biological effects (Berrougui *et al.*, 2004). We report here the protective effect of the crude extract of *A. spinosa* against oxidative status and liver enzyme activities induced by high methionine intake in mice. After 3 weeks of treatments, liver enzyme activities, hepatic antioxidant status were determined. Our results showed that consumption of high methionine diet (500mg/Kg) led to an increase in serum AST, corresponding with decrease of catalase activities. However, the administration of the crude extract of *A. spinosa* (150mg/Kg) in combination with methionine ameliorated all these changes. This study recommends that administration of crude extract of *A. spinosa* acts as hepatoprotective agent and improves liver function.

Keywords: *Argania spinosa*, liver, enzyme, antioxidant.

References

Berrougui H., Alvarez S., Perez-Guerrero C., Ettaib A., Hmamouchi M., Marhuenda E. and Herrera M.D. (**2004**). *Br J Nutr*, *92:* 921- 929.
Chaussod R., Adlouni A. and Christon R. (**2005**). *Cah Agric, 14:* 351-6.
Msanda F., El Aboudi A. and Peltier J. P. (**2005**). *Cah Agric*, *14:* 357 -64.

Optimization of oil-in-water emulsion stability

BADAOUI Fatima Zohra[1], SEFARI Wassila[1] and BEZIANE Roufeida[1]

[1]*Université Salah Boubnider-Constantine 3, Faculté de Génie des Procédés, Département de Génie Pharmaceutique, Constantine, Algeria*
E-mail: ph_fatimazohra25@hotmail.fr

Emulsions are biphasic systems constituted of two immiscible liquids, one of which is dispersed as a droplet in the other. They are a liquid preparations used for oral, parenteral or cutaneous drug administration. The objective of this work is to study the factors influencing the stability of an emulsion oil in water (o/w) evaluated by the separation rate of the emulsion. For this purpose, experimental design has been applied to evaluate the influence of three factors: surfactant concentration, oily phase ratio and agitation rate, then the work is completed by optimizing the influent factors levels. The results indicate that the stability of the o/w emulsion increases with the increase in surfactant concentration and the proportion of oil phase.

Keywords: emulsion, stability, experimental design.

References

Attwood D. and Florence A.T. (**2008**). Physical Pharmacy. *Pharmaceutical Press*: 69-74.
Barkat A. K. *et al.* (**2011**). Basics of pharmaceutical emulsions: A review. *African Journal of Pharmacy and Pharmacology, 5 (25)*.

Phytochemical and biological study of an Algerian plant belonging to the genus *Atractylis* (Asteraceae)

BADAOUI Mohamed Ibrahim[1], HABA Hamada[1] and BENKHALED Mohammed[1]

[1]*Department of Chemistry, Faculty of Matter Sciences, Batna-1 University, Laboratory of Chemistry and Environmental Chemistry (LCCE), Batna-1, 05000 Batna, Algeria*
E-mail: haba.hamada@yahoo.fr

The research concerning active principles extracted from the aromatic and medicinal plants is of a key importance, because it allows the development of drugs to maintain the human being health. It is for this reason that we are interested in this type of investigation in our research laboratory. Besides, our laboratory has recently started a research program intended for the systematic study of medicinal plants belonging to the genus *Atractylis* (Asteraceae family) in view of their valorization. The Asteraceae family is characterized by its wealth in secondary metabolites of biological interest such as triterpenes and phenolic compounds of type flavonoids, and sesquiterpenes. The plants of the genus *Atractylis* are deemed in traditional medicine for treating many diseases (El Rhaffari *et al.*, 2002; Melek *et al.*, 1992 and Sadek *et al.*, 1998). The main purpose of our work is to isolate and identify secondary metabolites from the different organic extracts of the species *Atractylis c.* that may have a biological activity. The hydro-alcoholic extraction: alcohol/water, separation and chromatographic purification: VLC, CC and TLC of extracts (petroleum ether and ethyl acetate) obtained from the whole plant, allowed us to isolate and identify secondary metabolites of different types of flavonoids, sterols and triterpenes. The determination of their molecular structures is performed by the spectroscopic analysis methods such as NMR 1D (1H, 13C J-modulated and DEPT) and NMR 2D (COSY, HSQC, HMBC, and NOESY) and mass spectrometry ESI-MS. It is mainly of Lupeol, Oleanolic acid, β-Sitosterol, Quercetin and Apigenin. In the second part, the three extracts (petroleum ether, ethyl acetate and *n*-butanol) were tested for their antioxidant activity with more than four methods (DPPH, ABTS, CUPRAC, β-Carotene…). Good results were obtained with the *n*-butanol extract.

Keywords: *Atractylis c.*, medicinal plants, spectroscopic analysis, Antioxidant activity.

References

El Rhaffari L. et Zaid A. (**2002**). Pratique de la phytothérapie dans le sud-est du Maroc (Tafilalet). Un savoir empirique pour une pharmacopée rénovée. *In : J. Fleurentin, Pelt J-M. et Mazars G. (2000). Des sources du savoir aux médicaments du futur, IRD Editions, Paris : 293-318.*

Melek F. R., Aboutabl E. A., El-Shabrawy O., Radwan A. S., Hilal S. H. and Hammam A. (**1992**). Atractylis carduus angustifolia flavonoids and anti-inflammatory activity. *Egypt. J. Pharm. Sci. 33:* 11-19.

Sadek E. G., Metwally M. A. and Mpango G. B., (**1998**). Triterpenes from Atractylis Carduus L. Boll. *Chim. Farm., 137:* 249-250.

Effect of the *n*-butanol extract *Astragalus armatus* on aortic structure in mice induced by hyperhomocysteinemia

BAGHRICHE Ibtissem[1,2], MESSAOUDI Sabar[2], SLIMANI Wassila[1,2], KEHILI Houssem Eddine[1,2], ZERIZER Sakina[1,2] and KABOUCHE Zahia[1] .

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L. O. S. T), 25000 Constantine, Algeria*
[2]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, 25000 Constantine, Algeria.*
E-mail: baghricheb@yahoo.fr

Our research aims to determine the protective effect of the *n*-butanol extract of *Astragalus armatus* (Fabaceae) on hyperhomocysteinemia (HHcy), which is considered as a risk factor in cardiovascular diseases. Some phenolic compounds such as catechin, quercetin, chlorogenic acid, coffeic acid and wine phenolics have been demonstrated to be effective in decreasing plasma Hcy level. The plasma Hcy concentrations were determined after the oral administration of L-methionine in high dose to mice. The results showed that the *n*-butanol extract of *Astragalus armatus* prevents the endothelial alteration and heart and liver damages.

Keywords: Hyperhomocysteinemia, *Astragalus armatus*, L-methionine.

Antibacterial and antioxidant activities of Algerian *Salvia* species (Lamiaceae)

BECHKRI Sara[1], BERREHAL Djemaa[1], KHALFALLAH Assia[1], SEMRA Zahia[2], KABOUCHE Ahmed[1] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substance Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria.*
[2]*CHUC Benbadis-Constantine, Service de Bactériologie, 25000 Constantine, Algeria*
E-mail: sarabechkri@gmail.com

The Lamiaceae (formerly Labiatae), a widespread family, comprises about 220 genera and more than 4000 species distributed throughout most of the world. *Salvia* is an important genus that is represented by more than 900 species distributed in all over the world (Senatore *et al.*, 2006). In Algeria there are 23 *Salvia* species from which four are endemic (Quezel and Santa, 1963). The genus *Salvia* has been used worldwide in folk medicine since ancient times due to its large spectrum of activities as an antibacterial, antiplasmodial, antidiabetic, anti-inflammatory, analgesic, antispasmodic, antitumor, antifungal and antioxidant (Romussi *et al.*, 2001). The aim of this work is to evaluate the antibacterial and antioxidant activities of the polar extract of *Salvia argentea* growing in Algeria. The antibacterial activity of the extract was tested against a range of bacteria by the use of the disc diffusion method. The antioxidant activity was also investigated by the use DPPH method.

Keywords: *Salvia,* Lamiaceae, antioxidant, antibacterial, DPPH.

References

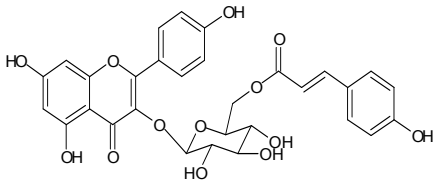
Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS, Paris France.*
Romussi G., Ciarallo G., Bisio A., Fontana N. and Pinto L. (**2001**). *Planta Medica*, *67:* 153-155.
Senatore F., Arnold N.A., Piozzi F. and Formisano C. (**2006**). *J Chromatogr A*, *1108:* 276-278.

Chemical constituents of the species *Helianthemum hirtum* ssp. *ruficomum* (Cistaceae)

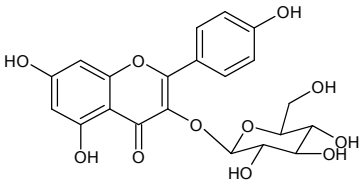
BENCHADI Wassila[1], LAVAUD Catherine[2], BENKHALED Mohammed[1] and HABA Hamada[1]

[1]*Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences, Université de Batna, 05000 Batna, Algérie.*
[2]*Laboratoire de Pharmacognosie, Institut de Chimie Moléculaire de Reims, CNRS UMR 6229, BP 1039, 51097 Reims Cedex 2, France.*
E-mail: be.wassila@yahoo.fr

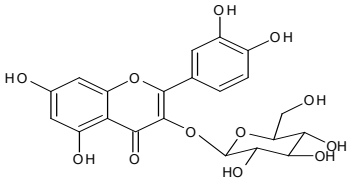
Helianthemum hirtum ssp. *ruficomum* is a species belonging to the family Cistaceae which includes about 110 species of evergreen and semi-evergreen shrubs. The genus *Helianthemum* can be found in America, Europe and North Africa. However, the Mediterranean region is center of diversity. This work describes the isolation by chromatographic methods of six flavonoid compounds from the aerial parts of EtOAc extract of *H. hirtum* ssp. *ruficomum*: Tiliroside (**1**), Astragalin (**2**), Isoquercetrin (**3**), Kaempferol 3-*O*-vicianoside (**4**), Quercetrin (**5**) and Rutin (**6**). The structures of these compounds have been elucidated by means of spectroscopic studies including 1D and 2D-NMR, mass spectrometry ESI-MS, UV, measurement of optical rotation and by comparison with literature data.



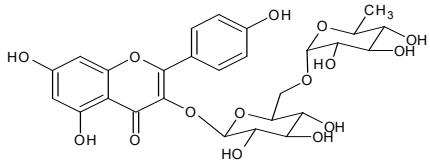
(1)



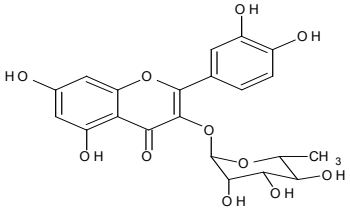
(2)



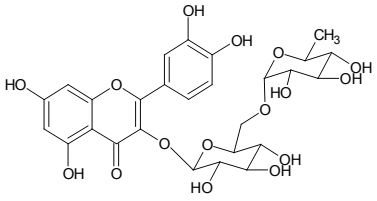
(3)



(4)



(5)



(6)

Keywords: Cistaceae, *Helianthemum hirtum* ssp. *ruficomum*, flavonoid, NMR.

Chemical composition and antioxidant activities of the methanolic extract of *Scabiosa* species

BENDAMENE Samia[1,2], BOUTAGHANE Naima[1], BELLIK Yuva[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Campus Chaabet-Ersas, 25000 Constantine, Algeria*
[2]*Université Mohammad El Bachir El Ibrahimi-Bordj Bou Arreridj, Département des Sciences biologiques, Laboratoire de Caractérisation et Valorisation des Ressources Naturelles (LCVRN) BBA, Algeria*
E-mail: sousou2549@hotmail.fr

In this work, we present the chemical composition and antioxidant activities of the methanolic extract of the aerial part of *Scabiosa* species (Caprifoliaceae). The antioxidant activity of this extract was determined by four complementary tests, namely, the *β*-carotene-linoleic acid assay for lipid peroxidation activity, $DPPH^{\bullet}$ and $ABTS^{\bullet+}$ assays for radical-scavenging activity, and CUPRAC assay for reducing antioxidant activity. Detection of chemical compounds in the methanolic extract of *Scabiosa* was confirmed by results from Thin-Layer Chromatography, with the presence of saponins, polyphenols and flavonoids. The experimental findings indicated that the methanolic extract demonstrated activity in all antioxidant activity tests employed.

Keywords: Caprifoliaceae, *Scabiosa*, flavonoids, saponins, antioxidant activity.

