
VOUS SAVEZ, LES SCIENTIFIQUES SONT DES GENS COMME TOUT LE MONDE!
"ARRÊTONS D'AVOIR PEUR!"
HA HA HA!
GAB

Working method and terminology 2
1st year Licence SNV
University of Bejaia

Chapter II : Critical reading of a scientific article; Course 1

SAIT-DIB Sabrina MCA à Université de Bejaia

2025/2026

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Course description

1. Why must scientists publish?
2. Definition of a Scientific Journal
3. Definition of the scientific article
4. The different types of articles published
5. Structure of a scientific article
6. The keys to the scientific text

I. Why must scientists publish?

The current system for validating scientific work is based on publication.

Le système actuel de validation des travaux scientifiques est basé sur la publication.

Observation

scientific communication **Research**

are closely linked and complementary (étroitement liées)

But it is not enough for the scientist to communicate their research findings to other researchers in one form or another (for example, through an oral presentation at a seminar or conference)

I. Why must scientists publish?

What to do?

they must publish these results in primary journals (a scientific journal) because "without publication, science is dead."

That's why the researcher must not only "do science" but also "write their science";

il doit publier ces résultats dans des revues primaires (un journal scientifique) car « sans publication, la science est morte ».

C'est pourquoi le chercheur ne doit pas seulement "faire de la science" mais aussi "écrire sa science

SCI-HUB

the databases

http://sci-hub.bz

Sci-hub: 64,5 Millions d'articles scientifiques contournent les paywalls (« péages »)

Kazakhstan

Russie

Alexandra Elbakyan
Fondatrice de Sci-Hub
5 septembre 2011

6

Sci-Hub is a website that provides **free access to scientific research papers** that are usually behind paywalls.

- It as created in 2011 by **Alexandra Elbakyan**.
- The site bypasses paywalls from major academic publishers.
- It hosts **millions of research articles** from scientific journals.

Within the scientific community, information is primarily disseminated through scientific publications. These now hold a paramount position in research. They constitute the very goal of scientific research since a researcher is generally evaluated based on their publications.

Au sein de la communauté scientifique, la diffusion de l'information se fait essentiellement par le biais des publications scientifiques. Celles-ci occupent aujourd'hui une place prépondérante dans la recherche. Elles constituent le but même de la recherche scientifique puisqu'un chercheur est généralement évalué sur la base de ses publications.

N.B: in addition to scientific communication (oral and written), there has been the emergence of new forms of communication through electronic media (e-mail, blogs, electronic scientific journals).

II. Definition of a Scientific Journal

It is a serial publication, issued regularly, with a registered title and composed of a series of articles evaluated by a review committee based on scientific criteria..

Il s'agit d'une publication en série, parue régulièrement, avec un titre enregistré et composée d'une série d'articles évalués par un comité de révision sur la base de critères scientifiques.

III. Definition of the scientific article

It is a scientific document in the form of a written report that is published and describes the original results of research, or it is a contribution that has been evaluated and published in a standardized form in a scholarly journal.

C'est un document scientifique sous forme de rapport écrit qui est publié et qui décrit les résultats originaux d'une recherche, ou bien une contribution qui a été évaluée et publiée sous une forme standardisée dans une revue scientifique

To remember: A scientific article:

✓is evaluated and validated, before its publication, by a review committee or a group of experts, who either accept or reject it, and in case of acceptance, often suggest modifications before publication and dissemination.

✓it is published in a specialized periodical, in a conference report or proceedings, or in a collective work,

✓ it emanates from a specialist, an expert, recognized by their peers,

✓ it always builds (s'appuie) on other works and cites its sources (bibliography, footnotes, etc.).