Antibacterial, antioxidant and tyrosinase inhibitory activities of parts of *Eryngium*

BENMERACHE Abbes[1], ALABDUL MAGID Abdulmagid[2], BERREHAL Djemaa[1], KABOUCHE Ahmed[1], VOUTQUENNE-NAZABADIOKO Laurence[2], MESSAILI Souhila[2], ABEDINI Amin[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Campus Chaabet-Ersas, 25000 Constantine, Algeria*

[2]*ICMR-UMR CNRS 7312, Groupe Isolement et Structure, Campus Sciences, Bât. 18, BP 1039, 51687 Reims Cedex 2, France*

E-mail: abbes_25@yahoo.fr

Eryngium tricuspidatum L. is a species belonging to the large family of Apiaceae, comprising more than 3000 species. *Eryngium* genus is the largest genus with, approximately 250 species, distributed worldwide, mainly in Eurasia, North Africa and South America (Merghache *et al.*, 2014). About 7 species can be found in Algeria (Quezel and Santa, 1963). Plants of this genus are known for their rich content in secondary metabolites. Indeed, numerous studies undertaken on this genus have revealed the presence of flavonoids, saponins, polyacetylene and monoterpene glycosides (Nacef *et al*., 2008). Anti-inflammatory cytotoxic (Yurdakok and Baydan, 2013), antioxidant, antimicrobial, and antidiabetic (Merghache *et al.*, 2014) activities have been reported from *Eryngium* species. In folk medicine, various *Eryngium* species are used against inflammatory disorders or as antitussive, diuretic, appetizer, stimulant, and aphrodisiac (Nacef *et al.*, 2008). *Eryngium tricuspidatum* L. grows in North Africa, Spain, Sardinia and Sicily (Merghache *et al.*, 2014). The decoction of its roots is effective against poisoning and constipation (Merghache *et al.*, 2014). The chemical composition and the antibacterial, antifungal and antioxidant activities of the aerial parts essential oil of *E. tricuspidatum* have been reported recently (Merghache *et al.*, 2014). The essential oil showed significant antibacterial and antifungal property against *Staphylococus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa* (MIC 9 mg/mL) and *Candida albicans* (MIC 4.6 mg/mL) and moderate DPPH radical-scavenging activity and ferric reducing-antioxidant power. In continuation of our phytochemical and bioactivity studies on the Algerian plants, herein we reported the isolation, structural identification and bioactivities (antibacterial, antioxidant, and tyrosinase inhibitory) of extracts and compounds from the aerial parts of *E. tricuspidatum*.

Keywords: *Eryngium tricuspidatum,* Apiaceae, antibacterial activity, antioxidant activity, tyrosinase inhibitory activity.

References

Merghache D., Boucherit-Otmani Z., Merghache S., Chikhi I., Selles C. and Boucherit K., (**2014**). Chemical composition, antibacterial, antifungal and antioxidant activities of Algerian *Eryngium tricuspidatum* L. essential oil. *Nat. Prod. Res., 28:* 1-13.

Nacef S., Ben Jannet H., Hamza M.A. and Mighri Z., (**2008**). Contribution to the phytochemical investigation of the plant *Eryngium dichotomum* Desf. (Apiaceae) from Tunisia. *J. Soc. Chim. Tunisie, 10 :* 141-148.

Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. CNRS, Paris*.

Chemical composition and biological activity of *Sedum caeruleum*

BENSOUICI Chawki[1,2], KABOUCHE Ahmed[1], ARIBI Boutheyna[3] KARIOTI Anastasia[4], OZTURK Mehmet[5] EMIN DURU Mehmet[5], Anna Rita Bilia[4] and KABOUCHE Zahia[1]

[1]*Centre de Recherche en Biotechnologie, Ali Mendjli Nouvelle Ville UV 03, Constantine, Algeria*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[3]*University of Constantine 1, Departement of Animal Biology, Faculty of Biology, Laboratory of Immuno-Oncology, Constantine, Algeria*
[4]*Department of Pharmaceutical Sciences, University of Florence, Sesto, Fiorentino (FI), Italy*
[5]*Department of Chemistry, Faculty of Sciences, Mugla Sıtkı Kocman University, Mugla, Turkey*
E-mail: chawkiislam@yahoo.fr

The genus *Sedum*, including about 500 species, is almost restricted to the temperate and subtropical regions of the Northern hemisphere (Wolbis, 1989). Previous phytochemical studies on this genus reported the presence of alkaloids, flavonoids and phenolic acids ('t Hart and Bleij, 2005; Van Ham and 't Hart, 1998). Some *Sedum* plants have been used as either vegetables or folk medicines for treatment of many diseases. Ursolic acid (**1**), daucosterol (**2**), β-sitosterol-3O-β-D-galactopyranoside (**3**), apigenin (**4**), apigetrin (**5**), and apiin (**6**) have been isolated from whole plant of *Sedum caeruleum*. The structures of the compounds were elucidated by UV, 1D-, 2D-NMR, and MS techniques. The extracts were investigated for their antioxidant, anticholinesterase, antibacterial, toxicity and *in vivo* anti-inflammatory activities. The *n*-butanol extract exhibited highest antioxidant activity in all tests (IC_{50} value: 28.35 ± 1.22 mg/mL in DPPH assay, IC_{50} value: 40.83 ± 2.24 µg/L in metal chelating activity, and IC_{50} value: 23.52 ± 0.44 µg/L in CUPRAC), and the highest BChE inhibitory activity (IC_{50} value: 36.89± 0.15 µg/L). Moreover, the chloroform extract mildly inhibited (MIC value: 80 µg/mL) the growth of all the tested bacterial strains. For the *in vivo* anti-inflammatory, the plant extract demonstrated a significant inhibition of the xylene ear edema formation, the results showed a highest inhibition for Chloroform extract 34.13% compared to ibuprofen standard 33.52% at the 50 mg/kg and the Ethyl Acetate extract show highest inhibition 39.64% at 100 mg/Kg. Our extracts at a dose of 2000 mg/kg caused neither visible signs of toxicity nor mortality.

Keywords: *Sedum caeruleum*, antioxidant, anticholinesterase, antibacterial, toxicity, *in vivo* anti-inflammatory

References

Wolbis M. (**1989**). *Acta Poloniae Pharmaceutica, 46 (5-6):* 500.
't Hart H. and Bleij B. (**2005**), *In: Eggli U (eds). Illustrated Handbook of Succulent Plants: Crassulaceae. New York: Springer; Sedum:* 234-260.
Van Ham R. and 't Hart H. (**1998**) Phylogenetic relationships in the Crassulaceae inferred fromchloroplast DNA restriction-site variation. *American Journal of Botany, 85:* 123-134.

Evaluation of the antioxidant potential, phenolic and flavonoid contents of the methanol extract of *Ammoides atlantica*

BENTELDJOUNE Mounira[1], BOUDIAR Tarek[2], BENSOUICI Chawki[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Biotechnology Research Centre (C.R.Bt) Ali Mendjli Nouvelle Ville BPE.73 Constantine, Alegria*
E-mail: benteldjounemounira@gmail.com

The genus *Ammoides* (Apiaceae) tribe of Ammineae includes two species in Algeria, from which the endemic species *A. atlantica* (Coss. EtDur.) Wolf. the other one, *A. pusilla* (Brot.) Breistr, is widespread in the Mediterranean region (Quezel and Santa, 1963). In Algerian traditional medicine, the aerial parts of *A. atlantica* are used in infusions for the treatment of headache, fever and diarrhea. It is also used in compresses, alone or soaked in alcohol or vinegar and mixed with henna, to treat children affected by mental debility (Bellakhdar, 1997). The plant was collected during the flowering period in Eastern region of Algeria (Jijel) in May 2016. The aerial parts of *Ammoides* were extracted by methanol-water (80:20, v/v). The aim of this study was to examine the possible antioxidant activities from the aerial parts of *Ammoides*. *In vitro* antioxidant activity was evaluated from methanol extract using different antioxidant tests, namely, total antioxidant (DPPH) scavenging, (ABTS.+) scavenging, superoxide radical scavenging by alkaline DMSO, reducing power, cupric reducing antioxidant capacity (CUPRAC) and ferrous ions chelating assays compared to the synthetic antioxidants (BHA, BHT and ascorbic acid). The methanol extract of *Aatlantica* exhibited highest antioxidant activity in DPPH essay (IC_{50}: 23.31 ± 0.99 µg/mL), $ABTS^{+}$ (IC_{50}: 11.31 ± 2.49 µg/mL), O_2^{-} DMSO alkalin assay (IC_{50}: 3.19±0.17 µg/mL), Reducing power assay ($A_{0.50}$ 92.70±1.37 µg/mL), CUPRAC assay (A0.50: 13.56±1.06 µg/mL), Ferrous ions chelating assay (IC_{50} : 102.35±2.91 µg/mL), Total Phenolic content (371.57±7.80 mg/g) and Total Flavonoid content 41.02±6.16 mg/g, respectively compared with BHA, BHT and ascorbic acid which were used as positive controls.

Keywords: *Ammoides atlantica*, Apiaceae, antioxidant activity, DPPH, CUPRAC.

References

Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. CNRS, Paris:* 402.
Bellakhdar J. (**1997**). La pharmacopée marocaine traditionnelle. *Casablanca / Paris : Éditions Le Fennec / Ibis Press :* 739.

Phytochemical study of Algerian propolis

BOUAROURA Amina[1], DAIKH Amina[1], SEGUENI Narimane[1], BENSOUICI Chawki[2] and RHOUATI Salah[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire des produits naturels d'origine végétale et de synthèse organique, Constantine, Algeria*
[2]*Centre de Recherche en Biotechnologie, Ali Mendjli Nouvelle Ville UV 03, Constantine, Algeria*
E-mail: aminaa25@hotmail.fr

In recent years, natural products have become the subject of a widespread food producers and consumers interest. Among them bee products are worth of particular attention (Burdock, 1998). Propolis is one of bee products described as a viscous material collected from different parts of plant and mixed with salivary secretions and wax (Socha *et al.*, 2014). This material found numerous uses in the beehive and is considered as a very interesting product for human with many biological activities. The chemical composition of propolis has been the subject of this study, its composition is very complex and varies with the season and the vegetation in the areas in which it is collected. The ethyl acetate extract of propolis was fractionated on a column of silica gel then the sub-fractions were separated on a sephadex column. This phytochemical investigation allowed us to isolate several products; among them we found two compounds chrysin and dehydrochrysin. The identification of the isolated products was carried out by the combination of the data obtained from the spectroscopic analyzes, in particular ^{1}H-NMR,^{13}C and by comparison with literature data.

Keywords: propolis, ^{1}H-NMR, ^{13}C.

References

Burdock G.A. (**1998**). Review of the biological properties and toxicity of bee propolis. *Food. Chem. Toxicol*., *36:* 347-363.
Socha R., Galkowska D., Bugaj M. and Juszczak L. (**2014**). Phenolic composition and antioxidant activity of propolis from various region in Poland. *Nat. Prod. Res. Formerly Nat. Prod. Lett., 29 (5):* 416-422.

Phenolics content and scavenger ability of Algerian propolis

BOUAROURA amina[1], DAIKH Amina[1], SEGUENI Narimane[1], BENSOUICI Chawki[2] and RHOUATI Salah[1].

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire des produits naturels d'origine végétale et de synthèse organique, Constantine, Algeria*
[2]*Centre de Recherche en Biotechnologie, Ali Mendjli Nouvelle Ville UV 03, Constantine, Algeria*
E-mail: aminaa25@hotmail.fr

Propolis is a resinous natural hive product derived from plant exudates collected by honey bees. Due to biological and pharmacological activities, it has been extensively used in folk medicine. The present study was designed to measure the antioxidant power of Algerian propolis with 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging (Blois, 1958), and 2,2'azinobis (3-ethylbenzothiazoline-6-sulfonic acid) radical cation decolorization assays (ABTS) (Re *et al.*, 1999). Total flavonoid and polyphenol contents of propolis, determined by using aluminum nitrate and Folin–Ciocalteu colorimetric methods. The IC_{50} values for scavenging DPPH radical and ABTS radical were in the range of 7.91 to 10.0 and 5.31 to 58.38 respectively. The result of this experiment may show that propolis as a natural source of antioxidant compounds.

Keywords: propolis, total flavonoid, total polyphenol, DPPH. ABTS.

References

Blois M.S. (**1958**). Antioxidant determinations by the use of a stable Free Radical. *Nature, 4617 (181):* 1119-1200.
Re R., Pellegrini N., Proteggente A., Pannala A., Yang M. and Rice-Evans C. (**1999**). Antioxidant activity applying an improved ABTS radical cation decolorization assay. *Free Radical Bio. Med. 26:* 1231-1237.

Polyphenols and phytochemical screening of *Asphodelus* species

BOUCHOUKA Racha Lydia[1], TEBIBELSoraya[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratory of Ethnobotany Palynology and Ethnopharmacology and Toxicology (E.P.E.T), 25000 Constantine, Algeria.*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: rachabuchouka@gmail.com

Asphodelus tenuifolius is a perennial plant with an average height of one meter, found throughout the Mediterranean region and in India. The aerial part of the plant is used for nutritional and medicinal purposes, particularly in cardiovascular, dermatological and gastrointestinal diseases. This study is designed to assess the phytochemical screening of *Asphodelus tenuifolius* collected from Ghardaïa and to analyze its total phenolic content by the Folin Ciocalteu reagent. The results revealed the presence of flavonoids and tannins, and the absence of alkaloids and triterpenoids. In addition, the extracts of this plant contain relatively high concentrations of polyphenols (315.14 ± 3.37 mg/g of extract).

Keywords: *Asphodelus*, phytochemical screening, polyphenols, Folin Ciocalteu.