The importance of a scientific article

The scientific article :

- Is a **communication tool**: transmits one or more pieces of information
- Contributes to **scientific knowledge**
- **Allows** for the **verification** of **result reproducibility**: The reproducibility of results is an essential criteria in science to ensure the objectivity of the conclusion and, consequently, to guarantee scientific honesty (l'honnêteté).
- **Others:** Visibility and reputation of a researcher, promotion...etc

IV. The different types of articles published

- Original research paper (Article de recherche)
- *Review paper (Article de revue ou article de synthèse, revue narrative, Revue bibliographique)*
- Research note (Note de recherche, lettre de recherche)
- Protocol article (Article de protocole)
- Theoretical article (Article théorique)
- Systematic Review (Revue systématique)
- Meta-analysis (Méta analyse)

IV. The different types of articles published

Before starting the writing process, it is necessary to choose the type of article. There are several distinct types:

❖ Original research paper (Article de recherche)

Presents the original results of one or more empirical studies (it is a primary document). It is produced from research data. It follows the IMRAD model (Introduction, Methods, Results, and Discussion).

A research article presents the original results (a priori or a posteriori) of a research project.

Heliyon 8 (2022) e09533

Research article= article original

le at ScienceDirect

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ww.cell.com/heliyon

Research article

A comparative evaluation of antibacterial activities of imidazolium-, pyridinium-, and phosphonium-based ionic liquids containing octyl side chains

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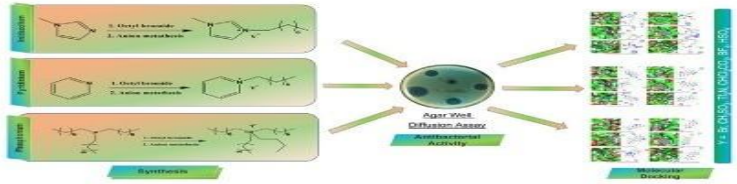
GRAPHICAL ABSTRACT



ARTICLE INFO

Keywords:
Imidazolium
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Phosphonium
Ionic liquids
Octyl
Antibacterial activity

ABSTRACT

Antibacterial activity is an essential property of ionic liquids. In this work, a comprehensive study has been performed on the antibacterial activity of ionic liquids to be utilized for further research and applications. Eighteen ionic liquids *viz.* Octyl Imidazolium, octyl Pyridinium, quaternary phosphonium-based cations containing bromide, sodium methane sulphonates, bis(trifluoromethane sulfonyl) imide, dichloroacetate, tetrafluoroborate, hydrogen sulfate were prepared and characterized with the help of different spectroscopic techniques. All these samples of ionic liquids were tested for their antibacterial activity against the most commonly occurring bacteria in the environment, i.e., *Enterobacter aerogenes (E. aerogenes), Proteus vulgaris (P. vulgaris), Klebsiella pneumoniae (K. pneumoniae), Pseudomonas aeruginosa (P. aeruginosa), Escherichia coli (E. coli), and Streptococcus pyogenes (S. pyogenes)*. Most of the ionic liquids show good antibacterial properties, and imidazolium-based ionic liquids were even more antibacterial as compared to positive control. It was observed that a unique combination of cation and anion is essential to achieve desired antibacterial properties. The mechanism of antibacterial activity was further investigated using density functional theory calculations. A good correlation was found between experimental and theoretical studies.

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Research article= article original

ORIGINAL RESEARCH PAPER

EFFECT OF DIFFERENT DRYING TEMPERATURES ON THE COMPOSITION AND ANTIOXIDANT ACTIVITY OF GINGER POWDER

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The influence of drying temperatures ranging from 40° to 100°C on the chemical composition, antioxidant properties and microstructure characteristics of the ginger powders was investigated. The ginger samples dried at 100°C showed a significantly higher amount of polyphenols (24.154 mg EAG/g) and flavonoids (10.564 mg EAG/g) contents. Moreover, the antioxidant activity increased from 73.47% at 40°C to 78.23% at 100°C. The reduction trend of 6-gingerol and *β*-carotene concentrations was obtained by rising the drying temperatures as indicated by high performance liquid chromatography (HPLC) analysis. In contrast, zingerone and 6-shogoal contents significantly increased at high drying temperatures. A pronounced gelatinization and a more compacted structure was observed in the ginger powders dried at high temperatures (80 and 100°C) as indicated by scanning electron microscopy analysis. These findings offer a better comprehension of the influence of the oven drying process on the functional properties and structure characteristics of the ginger powder, hence allowing the optimization and development of applications in the food and pharmaceutical industries.

Keywords: dried ginger, antioxidant activity, flavonoids, 6-gingerol, 6-shogoal, zingerone

Introduction

Belonging to the family Zingiberaceae, Ginger *(Zingiber officinale Roscoe)* is one of the most common plants globally used in food and beverages as a spice and flavouring agent. Ginger has been used for more than 2000 years in many cultures (Bartley and Jacobs, 2000). For instance, Asians, Egyptians, Greeks and Romans

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Research article=
article original

RESEARCH ARTICLE

Syrup from Comm *ctylifera* L.): Optimization of Sugars Extraction and their Quantification by High Performance Liquid Chromatography

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Abstract: ***Background***: In Algeria, important quantities of secondary date variety (*Phoenix dactylifera* L.) are generated in each campaign; their chemical composition is similar to that of commercial dates. The present work aims to valorize this common date variety (Degla-Beida) which is often poorly exploited.

Methods: In this context, we tried to prepare syrup from the secondary date variety and evaluate the effect of conventional extraction (CE) or water bath extraction (WBE) and alternative extraction (microwaves assisted extraction (MAE) and ultrasound-assisted extraction (UAE)) on its total sugar content (TSC), using response surface methodology (RSM). Then, the analysis of individual sugars was performed by high performance liquid chromatography (HPLC).

Results: Maximum predicted TSC recoveries under the optimized conditions for MAE, UAE and CE were 233.248 ± 3.594 g/l, 202.889 ± 5.797 g/l and 233.535 ± 5.412 g/l, respectively, which were close to the experimental values: 233.796 ± 1.898 g/l; 202.037 ± 3.401 g/l and 234.380 ± 2.425 g/l. HPLC analysis revealed high similarity in the sugar composition of date juices obtained by MAE (60.11% sucrose, 16.64% glucose and 23.25% fructose) and CE (50.78% sucrose, 20.67% glucose and 28.55% fructose), although a large difference was detected for that obtained by UAE (0.00% sucrose, 46.94% glucose and 53.06% fructose).

Conclusion: Microwave-assisted extraction was the best method for the preparation of date syrup with an optimal recovery of total sugar content. However, ultrasound-assisted extraction was the best one for the preparation of date syrup with high content of reducing sugars.

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Keywords: Dates, extraction methods, HPLC analysis, RSM, sugars, syrup.

❖ *Review paper* (Article de revue ou article de synthèse (*revue narrative, Revue bibliographique*)

Provides an **overview of a set of published studies** with the aim of suggesting new hypotheses or further studies (it is a secondary document), **or** it presents a state of the art on a given problem or subject. **The objective** of a review article is to summarize the current state of scientific knowledge in a specific field. It does not rely on experimentation. It is longer than a research article and does not follow the IMRAD model.

- Fait le point sur un ensemble d'études publiées dans le but de suggérer de nouvelles hypothèses ou poursuites d'études (c'est un document secondaire) ou bien il présente un état de l'art sur un problème ou un sujet donné.
- L'objectif d'un article de synthèse est de faire le point sur l'état des connaissances scientifiques dans un domaine bien précis.

Phytothérapie (2007) 5: 264–270

DOI 10.1007/s10298-007-0268-9

Review article

Article de synthèse

Pharmacognosie

Les polyphénols et les polyphénols de thé[1]

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Résumé : Dans cet article de synthèse, l'auteur résume les principales données que nous avons sur les polyphénols en général et sur les polyphénols du thé plus particulièrement.

Mots clés : Polyphénols naturels – Polyphénols du thé – Activités pharmacologiques – Intérêt diététique

Polyphenols and tea polyphenols

d'environ 8 000 composés, divisés en plusieurs catégories qui sont les acides phénoliques, les flavonoïdes, les tanins issus de la polymérisation des flavonoïdes, les lignanes qui, avec les isoflavones, sont nommées phyto-œstrogènes.