Protective effect of the plant *Salvia argentea* on Hcy level and the aorta of mice induced by hyperhomocysteinemia

BOUDEBOUZ Samira[1], ZERIZER Sakina[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratoire d'Obtrntion de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria.*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria.*
E-mail: samira.boudebouz@umc.edu.dz

Homocysteine (Hcy) is a sulfer amino acid, synthesized from the methionine into cells. At high level, the hyperhomocysteinemia (HHcy), considered as a risk factor in atherosclerosis, can cause enormously molecular and cellular deteriorations. The present study was undertaken to explore the therapeutic effect of *Salvia argentea n*-butanol extract on the abnormalities caused by a high dose of methionine (400mg/kg) in mice. After 21 days of treatment, Serum Hcy was measured and histological cuts of the aorta were realized. Our study showed, in the mice induced by HHcy, a significant increase in Hcy level and structural deteriorations of aorta. The treatment with plant extract decreases significantly the Hcy level and exerts a corrective effect on all the abnormalities of aorta caused by HHcy.

Keywords: homocysteine, methionine, *Salvia argentea*, aorta.

Antioxidant activity of *Rosmarinus tournefortii* de noé extracts

BOUDIAR Tarek[1] and BENSOUICI Chawki[1]

[1]*Centre de Recherche en Biotechnologie, Ali Mendjli Nouvelle Ville UV 03, Constantine, Algeria*
E-mail: boudiar_tarek@yahoo.fr

In Algeria, leaves of *Rosmarinus tournefortii* de Noé are widely used in folk medicine as a remedy for some diseases, including anti-stomach ache, cough, influenza, colic, fever, pain, hepatic and intestinal problems. The plant was collected during the flowering period in occidental southern region of Algeria (Djbalantar-Bechar) in April 2012. The aerial part of *R. tournefortii* de Noé (leaves & flowers) was extracted by methanol-water (80:20, v/v) and chloroform. The aim of this study was to examine the possible antioxidant activities from the leaves of *R. tournefortii. In vitro* antioxidant activity was evaluated from chloroform and methanol leaves extracts using different antioxidant tests, namely, total antioxidant (DPPH) scavenging, (ABTS.+) scavenging, superoxide radical scavenging by alkaline DMSO, reducing power, β-carotene linoleic acid bleaching, cupric reducing antioxidant capacity (CUPRAC) and ferrous ions chelating assays compared to the synthetic antioxidants (BHA, BHT & α-Tocopherol). The antioxidant activity evaluated by DPPH test (IC_{50} µg/mL=22.47±1.37 and ABTS IC_{50} µg/mL=6.62±1.49) showed that the methanol extract exerts a higher antioxidant effect than chloroform extract of rosemary leaves. In reducing power, superoxide radical scavenging, β-carotene and ferrous ions chelating tests; the methanol and chloroform extracts exhibited relatively the same antioxidant activity. For superoxide radical scavenging, the methanol extract showed better antioxidant activity (IC_{50} µg/mL=10.76±0.22) compared to the tested standards (BHA, BHT (IC_{50} µg/mL=>200) and α-Tocopherol (IC_{50}µg/mL=31.52±2.22)). However, for the other tests, the standard revealed a greater antioxidant activity.

Keywords: *Rosmarinus tournefortii*, antioxidant, DPPH, CUPRAC.

Dihydrophenanthrenes from *Tamus communis* L. and their antioxidant activities

BOUDJADA Amina[1], TOUIL Ahmed[1], BENDIF Hamdi[2], BENSSOUICI Chawki[3] and RHOUATI Salah[1]

[1]*Laboratory of Natural Product from Plants and organic synthesis, Department of chemistry, Faculty of Sciences, University of Mentouri-Constantine, Route Ain El-Bey, Constantine, Algeria*
[2]*Department of Natural and Life Sciences, Faculty of Sciences, University of Mohamed Boudiaf, BP 166 M'sila 28000, Algeria.*
[3]*Centre de Recherche en Biotechnologie, Ali Mendjli Ville, UV 03, BP E73 Constantine, Algeria.*
E-mail: amina_boudjada@yahoo.com

Tamus communis L. belonging to Dioscoreaceae family is a perennial herbaceous climber with large tubers and commonly known in Algeria as « Elkarma souda » (Quezel and Santa, 1963). The root of this plant is used in local medicine as a cathartic and diuretic and recommended in the treatment of pleurisy, whooping cough, bronchitis and bruises (Capasso *et al.*, 1983). Two dihydrophenantrenes have been identified for the first time from the species. The structures of isolated compounds were elucidated by spectroscopic methods (UV, IR, ^{1}H NMR, ^{13}C NMR, 2D-NMR experiments) and MS. The antioxidant activity of the extracts was determined by DPPH, ABTS, CUPRAC, reducing power and β-carotene bleaching methods. The results showed that the diethyl ether extract has higher antioxidant activity compared to ethyl acetate in all methods used (means of IC_{50} and A0.5).

Keywords: Dihydrophenanthrenes, *Tamus communis L.*, antioxidant activity.

References

Capasso F., Desimone F. and Senator F. (**1983**). Sterol constituents of *Tamus communis* L. *J Ethnopharmacol, 8:* 327-329.
Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. CNRS, Paris. France:* 218.

Analysis of the volatile compounds of *Rosmarinus officinalis* L. by SPME-GC / MS and study of the antioxidant activity of its essential oils and phenolic extracts

BOUGUERRA Ali[1], DJEBILI Samah[1], MASSOURAS Th.[2] and BARKAT Malika[1]

[1]*Laboratoire BIOQUAL, I.N.A.T.A.A, Université des Frères Mentouri-Constantine 1, Ain El-Bey, Constantine, Algérie*
[2]*Department of Food Science and Human Nutrition, Laboratory of Dairy Science and Technology, Agricultural University of Athens, Ieraodos 75, 11855 Athens, Greece*
E-mail: ali.bouguerra@umc.edu.dz

Herbs are a good source of bioactive compounds. In fact, secondary metabolites have been the subject of numerous researches *in vivo* as well as *in vitro*, in particular the search for new natural constituents such as volatile compounds (Takayama *et al.,* 2016) and phenolic compounds (Demir *et al.,* 2014). In this context, the present study aims to study the antioxidant activity of essential oils and phenolic extracts of *Rosmarinus officinalis* L. and to analyze their volatile compounds. The chemical composition of the volatile compounds (VC) was realized by Headspace Solid-Phase Micro Extraction (HS-SPME) coupled by Gas Chromatography /Mass Spectrometry (GC/MS). Quantitative evaluation of total polyphenols and flavonoids was performed using the Folin Ciocalteu and the aluminum trichloride method, respectively. To demonstrate the antiradical and antioxidant activity of essential oils and polyphenol extracts, the DPPH reduction test and the β-carotene bleaching method were used. *Rosmarinus officinalis* L. contains about ten volatile compounds. Camphor, α-Pinene, Camphene, 1,8-Cineole and *trans*-Caryophyllene were the major volatile compounds. The results showed that essential oils and polyphenol extract have interesting anti-radical and antioxidant activity. In addition, HS-SPME / GC / MS has proven to be a fast and simple method, and recommended to be used for the analysis of volatile compounds of herbs.

Keywords: HS-SPME/GC/MS, phenolic compounds, volatil compounds, *Rosmarinus officinalis* L.

References

Demir N., Yildiz O., Alpaslan M., and Hayaloglu A. A. (**2014**). *LWT - Food Science and Technology, 57:* 126-133.
Takayama C. *et al.* (**2016**). *Asian Pac J Trop Biomed, 6(8):* 677-681.

Phytochemical study, antibacterial and antioxidant activities of aerial parts of *Ferula lutea* (Poiret) Maire

BOULACEL Ibtissem[1], AKKAL Salah[1]*, DEMIRTAS Ibrahim[2], MERDJROUBI Kamel[1] and LAOUER Hocine[3]

[1]*Research Unit Development of Natural Resources, Bioactive Molecules and Physicochemical and Biological Analysis. Department of Chemistry, University of Constantine 1, Algeria*
[2]*University of Çankırı Karatekin, Faculty of Sciences, Department of Chemistry, Ballica Campus, 18100 Çankırı, Turkey*
[3]*Laboratoire de Valorisation des Ressources Naturelles Biologiques, Département de Biologie, Université Ferhat Abbas de Sétif, Algérie*
E-mail: boulacellrps@yahoo.fr

Apiaceae represents one of the known plant families of flowering plant and many species of this family are widely used in local herbal medicine. The genus *Ferula* (Apeaceae) includes 170 species (Pimenov *et al.*, 1993), mostly species growing in arid and temperate regions of Eurasia, in the Canary Island and in North Africa. Only five (05) species of the *Ferula* genus have been identified in the Algerian flora, from which 2 are endemic (Quezel and Santa, 1963; Ozenda, 1958). In the present study the aerial parts of *Ferula lutea* afforded four compounds: methyl Myristate (**1**), Maltol (**2**), ß-Sitosterol-*3-O-ß-D*-glucoside (**3**) and Spinasterol-*3-O-ß-D*-glucoside (**4**). The structures of these compounds were established by means of the combined systems with high resolution, 1D NMR (1H NMR, ^{13}C NMR) and 2D NMR (COSY, HSQC and HMBC). Further, the antibacterial activity of the CH_2Cl_2, EtOAc and *n*-BuOH extracts against standard and clinical strains was assessed using disk diffusion method. The antioxidant activity of the EtOAc and *n*-BuOH extracts was determinated using DPPH and TAC assays.

Keywords: *Ferula lutea*, Apeaceae, antibacterial activity, antioxidant activity, disk diffusion method.

References

Ozenda P. (**1958**). Flore du Sahara. *Ed. CNRS, Paris.*
Pimenov. M. G. and Leonov. M.V. (**1993**). *The General of yhe Umbelliferae. Kew: Royal Botanic Gardens.*
Quezel. P et Santa.S (**1963**). Nouvelle Flore de l'Algérie et des Régions Désertiques et Méridionales. *Tome II, Edition CNRS, Paris.*

In vitro study of antioxidant properties of methanolic extract of propolis obtained from Collo

BOULECHFAR Safia[1,2], ZELLAGUI Amar[1] and BENSOUICI Chawki[3]

[1]*Laboratory of Biomolecules and Plant Breeding, Life Sciences and Nature Department, Faculty of Exact Sciences and Life Sciences and Nature, University of Larbi Ben Mhidi-Oum El Bouaghi, Algeria*
[2]*Department of Biochemistry, Molecular and Cellular Biology, Faculty of Life Sciences and Nature, University of Frères Mentouri-Constantine, 25000 Constantine, Algeria.*
[3]*Research Center in Biotechnology, Ali Mendjeli, Constantine, Algeria.*
E-mail: saf.bio@hotmail.fr

Propolis is a complex resinous material produced by bees from several plant exudates (Rios *et al.*, 2014). It is regarded as a valuable natural resource of bioactive molecules. (Naik and Vaidya, 2011). Many antioxidant compounds were found in propolis such as polyphenols, including phenolic acids and flavonoids (Tosi *et al.*, 2006). Therefore, this study was performed to evaluate the antioxidant properties of methanolic extract of propolis obtained from region of Collo, Algeria. Total phenolic content was evaluated according to the Folin-Ciocalteu procedure. The phenolic amount was 504.21±2.23µg AG/mg extract. Antioxidant activity was analyzed using four methods: DPPH, CUPRAC, ABTS and β-carotene bleaching assay, using BHT as a control test. The results obtained seem to be very interesting: [(DPPH: IC_{50} (propolis)=41.33±0.61µg/mL, IC_{50} (BHT) =22.32±1.19µg/mL), (CUPRAC: IC_{50} (propolis)=18.25±2.34µg/mL, IC_{50} (BHT) =9.62±0.87µg/mL), (ABTS: IC_{50} (propolis)=8.73±0.32µg/mL, IC_{50} (BHT)=1.29±0.30µg/mL) and (β-carotene: IC_{50} (propolis)=30.59±0.01µg/mL, IC_{50} (BHT) =1.05±0.01µg/mL)]. The findings suggest that propolis could be a potential source of natural antioxidants.

Keywords: propolis, polyphenols, antioxidant activity.

References

Naik D. G. and Vaidya H. S. (**2011**). Antioxidant properties of volatile oil of Indian propolis. *Journal of ApiProduct and ApiMedical Science 3 (2):* 89-93.
Rios N., Yánez C., Rojas L., Mora F., Usubillaga A. and Vit P. (**2014**). Chemical composition of essential oil of *Apis mellifera* propolis from Falcón State, Venezuela. *Emir. J. Food Agric., 26 (7):* 639-642.
Tosi E. A., Ciappini M.C., Cazzolli A. F. and Tapiz, L. M. (**2006**). Physico chemical characteristics of propolis collected in Santa Fe (Argentine). *APIACTA*, *41:* 110-120.