On recense 4 000 flavonoïdes dans le règne végétal. Les flavonoïdes sont eux-mêmes classés en fonction de leur degré d'oxydation en 6 grandes classes [20] (Tableau 1).

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Article Review

Review

Health impact assessment of active transportation: A systematic review

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❖Research note (Note de recherche , lettre de recherche)

Short report of **original research findings**. It is a specific case of a research article; **it is a brief communication that does not exceed 2 to 3 pages** (including illustrations and bibliography), which is a maximum of around **1000 words. The structure follows the IMRAD model** but with a maximum of **2 to 3 illustrations.**

The choice to write a Research Note can be justified by:

1. **a lack of results to write a full article**
2. **work for which the method is not new but which contributes something new regarding a variety or a region**

❖ Theoretical article (Article théorique)

Development of new theoretical explanations concerning a phenomenon or a set of phenomena

theoretical article is a type of scientific paper that **develops, analyzes, or proposes theories, concepts, or models without necessarily presenting new experimental data.**

This type of article is common in fields such as **Psychology**, **Sociology**, **Philosophy**, and **Education Research**.

Example

In **Psychology**, a theoretical article might propose **a new model explaining human motivation** based on previous theories without conducting an experiment

Main Differences

Aspect	Theoretical Article	Review (Synthesis) Article
Objective	Develop or propose a theory	Summarize existing research
Type of analysis	Conceptual and theoretical	Literature synthesis
Data	No new empirical data	Based on previously published studies
Result	New theoretical model or framework	Overview of the research field

❖ Systematic Review (Revue systématique)

Answers a question by analyzing and synthesizing multiple data sources that all address the same question.

A **Systematic Review** is a **structured and comprehensive method of reviewing scientific literature** on a specific research question.

Une **Revue systématique** est une **méthode rigoureuse de synthèse de la littérature scientifique** visant à répondre à une question de recherche précise.

Example

Researchers collect and review all studies about a treatment for **Diabetes**, then **describe and compare their results** without necessarily combining the data statistically.

Exemple :
Analyser toutes les études publiées sur un traitement pour le **Diabète** et décrire leurs résultats.

Meta-analysis (Méta-analyse)

1. **Statistical analysis, combines quantitative data. Example: Bioclimatology, Ecology, Health, and synthesizing multiple data sources that all address the same question.**

2. *A* **Meta-analysis** is a **statistical technique used to combine the numerical results of several studies**.

3. It is commonly used in fields like **Medicine, Psychology, Public Health, and Education Research.

4. It is usually conducted as part of a **Systematic Review**, which collects and evaluates all relevant studies before performing statistical synthesis.

Meta-analysis (Méta-analyse)

Purpose of a Meta-analysis

Researchers use meta-analysis to:

- Increase **statistical power** by combining data from many studies 📊
- Resolve **conflicting results** between studies **(résultats contradictoires)**
- Estimate the **overall effect size** of an intervention or relationship **(l'effet global d'un traitement ou d'une relation)**
- Identify **patterns, moderators, or sources of variation** across studies

Example:

Combining many studies to determine whether a specific drug improves survival in **Cancer** patients.

Regrouper plusieurs études pour déterminer si un médicament est efficace dans le traitement du **Cancer**.

Main Differences

Aspect	Systematic Review	Meta-analysis
Nature	Literature review method	Statistical analysis
Purpose	Collect and evaluate studies	Combine numerical results
Data	Qualitative summary	Quantitative synthesis
Requirement	Protocol-based search	Requires comparable numerical data
Relationship	Can exist alone	Usually part of a systematic review

Simple way to understand it:
- **Systematic review = collecting and evaluating all studies** 📚
- **Meta-analysis = statistically combining their results** 📊

En résumé :
- **Revue systématique** → collecte et analyse critique des études 📚
- **Méta-analyse** → combine statistiquement les résultats de ces études 📊

IV. The different types of articles published

The types of articles consulted by readers vary according to their level and profile.

If the reader wishes to	Consult
Discover a new field	Summary articles and/or original articles
Specialise in a particular area	Research articles and/or research notes
Advance in a field	systematic reviews metadata

Table 2: Types of articles published in a journal

Primary literature	Secondary literature
Original research articles	Narrative reviews
Surveys (Enquêtes)	Systematic reviews
Case report/case series	Meta-analysis
Conference proceedings and abstracts	Book reviews
Editorial	Guidelines
Correspondence/letters to the editor	Commentary

V. The role of a scientific publication

Common reasons for reading journal articles

1. To update oneself with progress in a particular speciality /field of study;

1. Se mettre à jour avec les progrès dans une spécialité/un domaine d'étude particulier

2. To find out a solution for a specific problem- could be diagnostic (tests/methods) or therapeutic (medical/surgical)

Trouver une solution à un problème spécifique - cela peut être diagnostique (tests/méthodes) ou thérapeutique (médical/chirurgical)

3. To know about causation, clinical features, and course of a disorder/disease

Connaître les causes, les caractéristiques cliniques et l'évolution d'un trouble/d'une maladie

V. The role of a scientific publication

Common reasons for reading journal articles

4. To understand certain fundamental aspects like pathophysiology

4. Comprendre certains aspects fondamentaux comme la physiopathologie

5. To get an idea for carrying out a research work

5. Avoir une idée pour mener un travail de recherche

6. The article has been assigned to be read (for e.g., by an instructor to a postgraduate student)

6. L'article a été assigné à être lu (par exemple, par un instructeur à un étudiant de troisième cycle)

7. To find support for one's views

7. Trouver un soutien à ses opinions

8. To impress others (Impressionner les autres)

VI. Structure of a scientific article

The structure of a scientific document plays an important role in **the validation of research** by other researchers, including :

- ✓ **members of the editorial board** of the journal in which the paper is published
- ✓ and **its readers**.

A good structure **facilitates the flow of ideas** and **makes it easier to understand** the message as a whole.

V. Structure of a scientific article

Hindawi Publishing Corporation
Canadian Respiratory Journal
Volume 2016, Article ID 8209485, 6 pages
http://dx.doi.org/10.1155/2016/8209485

Research Article

Short-Term Health Impact Assessment of Urban PM_{10} in Bejaia City (Algeria)

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Academic Editor: Alice M. Turner

We used Health Impact Assessment (HIA) to analyze the impact on a given population's health outcomes in terms of all-causes mortality and respiratory and cardiovascular hospitalizations attributable to short-term exposure to particulate matter less than 10 μm diameter (PM_{10}) in Bejaia city, for which health effects of air pollution have never been investigated. Two scenarios of PM_{10} reduction were considered: first, a scenario where the PM_{10} annual mean is decreased by 5 μg/m³, and then a scenario where this PM_{10} mean is decreased to 20 μg/m³ (World Health Organization annual air quality guideline (WHO-AQG)). Annual mean level of PM_{10} (81.7 μg/m³) was calculated from objective measurements assessed *in situ*. Each year, about 4 and 55 deaths could be postponed with the first and the second scenarios successfully. Furthermore, decreasing PM_{10} annual mean by 5 μg/m³ would avoid 5 and 3 respiratory and cardiac hospitalizations, respectively, and not exceeding the PM_{10} WHO-AQG (20 μg/m³) would result in a potential gain of 36 and 23 per 100000 respiratory and cardiac hospitalizations, respectively. Lowering in current levels of PM_{10} has a nonnegligible impact in terms of public health that it is expected to be higher in the case of long-term effects.

1. Introduction

Short-term variations in air pollution have been associated with mortality from various causes in cities all over the world [1–10]. These associations include all-cause mortality [11–15], respiratory mortality [16–20], and cardiac mortality [21–23]. Among air pollutants, suspended particulate matter (PM) is extensively recognized as the most important air pollutant in terms of human health effects considering that many epidemiological studies substantiate significant associations between concentration of PM in the 2 air and adverse health impacts [4, 5, 24–28].

Health impacts assessment of Air Pollution (HIA-AP) is a method encouraged by WHO [29], whose aim is to provide the number of health events that could be prevented by reducing air pollutant levels in the target population.