Effect of *Athamanta sicula* oil on inhibition of mild steel corrosion in 1M HCl

BOURATOUA Aicha[1], KABOUCHE Ahmed[1], KABOUCHE Zahia[1], EL OUADI Yassir[2] and EL MSELLEM Hicham[2]

[1]*Université Constantine 1, Faculté des sciences exactes, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Laboratoire de Chimie Appliquée et environnement (LCAE-URAC18), Faculté des Sciences, B.P. 717, Oujda, Morocco*
E-mail: bouratoua_aicha@hotmail.fr

The genus *Athamanta* L. (Apiaceae) comprises about nine species which are largely distributed in southeastern Europe and North-Africa. In Algeria, there is only one species called *Athamanta sicula* (Syn. *Tingara sicula*) (Quezel and Santa, 1963). In South-Italy, fresh roots of this plant are used as a diuretic and to dissolve kidney stones (rock splitters) (Baroni *et al.*, 1977; Mormile *et al.*, 2002). The inhibitory effect of *Athamanta sicula* oil was estimated on the corrosion of mild steel in 1M in hydrochloric acid (HCl) using weight loss, Electrochemical Impedance Spectroscopy (EIS) and Tafel polarization curves. Inhibition was found to increase with increasing concentration of *A. sicula* oil. The effect of temperature on the corrosion behaviour of mild steel in 1M HCl with addition of *A. sicula* oil was also studied and thermodynamic parameters were determined and discussed. Values of inhibition efficiency calculated from weight loss, Tafel polarization curves, and EIS are in good agreement. Polarization curves showed that *A. sicula* oil behave as mixed type inhibitors in hydrochloric acid 1M. The obtained results showed that oil of *A. sicula* could serve as an effective inhibitor of the corrosion of mild steel in hydrochloric acid solution.

Keywords: Corrosion, mild steel, *Athamanta sicula*, electrochemical system, hydrochloric acid.

References

Baroni E. (**1977**). Guida Botanica di Italia, Cappelli Bologna.
Mormile C., Nicotra M., Tosto P., Barbagallo C. and Meli R. (**2002**). *Plante Medicinali*, *1:* 174.
Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS, Paris. France.*

Chemical constituents of *Genista numidica* Spach aerial parts and their antioxidant activities

BOUTAGHANE Naima[1], ALABDUL MAGID Abdulmagid[2]*, DJEGHIM Hanène[1], CAFOLLA Anaïs[1], VOUTQUENNE-NAZABADIOKO Laurence[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Campus Chaabet-Ersas, 25000 Constantine, Algeria*
[2]*ICMR-UMR CNRS 7312, Groupe Isolement et Structure, Campus Sciences, Bât. 18, BP 1039, 51687 Reims Cedex 2, France*
E-mail: boutaghane.naima@yahoo.fr

A previously undescribed triterpenoid saponin, 3-*O*-[α-L-rhamnopyranosyl-(1→2)-{β-D-glucopyranosyl-(1→6)-}β-D-galactopyranosyl-(1→2)-β-D-glucuronopyranosyl]-sophoradiol (1), in addition to eight known saponins (2-9) and twenty-one phenolic constituents (10-30) were isolated from the aerial parts of *Genista numidica* Spach. Structures elucidation was performed by comprehensive 1D- and 2D-NMR analyses and HRESIMS. The extracts, fractions and isolated compounds were evaluated for their antioxidant activities. The antioxidative effect of the extracts and fractions was determined by using β-carotene-linoleic acid, $DPPH^{\bullet}$ scavenging, $ABTS^{+}$ scavenging, and CUPRAC assays. Compounds 19 and *27* exhibited a good antiradical activity potential (IC_{50}11.8 and 11.1 μg/mL, respectively). The methanolic and chloroformic extracts of *G. numidica* showed cytotoxic activity using the brine shrimp lethality assay with LD_{50} of 9.2 and 15.7 µg/mL, respectively.

Keywords: *Genista numidica*, Fabaceae, triterpenoid saponins, flavonoids and antioxidant activity.

Phytochemical study and antioxidant activity of the methanolic extract of *Tuberaria*

HARIECHE Mohamed[1], BENOUDINA Farid[1], BENDAMENE Samia[1, 2], **BOUTAGHANE Naima[1]** and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Campus Chaabet-Ersas, 25000 Constantine, Algeria*
[2]*Université Mohammad El Bachir El Ibrahimi-Bordj Bou Arreridj, Département des Sciences biologiques, Laboratoire de Caractérisation et Valorisation des Ressources Naturelles (LCVRN) BBA*
E-mail: boutaghane.naima@yahoo.fr

This work has for objective to contribute to the valorization of *Tuberaria* (Cistaceae). The survey was about the phytochemical screening and the tracking of the antioxidant activity by TLC of the selective fractions. The phytochemical screening put in evidence the presence of several secondary metabolites families. The methanolic extract is rich in polyphenolic compounds, notably in flavonoids. The selective fractions showed an antiradical activity with regard to the DPPH.

Keywords: phytochemical screening, *Tuberaria*, Cistaceae, antioxidant activity.

Pharmacological and toxicological application of micronucleus test in mice

BOUTAMINE Yasmine[1], BENNOUI Yasmine[1], BOUCHEMA Selma[1], BOUHROUR Noor El Houda[1], BOUKOUS Mouhamed Mehdi[1], BELKHITHER N., DALIA Farid[2], BELKHIRI Abdelmalik[2] and DEROUICHE Mohamed Taher[1]

[1]*Pharmacology Laboratory, faculty of Medicine, University Constantine 3, Algeria*
[2]*Pharmacognosy Laboratory, faculty of Médecine, University Constantine 3, Algeria*
E-mail: belkhiri_abdelmalik@yahoo.fr

The micronucleus test in rodents has emerged as the main *in vivo* technique for detecting the genotoxicity of plant extracts. It is reported that this test can be used in its opposite form in the evaluation of the antimutagenic effect (pharmacological prevention of genomic lesions) of the substances to be tested. (Niwa *et al*., 2013). The aim of our work is to develop this test with its dual application (toxicological and pharmacological) to evaluate the genotoxic and antimutagenic potential of a hydroalcoholic extract of *Tilia cordata* (Tiliaceae). The results showed a probable absence of mutagenic effect of the hydroalcoholic extract of *Tilia cordata* with obvious signs of antimutagenic effect.

Keywords: micronucleus, genotoxicity, antimutagenic, mice.

References

Niwa A. M., Oliveira R. J. and Mantovani M. S. (**2013**). Evaluation of the mutagenicity and antimutagenicity of soy phytoestrogens using micronucleus and comet assays of the peripheral blood of mice. *Genetics and Molecular Research, 12 (1):* 519-527.

Antibacterial activity of *Juniperus* species growing in Algeria (Cupressaceae)

CHERCHAR Hanene[1], BERREHAL Djemaa[1], KHALFALLAH Assia and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: hanene-ch@hotmail.fr

The genus *Juniperus* L. (Cupressaceae) contains more than 67 species. It is divided into three sections: Caryocedrus (one species, *J. drupacea* Labill.); *Juniperus* (Oxycedrus, 9 or 10 species) and *Sabina* (the remaining, approximately 50 species) (Adams and Demeke, 1993; Adams, 1998). The flora of Algeria lists two sections and five *Juniperus* species; Sect. *Oxycedrus* (*J. communis* L., *J. oxycedrus* L.), and *Sabina* (*J. thurifera* L., *J. phonicea* L., *J. sabina* L.) (Quezel and Santa, 1962). All over the world, plants from this genus have always been regarded as a well known traditional remedy due to their numerous therapeutic properties, such as anti-inflammatory, diuretic, antiseptic (bacterial and fungal), hypoglycaemic, hypotensive, analgesic and abortifacient. We report here the antibacterial activity of *Juniperus* species growing in Algeria. Antibacterial properties were determined by the use of the disc diffusion method.

Keywords: *Juniperus*, Cupressaceae, antibacterial activity.

References

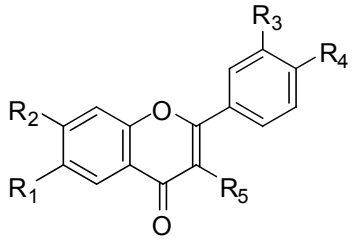
Adams R. P. and Demeke T. (**1993**). *Taxon*, *42:* 553-572.
Adams R. R. (**1998**). *Biochemical Systematics and Ecology, 26 :* 637-645.
Quezel P. et Santa S. (**1962**). Nouvel Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS, Paris. France.*

Flavonoids and antioxidant activity of *Santolina rosmarinifolia* L. from Algeria

CHIBANI Salih[1], KABOUCHE Ahmed[1], TOUZANI Rachid[2] and KABOUCHE Zahia[1*]

[1]*Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Faculté des Sciences Exactes, Université Constantine 1, Campus Chaabat Ersas, 25000 Constantine, Algeria.*
[2]*Université Mohamed Premier, Oujda LCAE-URAC 18, COSTE, Faculté des Sciences, Oujda*
&
Faculté Pluridisciplinaire Nador, Morocco
E-mail: chibani_salih@yahoo.fr

Santolina is a small genus of the large subfamily Asteraceae of the family Compositae. Species of this genus are used in folk medicine as anthelmintic, antispasmodic and antifectious. Sesquiterpenes lactones and volatiles terpenes have been isolated from the Spanish subspecies *S. rosmarinifolia* subsp. *Canescens*, *S. rosmarinifolia* subsp. *rosmarinifolia and S. chamaecyparissus*. Terpenes and acetylene derivatives were reported from the roots of *S. corsica* but no flavonoids have been reported from these two subspecies. We report here the isolation and identifiction of 7 flavonoids, from which 3 are 6-methoxylated (figure 1), from the Algerian species *S. rosmarinifolia*. Free radical DPPH scavenging potential of the ethyl acetate and *n*-butanol extracts was investigated by Blois method.



Compound	R_1	R_2	R_3	R_4	R_5
1	OMe	OH	OMe	OMe	H
2	OMe	OH	OMe	OH	H
3	OMe	OMe	H	OMe	H
4	H	OH	OH	OH	H
5	H	OH	OH	OH	OH
6	H	O-glu	OH	OH	OH
7	H	O-glu	OH	OH	H

1: Eupatilline; **2:** Jaceosidin; **3:** Salvigenin; **4:** Luteolin; **5:** Quercetin; **6:** Quercetin-3-O-glucoside **7:** Luteolin-7-O-glucoside.

Figure 1: Structures of flavonoids isolated from *Santolina rosmarinifolia*

Keywords: *Santolina rosmarinifolia* L., flavonoids, antioxidant.

Effect of propolis extracts against Methicillin Resistant *Staphylococcus aureus* (MRSA)

DAIKH Amina[1], BOUAROURA Amina[1], SEGUENI Narimane[1] and RHOUATI Salah[1]

[1]*Laboratoire des produits naturels d'origine végétal et de synthèse organique. Département de Chimie, Université Constantine 1, Algeria*
E-mail: daikh_amina@umc.edu.dz

Methicillin Resistant *Staphylococcus aureus* (MRSA) is a Gram positive human pathogen that causes a wide range of infections, some of which can be life-threatening such as septicemia, pneumonia, osteomyelitis and endocarditis (Enright *et al.,* 2001). The current study aimed to investigate the antibiofilm activity of propolis samples obtained from Algeria against a resistance MRSA. Crude sample of propolis was collected from the state of Ouad Sabt (Ferdjiwa-Mila, Algeria) in the summer of the years 2014-2015. Extracts of Algerian propolis samples were obtained by maceration of ground sample (10g) using solvents of different polarities; petroleum ether, chloroform, ethyl acetate followed by methanol (100 mL, 3 times) for 1 day at room temperature (37°C). The solvents were evaporated at 40°C under reduced pressure to obtain dry extracts. The antibiofilm effect of the propolis extracts against biofilm forming bacteria was tested on 96-well polystyrene plates using crystal violet assay (Kouidhi *et al.*, 2010).The bacterial cultures were grown in 5 mL TSB at 37°C under aerobic conditions for 24 h. The Chloroform extract exhibited the highest eradicating capability for M20 with an inhibition varying from 34.46% to 62.63%.

Keywords: MRSA, crystal violet assay, propolis.

References

Kouidhi B., Zmantar T. and Bakhrouf A. (**2010**). Anti-cariogenic and anti-biofilms activity of Tunisian propolis extract and its potential protective effect against cancer cells proliferation. *Anaerobe, 16:* 566-571.
Enright M. C., Robinson D. A., Randle G., Feil E. J., Grundmann H. and Spratt B. G. **(2002)**. The evolutionary history of methicillin resistant *Staphylococcus aureus* (MRSA), *Proc Natl AcadSci U S A,* 99: 7687-7692.

Reducing capacity of propolis

DAIKH Amina[1], BOUAROURA Amina[1], SEGUENI Narimane[1] and RHOUATI Salah[1]

[1]*Laboratoire des produits naturels d'origine végétal et de synthèse organique. Département de Chimie, Université Constantine 1, Algeria*
E-mail: daikh_amina@umc.edu.dz

Propolis is a complex mixture composed of beeswax (30%), resins and plant balsams (50%), essential oils (10%), pollen (5%) and some organic and mineral compounds (5%) (Burdock, 1998). Propolis has been proved to possess valuable biological activities: antimicrobial, antiviral, anti-inflammatory, antioxidant, antitumor….etc. (Banskota *et al.*, 2001; Bankova, 2005). The present study was conducted to evaluate the antioxidant activity of Algerian propolis extracts using two methods (Cupric reducing capacity (CUPRAC) and Reducing power). The obtained results indicated very low $A_{0.50}$ values, indicating a high antioxidant activity for propolis extracts.

Keywords: CUPRAC, Reducing power, propolis.

References

Burdock G. A. (**1998**). *Food and Chemical Toxicology*, *36:* 347-363.
Banskota A. H., Tezuka Y. and Kadota S. (**2001**). Recent progress in pharmacological research of propolis. *Phytother Res, 15:* 561-571.
Bankova V. (**2005**). Recent trends and important developments in propolis research. *eCAM*, *2: 29*-32.