Studies on health impact of air pollution carried out in Algeria are few and limited to Algiers where air pollution is monitored through one air quality (AQ) station. In other regions, like Bejaia city (~200000 inhabitants) there are no AQ measuring stations. Yet, the constantly increasing number of vehicles, their age (average of 8.5 years), and the tendency to dieselization (52.9% in 2014) are reasons that make Bejaia vehicle fleet a major source of air pollution. In a precedent paper [30], we have presented a descriptive study of the impact of air pollution as assessed through vehicles counts on Bejaia population. We have shown that at the population level exposure to vehicle air pollution is a cause of increased prevalence of respiratory diseases. No objective assessment of air pollutants levels was available at that time.

In this paper, we present for the first time results for HAI-AP in Bejaia city. Our HAI provided estimates of the number

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Available online at www.CivileJournal.org

Civil Engineering Journal

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Bioindication of Urban Air Polycyclic Aromatic Hydrocarbons Using *Petunia Hybrida*

Fatima Benaissa[a, b*], Ibrahim Bendahmane[c], Nassima Bourfis[d], Oussama Aoulaiche[e], Rezak Alkama[e]

Abstract

1. Introduction

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Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

Review

A review of land-use regression models to assess spatial variation of outdoor air pollution

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Spatial variation
NO_2
Particulate matter
Air pollution

A B S T R A C T

Studies on the health effects of long-term average exposure to outdoor air pollution have played an important role in recent health impact assessments. Exposure assessment for epidemiological studies of long-term exposure to ambient air pollution remains a difficult challenge because of substantial small-scale spatial variation. Current approaches for assessing intra-urban air pollution contrasts include the use of exposure indicator variables, interpolation methods, dispersion models and land-use regression (LUR) models. LUR models have been increasingly used in the past few years. This paper provides a critical review of the different components of LUR models.

We identified 25 land-use regression studies. Land-use regression combines monitoring of air pollution at typically 20–100 locations, spread over the study area, and development of stochastic models using predictor variables usually obtained through geographic information systems (GIS). Monitoring is usually temporally limited: one to four surveys of typically one or two weeks duration. Significant predictor variables include various traffic representations, population density, land use, physical geography (e.g. altitude) and climate.

Land-use regression methods have generally been applied successfully to model annual mean concentrations of NO_2, NO_x, $PM_{2.5}$, the soot content of $PM_{2.5}$ and VOCs in different settings, including European and North-American cities. The performance of the method in urban areas is typically better or equivalent to geo-statistical methods, such as kriging, and dispersion models.

Further developments of the land-use regression method include more focus on developing models that can be transferred to other areas, inclusion of additional predictor variables such as wind direction or emission data and further exploration of focalsum methods. Models that include a spatial and a temporal component are of interest for (e.g. birth cohort) studies that need exposure variables on a finer temporal scale. There is a strong need for validation of LUR models with personal exposure monitoring.

1. Introduction

A large number of epidemiological studies have shown that current day outdoor air pollution is associated with significant adverse effects on public health (Brunekreef and

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VI. Structure of a scientific article

According to Aristote, every plan consists of two parts:

The first is to define the problem, the second aims to solve it. A universal plan could be schematically represented as follows:

Define the problem from the diversity of phenomena (synthetic approach)

Solve the already defined problem by analyzing it in several parts (analysis)

Conclusion: from the analyses, an attempt (tentative) is made to find a final solution (final synthesis).

structure IMRAD

Introduction, Materials and Methods, Results, and Discussion (IMRAD for English speakers) makes the structure of the article intelligible to researchers worldwide, regardless of their language. However, it can vary depending on the type of work (thesis, article) and the discipline.

Structure OPERA

which stands for Observation, Problem, Experimentation, Results, and Action. This type of structure is primarily used for analytical articles, especially in applied sciences (technology, management, etc.).

Structure ILPIA

which is structured as follows: **Introduction, Literature, Problem, Implication, Future.** It is better suited for review articles and surveys.

VII. The keys to the scientific text

- title
- The authors
- lead author
- Co-authors
- Journal or review title
- Year of publication
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VII. The keys to the scientific text

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Abstract

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Paronychia argentea
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ABSTRACT

Paronychia argentea Lam., belonging to the Caryophyllaceae family, is a perennial plant widely distributed in Algeria. Even though this plant is used in the Algerian popular medicine, its phytochemical characterization is incomplete. In this study, the flavonoid profile and the *in vitro* antioxidant activity of the ethanolic extract, decoction and infusion of *P. argentea* aerial parts are reported.

Flavonoids were analyzed by means of high-performance liquid chromatography coupled with diode array detection and electrospray ionization mass spectrometry. Eleven compounds were identified and six of them, including isorhamnetin-3-*O*-dihexoside, quercetin-3-*O*-glucoside, quercetinmethylether-*O*-hexoside, quercetin, jaceosidin and isorhamnetin, were described in this plant for the first time.

The ethanol extract showed the highest flavonoid content, followed by the decoction and the infusion (25.4 ± 0.8 mg/g of DM, 8.4 ± 0.5 mg/g of DM, 0.2 mg/g of DM, respectively), while the best antioxidant activity was shown by the decoction ($RC_{0.5}$ = 178 μg/mL for reducing power, 72.4% of inhibition of lipid peroxidation, IC_{50} = 27.38 μg/mL for DPPH$^•$ radical scavenging activity and 59.7% of inhibition of NO$^•$ radical). These results showed that *P. argentea* decoction could be considered as a valuable source of flavonoids and antioxidants that might contribute to the valorization of the phytotherapeutic potential of this plant.

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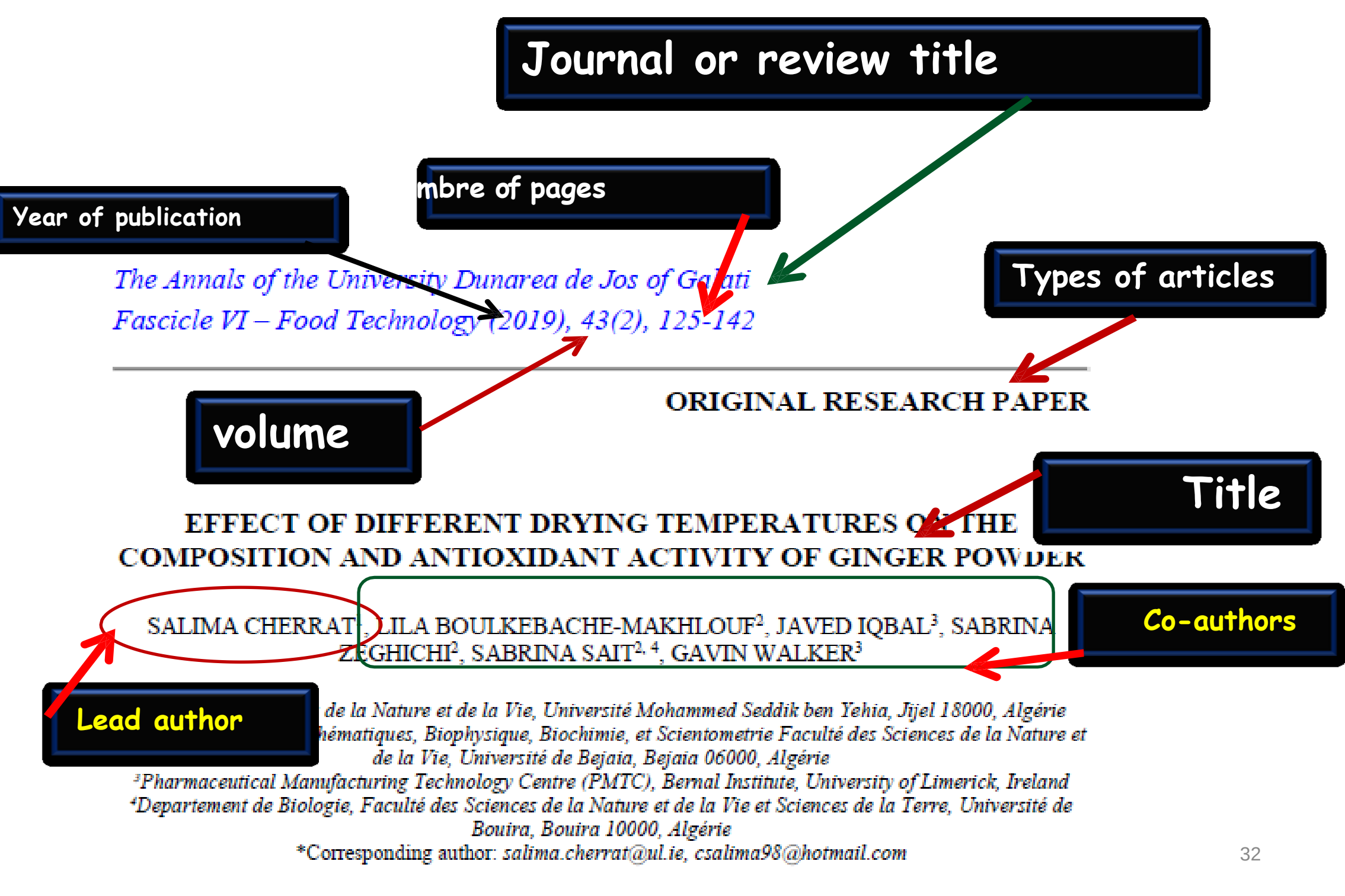
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Research article