Interest of computerized behavioral analysis in the screening of anxiolytic and antidepressive activities in mouse

DERNANE Manal[1], HAINE L.[1], LABDAI Mohamed Saad Eddine[2], BELKHIRI Abdelmalik[2] and DEROUICHE Mohamed Taher[1]

[1]*Pharmacology Laboratory, Faculty of Medicine, University of Constantine 3, Algeria*
[2]*Pharmacognosy Laboratory, Faculty of Medicine, University of Constantine 3, Algeria*
E-mail: belkhiri_abdelmalik@yahoo.fr

Nowadays, Video-tracking has found important place in preclinical psychopharmacology, especially to study psychotropic effects of different pharmacological substances in animal models. Our study was undertaken to evaluate an automated preclinical behavioral assays on anxiolytic and antidepressant activities using a trial version of a video tracking software SMART®. Several tests *in vivo,* adapted to SWISS albino female mice were carried out: Open field and elevated plus maze tests for anxiolytic activity, forced swimming and caudal suspension tests for antidepressant activity. The validation of our work is based on a comparative study in each test between a negative control (group that received the placebo) and a positive control (group that received a reference molecule: Diazepam for anxiolytic activity and Fluoxetin for antidepressant activity). In anxiolytic activity tests, the positive control group showed a significant increase in the residence time in the open area without altering the motor activity (Rodgers And Johnson, 1995), as well as for the antidepressant activity tests, the batch positive control showed a significant decrease in immobility time synonymous of despair (Cryan, 2005). The results obtained allowed us to validate the computerized tests for the screening of anti-anxiety and anti-depressive activities in mice applied to plant extracts or synthetic products.

Keywords: video-tracking, antidepressive, anxiolytic, mice.

References

Cryan J. F., Valentino R. J. and Lucki I. (**2005**). Assessing substrates underlying the behavioral effects of antidepressants using the modified rat forced swimming test. *Neuroscience & Biobehavioral Reviews.*
Rodgers R. J. And Johnson N. J. (**1995**). Factor analysis of spatiotemporal and Ethological measures, in the murine elevated plus-maze test of anxiety. *Pharmacol. Biochem. Behav, 5.*

Chemical composition, antimicrobial and antioxydante activities of *Chrysanthemum reboudianum*

DEROUICHE Kamel[1], ZELLAGUI Amar[1], MAARFIA Sara[1], GHOUT Agena[1], BENBOUT Amel[1] and RHOUATI salah[1]

[1]*Laboratoire de Biomolécules Végétales et Amélioration des Plantes, Département des Sciences de la Nature et de la Vie, Faculté des Sciences Exactes et Sciences de la Nature et de la Vie, Université Larbi Ben Mhidi-Oum El Bouaghi, Algérie*
E-mail: kderouiche@yahoo.fr

The essential oil obtained by hydrodistillation of the flowers of *Chrysanthemum reboudianum* was analyzed by GC/MS. The main constituents of the essential oil were Butyl octyl phthalate (18.90 %), *o*-ocimene (11.60 %), 6-isopropenyl-3-methoxymethoxy-3-methyl-cyclohexene (14.32 %) Farnesene epoxide (12.07 %) and some other compounds that were presented only in minor amounts. In total, *Chrysanthemum reboudianum* essential oil is considered as a rich source of hydrocarbon mono and sesquiterpenes. Moreover, the antimicrobial activity of the essential oil against some bacteria strains and fungies was studied. It was found that the most powerful effect was against *Bacillus subtilis*, *Staphylococcus aureus* and *Aspergillus flavus*. The essential oil was screened for its possible *in vitro* antioxidant activity by DPPH free radical-scavenging test. The findings showed that reduction percentage is very important.

Keywords: *Chrysanthemum reboudianum*, Asteraceae, essential oil, flowers, antimicrobial activity, antioxidant activity.

Total phenolic content evaluation and physico-chemical characterization of red pepper mixture

DJEBILI Samah[1], BOUGUERRA Ali[1] and BARKAT Malika[1]

[1]*Laboratoire de Biotechnologie et Qualité des Aliments (BIOQUAL), Institut de la Nutrition, de l'Alimentation et des Technologies Agroalimentaire (I.N.A.T.A.A), Université des Frères Mentouri-Constantine, Algérie*
E-mail: djebili.samah1@gmail.com

Pepper, belonging to the genus *Capsicum*, is one of the most consumed vegetables in the world. It represents an important source of nutrients. The quality evaluation of a mixture of red peppers for three different batches intended for the industrial production of *Harissa* was carried out. The aim of this study is to evaluate the total phenolic contents in a mixture of red pepper and analyze its physico-chemical properties (Colour, titratable acidity, pH, total soluble solids, water content, and ash rate). Total phenolics content of the fruits was analyzed spectrophotometrically using the modified Folin-Ciocalteu colorimetric method. Our results for total phenolic contents (/100g DM) (Day1: 2208.26±109.07^{a}; Day2: 1937.95±399.50^{a} ; Day3: 1565.17±193.88^{b}) are in good agreement with the results reported by Zhuang *et al.* (2012) which analyzed 9 varieties of peppers. The results obtained for the pH: Day1 :4.98±0.09^{a} ; Day2: 4.89±0.09^{a} ; Day3: 4.79±0.03^{b}, Brix : Day1: 8.13±0.36^{b} ; Day2: 7.27±0.02^{d} ; Day3: 8.67±0.02^{b}, the water content: Day1: 90.29±0.80^{b}% ; Day2: 89.59±0.46^{b} %; Day3: 88.66±0.36^{a}%, ash content : Day1: 0.43±0^{b} ; Day2: 0.42±0.22^{c} ; Day3: 0.43±0.3^{b}. colour: Day1: **L**(25.93±0.63) ; **a**(40.80±2.5) ; **b**(17.46±2.26), Day2: **L**(25.05±0.13), **a**(37.11±0.21), **b**(17.09±0.08), lot3 : **L**(24.63±0.05), **a**(39.99±0.18), **b**(17.48±1.21). By comparing the pH of the tested samples with those of other studies, we find that our results are within the pH range cited by Kumar Shaha *et al.* (2013) (4.31 to 5.75). The moisture content values are consistent with the results of Luitel and Kang (2013) (84.3% - 92.0%). The colour values: **a** are greater than the interval described by Luitel and Kang (2013) (1.21- 36). On the other hand, the values of **L** and **b** are lower than those obtained by Luitel and Kang (2013) (35.47 – 62.41; 23.42 – 59.74).

Keywords: red pepper, total phenolic contents, physico-chemical characterization, colour.

References

Kumar Shaha R., Rahman S. and Asrul A. (**2013**). Bioactive compounds in chilli peppers (*Capsicum annuum* L.) at various ripening (green, yellow and red) stages. *Annals of Biological Research, 4 (8):* 27-34.
Luitel B. P. and Kang W. H. (**2013**). Assessment of Fruit Quality Variation in Doubled Haploids of Minipaprika (Capsicum annuum L.). *Hort. Environ. Biotechnol., 54 (3):* 257-265.
Zhuang Y., Chen L., Sun L. and Cao J. (**2012**). Bioactive characteristics and antioxidant activities of nine peppers. *Journal of Functional Foods, 4:* 331-338.

Effect of extraction solvent on total phenolic and flavonoids content, and antioxidant activities of Algerian pomace olive oil

FERHAT Radhia

Laboratoire de Sciences des Aliments (LSA). Département de Technologie Alimentaire. Institut des Sciences Vétérinaires et des Sciences Agronomiques. Université de Hadj Lakhdar, Batna, Algérie
E-mail: radhia_boheme@yahoo.fr

The present study was aimed to investigate the influence of different solvent systems (acetone, hexane, petroleum ether and mixture of chloroform/methanol) employed in two-phases olive pomace extraction on the oil yield, phenolic and flavonoids contents and antioxidant activities. The Folin-Ciocalteu and Aluminium trichloride ($AlCl_3$) method was employed to calculate the total phenolic and flavonoid content respectively. Antioxidant capacity was assessed with DPPH, β-carotene/linoleic acid and FRAP. The highest oil yield 16.92% was obtained with the mixture chloroform/methanol 25/75. POO.8 (Pomace Olive Oil, extracted with pure methanol) has the highest total phenolic and flavonoids contents, which were 136.78 mg GAE/100g oil and 27.66 mg QE/100g oil. On the other hand, POO.7 (Pomace Olive Oil, extracted with mixture chloroform/methanol 25/75) exhibited the highest radical DPPH scavenging power (71.40% = 3.72 mg, gallic acid = 11.56 mg, BHA = 8.84 mg, quercetin =33.72 mg, vitamin C/g oil), and POO.5 (Pomace Olive Oil, extracted with mixture Chloroform/Methanol 75/25) presented the highest bleaching rate of β-carotene (83.84 % = 72.78 mg, gallic acid = 4.43 mg, BHA = 5.16 mg, quercetin = 55.27 mg, vitamin C /g oil). Positive significant correlation ($r=0.880$, $p<0.01$) was found between total phenolic content and FRAP. However, no significant correlation was found between total flavonoid content and β-carotene bleaching. The results obtained demonstrated that pomace olive oil could have to be used as a natural potential source of antioxidants.

Keywords: olive pomace, antioxidant activity, DPPH scavenging, β-carotene bleaching, FRAP.

Polyphenols and phytochemical screening of *Cleome* species

FOUGHALIA Amina[1], ZERIZER Sakina[1] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: amina18fough@gmail.com

Cleome arabica L. (Capparidaceae) is a desert plant, widely distributed in the North part of Africa. Its leaves are used in traditional medicine as a sedative for abdominal and rheumatic pains. This study is designed to assess the phytochemical screening of *Cleome arabica* L., collected from Ghardaïa (Algeria) and to analyze its total phenolic content by the Folin Ciocalteu reagent. The results revealed the presence of triterpenoids, flavonoids and tannins, and the absence of alkaloids mean while the extracts of this plant contain relatively high concentrations of polyphenols (289.34 ± 8.03 mg/g of extract).

Keywords: *Cleome*, phytochemical screening, polyphenols, Folin Ciocalteu.

Toxicity of the growing wild *Ruta chalepensis* alkaloids assessed by the brine shrimp (*Artemia salina*) bioassay

GALI Lynda[1,2] and BEDJOU Fatiha[1]

[1]*Plant Biotechnology and Ethnobotany Laboratory, Faculty of Natural Sciences and Life, University of Bejaia, Targa Ouzemour, 06000 Bejaia, Algeria*
[2]*Biochemistry laboratory, Biotechnology Research Center, PB E73/UV N°03 Ali Mendjeli Nouvelle Ville, Constantine, Algeria.*
E-mail: lyndag652@gmail.com

Ruta chalepensis is widely used in the folk medicine in many countries. It contains various secondary metabolites including phenolic compounds, saponins, volatile oil, and alkaloids. The plant was classified as a toxic plant essentially because of its coumarins and alkaloids contents (Ulubelen *et al.*, 1986; Zeichen de Sa *et al.*, 2000). In this work we assessed the toxicity of its alkaloids principally constituted by the quinolines, furoquinolines, quinazolones, and acridones. Eggs were hatched in artificial sea water. After 24h, 10 larvae of *Artemia salina* were separated and exposed to the alkaloids at different concentrations (10, 20, 40, and 80µg/ml). Mortality rate were determined after 48hours and LC_{50} was calculated. The extract showed a high toxicity against brine shrimp larvae that gave a mortality rate of 100% at the lowest concentration (10µg/mL) with an IC_{50} < 10µg/mL. Caution must be taken in the use of *Ruta chalepensis* as a traditional remedy. This bioassay still simple and useful to give a toxicity insight on this herb and we must employ other methods *in vitro* and *in vivo*.

Keywords: *Ruta chalepensis*, brine shrimp bioassay, toxicity, alkaloids, toxic plants.

References

Ulubelen A., Terem B., Tuzlacis E., Cheng K. F. and Kong Y. C. (**1986**). *Phytohemistry*, *11 :* 2692-2693.
Zeichen de Sa R., Rey A., Arganaraz E. and Bindstein E. (**2000**). *Journal of Ethnopharmacology, 69:* 93-98.

Phytochemical study and antioxidant activity of *Traganum nudatum* Del.

GHORAB-BOUHEDJAR Hamida[1], BOUHEDJAR Khalid[2], BENSOUICI Chawki[2], KABOUCHE Ahmed[3], VOUTQUENNE-NAZABADIKO Laurence[4] and KABOUCHE Zahia[1*]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Centre de Recherche en Biotechnologie, Ali Mendjli Nouvelle Ville UV 03, Constantine, Algeria*
[3]*Université des Frères Mentouri-Constantine, INATAA constantine, Algeria*
[4]*Groupe Isolement et Structure, Institut de Chimie Moléculaire de Reims (ICMR), CNRS UMR 7312, UFR de Pharmacie, BP 1039, 51687 Reims, France*
E-mail: ha.ghorab@gmail.com

Traganum nudatum (Amaranthaceae), locally known as "Domran" is a perennial herb that grows in North Africa and Western Asia. This plant has been used for many centuries as a popular remedy for diabetes and various pains (Bouallala *et al.*, 2014), wounds, rheumatism, diarrhea and dermatosis (Ouled El Hadj *et al.*, 2003). In the present work, we describe the isolation of flavonoids from the *n*-butanol extract of *T. nudatum*, collected from Tiguentourine. The evaluation of the free radical-scavenging properties of this plant is also investigated. Their structures were elucidated by extensive spectroscopic methods, including 1D-(^{1}H and ^{13}C) and 2D-NMR (COSY, HSQC and HMBC).