A comparative evaluation of antibacterial activities of imidazolium-, pyridinium-, and phosphonium-based ionic liquids containing octyl side chains

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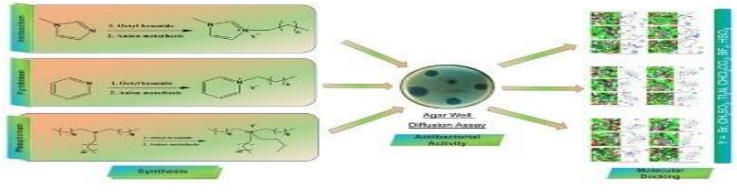
GRAPHICAL ABSTRACT



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ABSTRACT

Antibacterial activity is an essential property of ionic liquids. In this work, a comprehensive study has been performed on the antibacterial activity of ionic liquids to be utilized for further research and applications. Eighteen ionic liquids *viz.* Octyl Imidazolium, octyl Pyridinium, quaternary phosphonium-based cations containing bromide, sodium methane sulphonates, bis(trifluoromethane sulfonyl) imide, dichloroacetate, tetrafluoroborate, hydrogen sulfate were prepared and characterized with the help of different spectroscopic techniques. All these samples of ionic liquids were tested for their antibacterial activity against the most commonly occurring bacteria in the environment, i.e., *Enterobacter aerogenes (E. aerogenes), Proteus vulgaris (P. vulgaris), Klebsiella pneumoniae (K. pneumoniae), Pseudomonas aeruginosa (P. aeruginosa), Escherichia coli (E. coli), and Streptococcus pyogenes (S. pyogenes)*. Most of the ionic liquids show good antibacterial properties, and imidazolium-based ionic liquids were even more antibacterial as compared to positive control. It was observed that a unique combination of cation and anion is essential to achieve desired antibacterial properties. The mechanism of antibacterial activity was further investigated using density functional theory calculations. A good correlation was found between experimental and theoretical studies.

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*STATE governments
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*CONTENT analysis (Communication)
MEDICAL coding

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Abstract: **Restorative** justice is a relatively new approach to crime response, developing in the U.S. since the 1970s. Over the past three decades, these **practices** have been incorporated into legislation. Using content analysis of statutes in state criminal and juvenile codes, this study asks how **restorative** justice has been translated into law. The authors find that 32 states now have statutory support for the use of **restorative** justice, and that legislation ranges widely from general statements of support to structured use of **restorative practices** in at least some instances and for some offenders. Implications for practitioners, policy makers, and scholars are suggested. [ABSTRACT FROM PUBLISHER]

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