Keywords: Amaranthaceae, *Traganum nudatum,* flavonoids, antioxidant activity.

References

Boualala M., Bradai L. et Abid M. (**2014**). Diversité et utilisation des plantes spontanées du Sahara septentrional algérien dans la pharmacopée saharienne. Cas de la région du Souf. *Revue ElWahat pour les Recherches et les Etudes, 7:* 18-26.

Ould El Hadj M. D., Hadj-Mahammed M., Zabeirou H. et Chehma A. (**2003**). Importance des plantes spontanées médicinales dans la pharmacopée traditionnelle de La région d'Ouargla (Sahara septentrional - Est algérienne). *Sciences & Technologie :* 73-78.

HPLC analysis and antioxidant activity of butanolic extract of *Euphorbia helioscopia* growing in Algeria

GHOUT Agena[1], ZELLAGUI Amar[1], DEROUICHE Kamel[1], NOMAN Labib[1], GHERRAF Noureddine[1] and LAHOUEL Mesbah[2]

[1]*Laboratoire de Biomolécules Végétales et Amélioration des Plantes, Département des Sciences de la Nature et de la Vie, Faculté des Sciences Exactes et Sciences de la Nature et de la Vie, Université Larbi Ben Mhidi-Oum El Bouaghi, Algérie*
[2]*Laboratory of Molecular Toxicology, University of Jijel, 18000 Jijel, Algeria*
E-mail: agenaghout@yahoo.fr

The objective of our research work was to evaluate the *in vitro* antioxidant activity for reducing power, inhibition of lipid peroxidation of butanolic extract of aerial part of *Euphorbia helioscopia* collected in Algeria. Total phenolic and flavonoids contents of plant extract were measured; butanolic extract showed a good antioxidant activity in all tested methods, the total phenolic and flavonoid contents were the highest in *n*-butanol extract (156.21±4.55). Quantification of phenolic compounds was performed by HPLC-TOF-MS technique, which revealed that gentisic acids were the major phenolic compounds in *n*-butanol extract. Different phenolic compounds were identified by comparing their retention times, UV-Vis absorption spectra and mass spectra with authentic standards. The *n*-butanol extract had higher antioxidant potencies and polyphenol contents, had the highest ferric reducing activity with absorbance value of 1.396 at 1000 µg/ml and possess the best lipid peroxidation inhibitory (44.38 % at 500 µg/ml).

Keywords: polyphenols content, reducing capacity, lipid peroxidation, HPLC, *Euphorbia helioscopia*.

Flavonoids, cytotoxic and antioxidant activities of *Evax pygmaea*

KHALFALLAH Assia[1], BERREHAL Djemaa[1] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: assiakhalfallah93@gmail.com

Evax genus, belonging to Asteraceae family, is represented by 408 species (Quezel and Santa, 1963) of which five are found in Algeria. We've been interested with the phytochemical study, cytotoxic and antioxidant activities of the endemic species *Evax pygmaea.* Air-dried and powdered aerial parts (950 g) of *Evax pygmaea,* collected at Djebel El-Ouahch-Constantine (Eastern Algerian), were macerated in a methanolic solution (70%), The extract was concentrated to dryness (under low pressure); the residue was dissolved in boiling water and extracted with chloroform, ethyl acetate and *n*-butanol, successively. The mixture of *n*-butanol and ethyl acetate extracts was column chromatographed on polyamide SC6, eluted with toluene-methanol with increasing polarity, leading to six pure flavonoids which were identified by the usual physico-chemical techniques. *Evax pygmaea* extracts were found to exhibit a good antioxidant activity. The plant didn't show any toxicity.

Keywords: *Evax pygmaea,* Asteraceae, antioxidant, cytotoxic.

References

Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS, Paris. France.*

Study of the antibacterial activity of the methanolic extract of *Crataegus monogyna* fruit against antibiotic-resistant bacteria

LAGGOUNE souheila[1], ALIOUA Roqyia[1] and BOUAMOUCHA Imane[1]

[1]*Université Mouhamed Seddik Ben Yahia-Jijel, Faculté des Sciences de la Nature et de la Vie, Département de Microbiologie Appliquée et Sciences Alimentaires.*
E-mail: souheilalaggoune@yahoo.fr

The aim of this study is to evaluate the antibacterial activity of the methanolic extract of *Crataegus monogyna* fruit, by measuring the inhibition diameter using disk diffusion on solid medium technique (Bonnet *et al*., 2013) and determination of the minimum inhibitory concentration (Carbonelle *et al*., 1987). For that, the test was performed on three bacterial references strains, and seven antibiotic resistant bacteria Gram negative and Gram positive. The evaluation of the antibacterial activity showed a low antibacterial effect in both Gram (+) and Gram (–). The highest activity was recorded with *Klebsiella pneumoniae*, the inhibition diameter's zone is around 13±1.41mm and MIC with 12.5µg/mL, whereas the other strains are showing a weak sensitivity with the tested extract.

Keywords: *Crataegus monogyna*, resistant bacteria, antibiotic, minimum inhibitory concentration.

References

Bonnet R., Caron F., Cavallo J., Chardon H., Chidiac C., Courvalin P. et Lambert T. (**2013**). Comité de l'antibiogramme de la société française de microbiologie. *In Recommandations.*
Carbonelle B., Denis F., Marmonier A., Pinon G. et Varguas R. (**1987**). Bactériologies médicales : techniques usuelles. *Edition SIMEP (2ème tirage), France.*

Polyphenols content, antioxidant and antibacterial activities of Algerian *Crepis*

LAKHAL Hichem[1,2], KABOUCHE Ahmed[1,3] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria.*
[2] *Université Mohamed Boudiaf, Faculté de Technologie, 28000 M'sila, Algeria*
[3] *Université des Frères Mentouri-Constantine, INATAA, 25000 Constantine, Algeria*
E-mail: lakhalhichem@gmail.com

Crepis (Asteraceae) is a large genus with about 200 species with a wide distribution including Europe, temperate Asia, large parts of Africa, and North and South America. We report here, the polyphenol content, the antioxidant and antibacterial activities of the Algerian species *Crepis* collected from Guelma (Algeria).The *n*-butanol extract exhibited a high DPPH scavenging activity while the $CHCl_3$ extract inhibited particularly the growth of *Escherichia coli SH, Enterobacter cloacae*, and *Pseudomanas aeruginosa* strains with 21 mm, 21 mm and 19 mm inhibition zone diameters, respectively (MIC: 30 µg/mL).

Keywords: Crepis, Asteraceae, antioxidant, antibacterial.

Two glycosylated flavonoids from *Limonium thouinii* (Viv.) Kuntze (Plumbaginaceae)

LEFAHAL Mostefa[1], MAKHLOUFI El-Hani[1], ZAABAT Nabila[1], [1]AKKAL Salah[1], MEDJROUBI Kamal[1] and LAOUER Houcine[2].

[1]*Unité de Recherche et Valorisation des Ressources Naturelles, Molécules Bioactives et Analyse Physico-Chimiques et Biologiques, Département de Chimie, Université des Frères Mentouri-Constantine 1, Algérie.*
[2]*Laboratoire de Valorisation des Ressources Naturelles Biologiques, Département de Biologie, Université Ferhat Abbas de Sétif, Algérie.*
E-mail: mlefahal@gmail.com

The genus *Limonium* belonging to the Plumbaginaceae family is represented by 350 species that are growing throughout the world (Liedo *et al.*, 2003). The Algerian flora contains 20 species of *Limonium* among them, 8 are endemic (Quezel and Santa, 1963). Several members of this genus were well known in folk medicine for their cure proprieties (Medini *et al.*, 2011). This study was aimed to investigate the flavonoid compounds of aerial parts of the species *Limonium thouinii* (viv.) Kuntze (Plumbaginaceae). The aerial parts of the studied species allow the isolation of two glycosylated flavonoids: Isoorientin and Cannabiscitrin. The structures of isolated flavonoids were elucidated on the basis of spectroscopic analysis, including UV, MS and NMR techniques and the comparison with literature.

Keywords: *Limonium thouinii*, Plumbaginaceae, glycosylated flavonoids.

References

Liedo M. D., Erben M. and Crespo M. B. (**2003**). *Taxon, 52:* 67-73.
Medini F., Ksouri R., Falleh H., Megdiche W., Trabelsi N. and Abdelly C. (**2011**). *Journal of Medicinal Plants Research*, *5(31) :* 6719-6730.
Quezel P. et Santa S. (**1963**). Nouvelle Flore de l'Algérie et des régions désertiques méridionales. *Vol. 1-2. Ed. CNRS, Paris. France.*

Five previously undescribed triterpensponins with fifteen other known compounds from *Calendula stellata* and their antimicrobial and cytotoxic activities

LEHBILI Meryem[1], ALABDUL MAGID Abdulmagid[2], KABOUCHE Ahmed[1], VOUTQUENNE-NAZABADIOKO Laurence[2], Amin ABDENI[2], MORGANI Hamid[3] and KABOUCHE Zahia[1]

[1]*Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Université des Frères Mentouri-Constantine, 25000 Constantine, Algérie.*
[2]*Laboratoire de Pharmacognosie, ICMR-UMR, SFR Capsanté, Université de Reims Campagne-Ardenne, 51687 Reims Cedex 2, France*
[3]*MEDyC UMR CNRS 7369, URCA, Faculté de Pharmacie, SFR CAP Santé, 1, rue du Maréchal-Juin, 51096 Reims, France*
E-mail: meriemlehbili@yahoo.fr

The genus *Calendula* (Asteraceae) includes approximately 25 annual or perennial herbaceous species, scattered over the Mediterranean Region. About 12-20 species of this genus have been reported in various floras. Up to now, extracts of C. *officinalis*, as well as pure compounds isolated from it, demonstrate pharmacological activities such as antioxidant, antibacterial, antiparasitic, anti-inflammatory, anti-tumoral and cytotoxic activities, that make include this plant in a number of herbal formulations for clinical or cosmetic uses and in medicament for the treatment of several ailment. In taking into account of this information on *Calendula*, we aimed to examine in this study, for the first time, the chemical composition of the ethanolic extract of an Algerian *Calendula* species. An aqueous ethanolic extract of the whole plant was subjected to multiple chromatographic steps over silica gel, using Diaion HP-20 chromatography followed by flash chromatography (FC) on silica gel or vacuum liquid chromatography (VLC) on reversed-phase RP-18 and HPLC semi-preparative purification. Purity and identification of compounds were assessed by TLC, HPLC, NMR and HRESIMS. 20 compounds including 5 new saponins were isolated. The antimicrobial and cytotoxic activities of the extract and isolated compounds were measured.

Keywords: *Calendula stellata*, saponins, flash chromatography, HPLC, NMR.

Chemical composition, antimicrobial activity of essential oil from Algerian *Bellis sylvestris*

MAARFIA Sara[1], ZELLAGUI Amar[1] and DEROUICHE Kamel[1]

[1]*Laboratoire de Biomolécules Végétales et Amélioration des Plantes, Département des Sciences de la Nature et de la Vie, Faculté des Sciences Exactes et Sciences de la Nature et de la Vie, Université Larbi Ben Mhidi-Oum El Bouaghi, Algérie*
E-mail: sabiomag@hotmail.com

The chemical composition of the essential oils hydrodistillated from leaves and stems of *Bellis sylvestris*, collected from Algeria, was analysed by (GCMS). In total, 60 chemical compounds were identified in the essential oils. Essential oil represents 80% and 84.5 % of the total oil composition in leaves and stems respectively. The results showed that the essential oil from leaves consists mainly of spathulenol (14.1%), α-curcumene (10.9%), α-bisabolol (7.4%), cis-Verbenol (5.8%), 6-Isopropenyl-4, 8a-dimethyl-1,2,3,5,6,7,8,8a-octahydro-naphthalen-2-ol (2.9%), and α-Himachalene (2.7%). Whereas the major components from stems are: Azuleno (2,1-b)thiophen-3(2H)-one (27,21), Phenoxathiin (16.3%), 2-Naphthalene acetaldehyde, 1,4-dihydro-à,à-dimethyl-1,4-dioxo- (4.6%), Tetracosane (4.4%), Oxirane, heptadecyl- (4.1%). The antimicrobial activity of *Bellis sylvestris* essential oils has been explored by using the agar-disk diffusion method against ten microorganisms, seven bacteria strains and three fungus. Results revealed that the most potent effect of the essential oils from leaves was against *Pseudomonas aeruginosa*, while stems essential oil showed highest activity against *Pseudomonas aeruginosa* and *Escherichia coli*. On the other hand, no antifungal activity has been shown due to the use of these essential oils except against *Saccharomyces cerevisiae*.

Keywords: *Bellis sylvestris*, Asteraceae, essential oil, hydro-distillation, leaves, stems, antimicrobial activity.

Chemical composition and anti-AGEs activities of the extract of Algerian *Daucus aureus* desf. (Apiaceae)

MAKHLOUFI El hani[1], LEFAHAL Mustapha[1], AKKAL Salah[1], MEDJROUBI Kamal[1], DERBRÉ Séverine[2] and LAOUER Houcine[3]

[1]*Unité de Recherche Valorisation des Ressources Naturelles, Molécules Bioactives et Analyse Physico-Chimiques et Biologiques, Département de Chimie, Université des Frères Mentouri-Constantine 1, Algérie.*
[2]*Université d'Angers, SFR QUASAV 4207, EA 921 SONAS, UFR SPIS, Angers, France.*
[3]*Laboratoire de Valorisation des Ressources Naturelles Biologiques, Département de Biologie, Université Ferhat Abbas de Sétif, Algérie.*
E-mail: makhloufi_el_hani@yahoo.fr

Daucus is a genus belonging to the Apiaceae family and consists of about 200 species that are widely distributed around the world (Sáenz-Lain, 1981). In Algeria, the *Daucus* genus is represented by 11 species growing in dry and uncultivated areas (Quezel and Santa, 1963). This work was interested in the phytochemical analysis of the aerial parts and inhibitors of glycation and AGE-breakers activities *in vitro* of *Daucus aureus* species (Apiaceae). Diverse separation and purification methods of the methanolic extract of the *D. aureus* have led to the isolation of flavonoid *O*-glucosides. The structures of compounds were elucidated by spectroscopic methods, including (1D and 2D NMR, UV, MS). The AGE-breaking activities of butanolic and ethyl-acetate extracts from the aerial parts of *D. aureus* showed AGE-breaking activities *in vitro*.

Keywords: *Daucus aureus*, Apiaceae, AGE, flavonoid.

References

Quezel P. et Santa S. (**1963**). Nouvelle flore de l'Algérie et des régions désertiques et méridionales. *Tome 2. Édition Centre National de la Recherche Scientifique, Paris. France.*
Sáenz-Lain C. (**1981**). Research on *Daucus L.* (Umbelliferae). *Anales Jard Bot Madrid, 37 :* 480-533.

Effect of extract *Citrullus lanatus* (Cucurbitaceae) seed on lipid profile of *Mus musculus* mice

MESSAOUDI Sabar[1], TEBIBEL Soraya[1], BELADJILA Aya Khadidja[2], BOUDJADJA Amira[1], MECHATI Chahinez[1], KHELIFI TOUHAMI Fatima[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratoire de Palynologie Ethnobotanique et de Toxicologie Ethno Pharmacologique, 25000 Constantine, Algérie*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
E-mail: saberchaoui@gmail.com

Citrullus lanatus (Cucurbitaceae) commonly known as watermelon belongs to family Cucurbitaceae. Gill *et al.* (2010) evaluated the antioxidant, anti-inflammatory and analgesic potential of the *Citrullus lanatus* seeds. Tirupur (2011) reported that the watermelon seeds are good source of linoleic acid (18:2 ω-6) as a major fatty acid. Sevcan *et al.* (2011) evaluated that the watermelon juice protects the liver, kidney and brain tissues from experimental CCL4 toxicity in rats and the protective effect of watermelon juice may be due to its antioxidant activity and inhibition of lipid peroxide formation. The seed is demulcent, diuretic, pectoral, vermifuge, hypotensive and tonic. The aim of this study was to investigate analgesic potential of *Citrullus lanatus* seeds oil. The objective of our work was to assess the effect of cholesterol and the extract of *Citrullus lanatus* seeds on the weight of the mouse and the consumption of the food and also on a few biochemical parameters (total cholesterol, triglycerides, HDL-C, LDL-C, AST and ALT) and markers of inflammation such as the CRP. For this purpose, the mice *Mus musculus*, receive a standard diet or an enriche diet or not in extract of *Citrullus lanatus* during 21 days. Our results show that the diet enriched induces hyperplasia and obesity in mice under hypercholesterolemiant diet compared to control mice. The increase in fat mass is accompanied by notable changes with an increase very highly significant of the plasma levels of ALT, HDL-C and CRP with (p=000). The beneficial effect of *Citrullus lanatus* seed oil is marked by a decrease in the production of triglycerides. In conclusion, the oil of *Citrullus lanatus* has beneficial effects on intracellular redox status and presents a nutritional interest.

Keywords: *Citrullus lanatus*, atherosclerosis, hyperlipidic regime, biochemical parameters, CRP.

References

Sevcan A., Göksel K., Murat K., Aydın K. and Parvez I. H. (**2011**). Protective effect of Diyarbakir watermelon juice on carbon tetrachloride-induced toxicity in rats. *Food and Chemical Toxicology, 49 (9):* 2433-2438.
Gill N. R., Bansal M., Garg S. and Sood A. (**2010**). Evaluation of antioxidant, anti-inflammatory and analgesic potential of *Citrullus lanatus* seed extract in rodent model. *Internet J. Nutr. Wellness, 9 (2).*
Tirupur V. L. (**2011**). Watermelon (*Citrullus lanatus* Thunb.). Matsumura and Nakai Seed Oils and Their Use in Health. *Nuts and Seeds in Health and Disease Prevention:* 1149-1157.

Study of antihyperlipidemic and anti-inflammatory activities of the extract *Crataegus monogyna* (Rosaceae) in obese mice

MESSAOUDI Sabar[1], TEBIBEL Soraya[1], BECHKRI Sara[2], MECHATI Chahinez[1], KHELIFI TOUHAMI Fatima[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratoire de Palynologie Ethnobotanique et de Toxicologie Ethno Pharmacologique, 25000 Constantine, Algérie*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
E-mail: saberchaoui@gmail.com

Historically, medicinal preparations are derived from plants, whether in the simple form of plant parts, or as crude extracts or mixtures, among others (Haneefa et al., 2010). This might be due to the fact that plants are a particularly good source of compounds with antioxidant properties. *Crataegus monogyna*, commonly known as « hawthorn », is indeed one of the species that is highly recommended in folk medicine, being regarded as particularly important in the management and prevention of age-related diseases (cardiovascular disease, atherosclerosis, arthritis, and hypertension) (Carvalho, 2010). The objective of our work is to evaluate the effects of enrichment of the standard diet and the diet by the ethanolic extract of *Crataegus monogyna* on a few biochemical parameters (total cholesterol, triglycerides, HDL-C, LDL-C, AST and ALT) and markers of inflammation; the CRP. In case of excess, hypercholesterolemia, considered as an independent risk factor for atherosclerosis, can cause a lot of molecular alterations and cellular. Mice *Mus musculus*, had received the standard regime or the regime enriched or not by the extract of *Crataegus monogyna* during 18 days. Our results show that the hypercholesterolemiant diet induces hyperplasia and obesity in mice under hypercholesterolemiant diet compared to control mice. After oral administration of the high dose of cholesterol, the degradation of this last product an excess of cholesterol in the blood plasma, which is in turn cause an increase very highly significant of the AST, ALT and the CRP but not significant for the TG, HDL and LDL. However, mice treated by cholesterol with extract of *Crataegus monogyna* have shown a significant decrease of the AST, ALT, cholesterol, TG, LDL and the CRP but not significant for the HDL. The results obtained in this study show that the extract of *Crataegus monogyna* can be considered as a natural source to prevent and treat cardiovascular diseases.

Key words: *Crataegus monogyna*, hypercholesterolemia, inflammation, CRP.

References

Haneefa M. K. P., Hanan S. K., Saraswathi R., Prasad G. M. and Chandini N. (**2010**). Formulation and evaluation of herbal gel of Pothos scandens Linn. *Asian Pac. J. Trop. Med., 3 :* 988-992.
Carvalho A. M. (**2010**). Plantas y sabiduría popular del Parque Natural de Montesinho. Un estudio etnobotánico en Portugal. *Biblioteca de Ciencias 35. Consejo Superior de Investigaciones Científicas (CSIC), Madrid.*

Antihyperlipidemic and anti-inflammatory activities of the extract *Crataegus azarolus* (Rosaceae)

MESSAOUDI Sabar [1], TEBIBEL Soraya[1], BECHKRI Sara[2], KOUTCHOUK ALI Soumeya[1], MECHATI Chahinez[1], KHELIFI TOUHAMI Fatima[1] and KABOUCHE Zahia[2]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, Laboratoire de Palynologie Ethnobotanique et de Toxicologie Ethno Pharmacologique, 25000 Constantine, Algérie*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
E-mail: saberchaoui@gmail.com

Azarole species (*Crataegus* spp.) have recently attracted increasing attention in the field of food, nutraceuticals, and medicine because of their widely reported health benefits, for example, the risk reduction of cardiovascular diseases (Chang *et al.*, 2005). These species are widespread in the moderate zones of the northern hemisphere, including the Mediterranean region (Bignami *et al.*, 2000). Different classes of active phenolics compounds were identified in azarole species and were involved in therapeutically virtues. *In vivo* experiments showed that *Crataegus* fruit extract inhibited the oxidation of human low-density lipoprotein (LDL) (Zhang *et al.*, 2001). The objective of our work is to assess the effect of cholesterol and ethanolic extract of *Crataegus azarolus* on the weight of the mouse and the consumption of the food and on a few biochemical parameters (total cholesterol, triglycerides, HDL-C, LDL-C, AST and ALT) and markers of inflammation such as the CRP. For this purpose, the mouse *Mus musculus*, receive a standard diet or an enriched diet or not in the extract of *Crataegus azarolus* during 18 days. Our results show that the hypercholesterolemiant diet induces hyperphagia and obesity in mice under hypercholesterolemiant diet compared to the witnesses. The increase in fat mass is accompanied by notable changes with an increase very highly significant of the plasma levels of AST, ALT, and CRP with (p=000), the increase of TG is highly significant but it is not significant for the HDL. The beneficial effect of *Crataegus azarolus* is marked by a decrease in the production of total cholesterol, TG, LDL, AST, ALT and CRP. In conclusion, the extract of *Crataegus azarolus* has beneficial effects on intracellular redox status and presents a nutritional interest.

Keywords: *Crataegus azarolus*, atherosclerosis, biochemical parameters, CRP.

References

Bignami C., Poalocci A., Scossa A. and Bertazza G. (**2000**). Preliminary evaluation of nutritional and medicinal components of Crataegus azarolus fruits. *J. Food Eng., 5:* 241-247.
Chang W., Dao J. and Shao Z. (**2005**). Hawthorn: potential roles in cardiovascular disease. *Am. J. Chin. Med., 33:* 1-10.
Zhang Z., Min Zhu Q., Huang Y., Hoz W. K. K. and Chen Z. Y. (**2001**). Characterization of antioxidants presents in hawthorn fruits. *J. Nutr. Biochem., 12:* 144-152.

Antioxidant activities of ethyl acetate extract of *Asteriscus maritimus*

DAROUI-MOKADDEM Habiba[1,2], ELKHALIFA CHEMSA Ahmed[3], BOUTEGHEN Naima[2], ZEGHIB Assia[2,4], ÖZTÜRK Mehmet[5], EROL Ebru[5], EMIN DURU Mehmet[5] and KABOUCHE Zahia[2]

[1]*Department of Medicine, Faculty of Medicine, Badji-Mokhtar University, Annaba, Algeria*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie.*
[3]*Department of Biology, Faculty of Life and Natural Sciences, El Oued University, Algeria*
[4]*Université Larbi Tébessi-Tébessa, Département de Biologie Appliquée, Faculté des Sciences Exactes, Tébessa, Algérie*
[5]*Department of Chemistry, Faculty of Sciences, Mugla Sitki Kocman University, Mugla, Turkey*
E-mail: habiba.mokaddem@yahoo.com

The aim of this study is to determine the antioxidant potential of *Asteriscus maritimus* (*Asteraceae*) L., collected from Annaba (Northern Algerian). The ethyl acetate (EA) extract obtained from the aerial parts of *Asteriscus maritimus*, was studied for the antioxidant activity. This activity was performed using four complementary assays; namely, β-carotene-linoleic acid assay, cupric reducing power (CUPRAC), DPPH scavenging and ABTS radical scavenging assays. EA extract exhibited the strongest antioxidant activity in ABTS assay (IC_{50}: 0.81 ± 0.07 µg/mL), DPPH (IC_{50}: 4.10 ± 0.01 µg/mL), CUPRAC (IC_{50}: 5.78 ± 0.11 µg/mL), β-carotene-linoleic assay (IC_{50}: 23.37 ± 2.04 µg/mL). *Asteriscus maritimus* may be suggested as a new potential source of natural antioxidant via its EA extract. Further investigations are necessary in order to refine its antioxidant potential and to determine its phytochemical composition.

Keywords: *Asteriscus maritimus*, EA extract, antioxidant activity.

Polyphenols and phytochemical screening of *Linum* species.

MOUNA Ryma[1] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Chabat Ersas, 25000 Constantine, Algeria*
E-mail: mounaryma@gmail.com

The aim of this study is to put in evidence the presence or the absence of certain compounds belonging to chemical families of secondary metabolites (flavonoids, tannins, triterpenes and alkaloids) in the methanolic extract of *Linum* and to determine its total polyphenol content. In order to evaluate the phytochemical composition of this plant, we conducted specific tests on color reactions, turbidity or precipitation, by using the methods described in the literature. The dosage of total polyphenols was done by spectrophotometry according the Folin-Ciocalteu method. Through this study, we highlighted the existence of flavonoids, tannins, and triterpenes with the exception of alkaloids that are absent. The dosage of total polyphenols revealed a less important content.

Keywords: *Linum,* alkaloids, polyphenols, flavonoids, tannins, triterpenes.

Compositions of essential oils from aerial parts of Aleppo pine (*Pinus halepensis* Mill.)

REKKAB Seif eddine[1], BACHARI Khaldoune[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Centre de Recherche Scientifique et Technique en Analyses Physico-Chimiques (C.R.A.P.C), Tipaza, Algeria*
E-mail: rekkabs42@gmail.com

The essential oils obtained by hydrodistillation of fresh cones of *Pinus halepensis* Mill. (Pinaceae), collected from various Algerian regions, were analyzed by GC and GC/MS. α-Pinene, β-myrcene and (E)-Caryophyllene were the major components of the studied essential oils.

Keywords: *Pinus halepensis* Mill., Pinaceae, Pinene, β-myrcene, (E)-Caryophyllene.

Evaluation of the antioxidant activity of *Phoenix dactylifera* fruit

SAKHRI Fatma Zahra[1], ZERIZER Sakina[1] and Kabouche Zahia[1]

[1]*Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), Université des Frères Mentouri-Constantine, 25000 Constantine, Algeria*
E-mail: fatisakhri@yahoo.fr

Phoenix dactylifera L., Date Palm, is a monocot plant of the Arecaceae family, with male-female and flowers occurring on separate plants. It's grown under arid conditions primarily in the Middle East, North Africa, and the United States. Date fruits are reported to possess wide range of attractive properties, such as anti-fungal, antioxidant, antimutagenic, anti-inflammatory, anticoccidial, and anti-apoptotic activities due to the presence of bioactive molecules. Our study aimed to investigate and compare firstly phenolic compounds (total phenolics, flavonoids and tannins) and to evaluate secondly *in vitro* antioxidant activity of different extract obtained by maceration of fruit (Mech degla variety) using several solvents with increasing polarity.After that, some correlation tests between the two studied parameters: the content of phenolics and the antioxidant activity of extracts were evaluated.

Keywords: *Phoenix dactylifera* L., phenolic, flavonoids, tannins, antioxydant activity.

Total phenolic content and antioxidant activities of *Mentha rotundifolia* extract from Algeria

SEMRA Ilhem[1], TEL G.[2], ÖZTÜRK M.[2] and KABOUCHE Zahia[1]

[1]*Universite des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
[2]*Faculty of Sciences, Department of Chemistry, Mugla Sıtkı Kocman University, 48121 Muga, Turkey*
E-mail: isem11@yahoo.fr

Mentha has been applied in the traditional medicine as stimulant, carminative, antispasmodic and antitussive (Moreno *et al.*, 2002). Phenolic, flavonoid and terpenoid compounds have been identified from different extracts of *Mentha* (Zaidi *et al.*, 1998; Ferhat *et al.*, 2017). The objective of this study is to evaluate the total phenolic content and the antioxidant activities of the *n*-butanol extract of *Mentha rotundifolia*. The results indicated that the *n*-Butanolic extract (BEMR) of *Mentha rotundifolia* shows a considerable content (356.75±2.58 mgEAG/g) of polyphenols. In DPPH Free Radical Scavenging Assay, BEMR exhibited strong activity with IC_{50} (9.33±1.42 µg/mL) slightly lower than that of α-Tocopherol. BEMR showed also good activity with the $ABTS^{+\cdot}$ test (IC_{50} : 9.12±0.74 µg/mL) and a high lipid peroxidation inhibitory with β-Carotene/linoleic acid assay (IC_{50} : 1.75±0.37 µg/mL). In fact, the results showed that the *n*-butanol extract, which has a high content of phenolic compounds, had also a high antioxidant activity.

Keywords: *Mentha rotundifolia,* antioxidant activity, polyphenols.

References

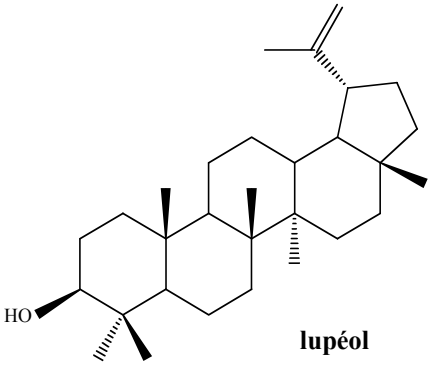
Ferhat M., Kabouche Z., Fujimoto Y. and Araya H. (**2017**). *Natural Product Communications, 12(0):* 1-4.
Moreno L., Bello R., Primo-Yúfera E. and Esplugues J. (**2002**). *Phytother. Res., 16:* 10-13.
Zaidi F., Voirin B., Jay M. and Viricel M. R. (**1998**). *Phytochemistry, 48(6):* 991-994.

Métabolites secondaires isolés de la plante *Atractylis humilis*

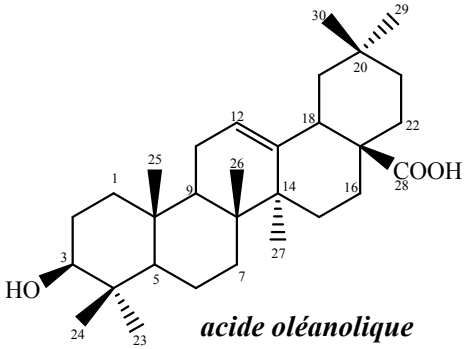
SIFOUANE Siham[1], LAVAUD Catherine [2], BENKHALED Mohammed[1] and HABA Hamada[1]

[1]*Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences, Université de Batna, 05000 Batna, Algérie*
[2]*Institut de Chimie Moléculaire de Reims, CNRS UMR 7312, BP 1039, 51097 Reims Cedex 2, France*
E-mail: Maj_siham@yahoo.fr

Les plantes médicinales disposent de propriétés thérapeutiques et pharmacologiques dues à la présence de diverses substances chimiques à activités biologiques prometteuses. Plusieurs techniques d'extraction modernes interviennent pour les isoler à l'état pur et les évaluer biologiquement (activités antibactérienne, anti-oxydante, anti-inflammatoire,….etc). Le genre *Atractylis* est un membre de la famille Asteraceae. Ce genre montre une richesse par de nombreux métabolites secondaires qui sont actifs biologiquement tels que les flavonoïdes, triterpènes, coumarines, acétylènes et phénols glycosylés (Melek *et al.*, 1992 ; Sadek *et al.*, 1998). Dans le cadre de la continuité des investigations phytochimiques sur le genre *Atractylis*, nous avons entrepris une étude phytochimique sur l'espèce *Atractylis humilis*. Cette espèce fait partie des 30 espèces que regroupe le genre *Atractylis* et dont 16 plantes poussent en Afrique du nord**.** L'étude phytochimique réalisée sur l'extrait d'acétate d'éthyle de la plante entière *A. humilis* a permis l'isolement et l'élucidation structurale de deux composés : acide oléanolique 1 et lupéol 2. Leurs structures ont été déterminées en se basant sur les analyses spectroscopiques telles que RMN 1D (^{1}H, ^{13}C) et 2D (COSY, HSQC et HMBC), spectroscopie de masse ESI-MS et par comparaison avec les données de la littérature.



lupéol



acide oléanolique

Mots clés : Asteraceae, *Atractylis*, triterpenes, RMN, ESI-MS.

Références

Melek F. R., Aboutabl E. A., El-Shabrawy O., Radwan A. S., Hilal S. H. and Hammam A. (**1992**). *Atractylis carduus angustifolia* flavonoids and anti-inflammatory activity. *Egypt. J. Pharm. Sci. 33:* 11-19.
Sadek E. G., Metwally M. A. and Mpango G. B. (**1998**). *Triterpenes from Atractylis carduus* L. *Boll. Chim. Farm. 137 :* 249-250.

Evaluation of immunomodulatory activity of dichloromethane extract of *Stachys circinata*

SLIMANI Wassila[1,2], KEHILI Houssem Eddine[2], KABOUCHE Zahia[2] and ZERIZER Sakina[1]

[1]*Université des Frères Mentouri-Constantine, Département de Biologie Animale, 25000 Constantine, Algeria*
[2]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algeria*
E-mail: wasbio@hotmail.fr

Immunomodulation is the regulation and modulation of immunity either enhancing or reducing the immune response.The use of medicinal plant products as immunomodulators as possible therapeutic measure is becoming a new subject of scientific investigations. The aim of this study was to evaluate the toxicity and the immunomodulatory activity of *Stachys circinata* dichloromethane extract (SCDC). For acute toxicity study, up and down method was adapted. A single dose of 2000 mg/kg of *S.circinata* extract was given orally to 5 healthy male Albinos *Mus musculus* mice. The animals were observed for mortality and clinical signs for 14 days. The immunomodulatory effect of the dichloromethane extract of *S. circinata* on the phagocytic activity was measured by the carbon clearance rate test. The results showed that SCDC extract caused neither visible signs of toxicity nor mortality. The results obtained showed that at different doses (50 mg/kg, 150 mg/kg and 200 mg/kg), SCDC increased the phagocytic activity when compared with the control. The clearance rate of carbon was significantly faster at the concentration of 150 mg/kg when it is compared to the two concentrations 50 mg/kg and 200 mg/kg ($P<0.05$). The present study concluded that the SCDC has no toxic effect; it holds an immuno-stimulatory effect on the reticulo-endothelial system.

Keywords: toxicity, immunomodulatory, phagocytic activity, *Stachys circinata*.

Phytochemical Study, antioxidant, and anti-tyrosinase activities of *Cotula anthemoides* L.

TADRENT Wafa[1], ALABDUL MAGID Abdulmagid[2], KABOUCHE Ahmed[1], HARAKAT Dominique[2], VOUTQUENNE-NAZABADIOKO Laurence[2] and KABOUCHE Zahia[1]

[1]*Université des Frères Mentouri-Constantine, Département de Chimie, Laboratoire d'Obtention de Substances Thérapeutiques (L.O.S.T), 25000 Constantine, Algérie*
[2]*Groupe Isolement et Structure, Institut de Chimie Moléculaire de Reims (ICMR), CNRS UMR 7312, UFR de Pharmacie, BP 1039, 51687 Reims, France*
E-mail: wafatadrent@yahoo.fr

Cotula anthemoides L. (*Asteraceae*) commonly known as « *Babunaj* » in Algeria is used for colic andas, a remedy for head and chest colds (Abhay and Tripathi, 2011). A new sulfonyl flavonol glucoside; 5,7,4′,5′-tetrahydoxyflavonol2′-[propanoic acid-(2‴-acetoxy-1‴-sulfonyl)]-5′-O-*β*-D-glucopyranoside (Abhay and Tripathi 2011) was isolated from the aerial parts of this species, in addition to 15 known compounds (2-16). The structure elucidation of these compounds was based on analyses of spectroscopic data including 1D-, 2D-NMR and HR-ESI-MS techniques and by comparing their NMR data with those reported in the literature. These compounds were evaluated for their DPPH radical scavenging and tyrosinase inhibitory activity. Compound 6 showed a high DPPH radical scavenging with EC50 value of 9.1±0.4 µM. Compound 11, 9 and 1 exhibited a mild tyrosinase inhibitory activity with IC_{50} values of 85±0.8, 95±1.5 and 100±0.5 µM, respectively.

Keywords: *Cotula anthemoides*, *Asteraceae*, antioxidant activity, tyrosinase inhibitory activity.

References

Abhay K.P. and Tripathi N. N. (**2011**). *Int J Pharm Sci Rev Res., 7:* 142-147.

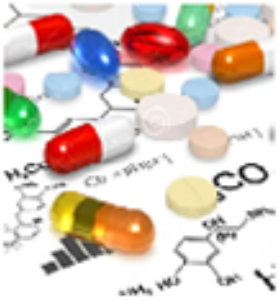
Etudes phytochimique et biologique de *Phlomis bovei* De Noé (Lamiaceae)

ZAABAT N.[1,2], Hay A-E[2], MICHALET S.[2], AKKAL S.[1] and DIJOUX-FRANCA M-G.[2]

[1]*Université des Frères Mentouri-Constantine, Laboratoire de Phytochimie et Analyses Physicochimiques et Biologiques, Département de Chimie, Faculté de Sciences Exactes, Route d'Ain El-Bey 25000 Constantine, Algérie.*
[2]*Université Claude Bernard-Lyon1, UMR CNRS 5557, CESN, Faculté de Pharmacie, 8 av. Rockefeller, 69373-Lyon cedex 08. France*
E-mail: z_nabila2002@yahoo.fr

Etant connue pour ses propriétés médicinales, aromatiques ou culinaires, la famille des Lamiacées présente un intérêt économique majeur, notamment comme source d'huiles essentielles. L'objet de ce travail porte sur l'étude phytochimique et biologique des plantes médicinales de la flore algérienne, dont *Phlomis bovei* de Noé subsp. Bovei. Diverses méthodes de séparation et de purification de la phase méthanolique des parties aériennes de *P. bovei* de Noé nous ont permis d'isoler et d'identifier des flavonoïdes glycosylés . Les extraits et les composés isolés ont fait l'objet d'une étude biologique dans les domaines antioxydants, antiradicalaire, génotoxique et antigénotoxique.

Mots clés : *Phlomis bovei* de Noé, Lamiaceae, étude phytochimique, étude biologique.



UFMC

LOST

Les 3èmes Journées Scientifiques LOST 2018

Phytochimie

Activités Biologiques de Plantes Médicinales et Aromatiques