FACULTY OF SCIENCES
DEPARTMENT OF BIOLOGY

COMMUNICATION AND EXPRESSION TECHNIQUES

2ND YEAR SNV
(NATURAL AND LIFE SCIENCES)

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2023-2026

TABLE OF CONTENTS

ILLUSTRATIONS

Introduction

The Communication and Expression Techniques course is designed for both first-year and second-year Licence Students (SNV-L1 and SNV-L2). This indicates the crucial function that competences in communication and expression techniques play in the acquisition of the rest of the courses offered at Algerian universities.

The generic content of the course for SNV-L2 is as follows:
CHAPTER ONE titled “Literature Research Methodology”, which presents the foundational steps for effective literature research methodology and its key strategies. While the second chapter (CHAPTER TWO) reviews “Scientific Literature Types”. CHAPTER THREE enunciates “The Structure of a Scientific Article”. CHAPTER FOUR shows “Writing a Scientific Report”, in order to identify the different steps of academic writing of the scientific article. CHAPTER FIVE presents “Research Vocabulary Words”, which help students to describe their methods, findings, and interpretations precisely in academic work. Biological prefixes and suffixes are presented in CHAPTER SIX. These biological prefixes and suffixes are essential for all students from different biological fields. Understanding and spelling biology terminology is a significant challenge for many university students, which leads them to conclude that studying biology is not difficult. The last chapter (CHAPTER SEVEN) of this course, which includes Plagiarism. Plagiarism is an extremely important topic for university students because understanding and avoiding it are fundamental to academic integrity and future professional credibility.

Upon successful coverage of the materials contained in this course, the student should be able to: apply research methods and gather useful and necessary information for analysis and written presentation (report, oral presentation, discussion), as well as apply some English grammar rules in a scientific context.

Chapter One Outline

Objectives

Literature Research

Core Steps in Literature Research

- Define the Research Topic/Scope and Research question
- Identify Keywords and Search Terms
- Systematic Search
  - *Identify Sources*
  - *Employ Strategies*
- Evaluate and Select Relevant Information
- Organize and Document Information
- Analyze and Synthesize Information
- Identify gaps and establish your research's place
- Outline your literature review's structure
- Write and Cite
- Revise and Edit

Key Strategies

- Footnote Chasing
- Berrypicking
- Citation Searching

Chapter One:

Literature Research Methodology

(Bibliographic Research Methodology: it a methodology of searching scientific documents)

Bibliographic research methodology involves systematically reviewing, evaluating, and organizing existing literature (books, articles, online sources) on a topic to build a foundation for new research, often forming a literature review. Key steps include defining the topic, conducting systematic searches using databases (such as Scopus & Web of Science) and strategies (footnote chasing, berrypicking), taking notes, analyzing findings, and writing a structured summary, ensuring proper citation (APA, Chicago).

Objectives

- By the end of this class students should be discover and learn foundational steps for effective literature research methodology.

Literature Research

It is a systematic methodology for identifying, evaluating, organizing, and utilizing existing published information on a specific subject. It serves as a foundational step for any scholarly work, ensuring research is original, well-informed, and credible.

Core Steps in Literature Research

An effective bibliographic research methodology generally involves several key phases:

1. Define the Research Topic/Scope and Research question

Narrow down your topic and formulate a specific research question or problem that your review will address. This helps focus your search and writing efforts.

2. Identify Keywords and Search Terms

Develop a list of relevant keywords, synonyms, and related terms to query information sources effectively.

3. Systematic Search

Select Information Sources: Choose appropriate databases and resources relevant to the discipline (e.g., academic databases like Scopus, Web of Science, or PubMed for health sciences).

a. *Identify Sources*
   Use databases (Scopus, Web of Science), library catalogs, and/or search engines.
b. *Employ Strategies*
   - *Footnote Chasing*
   - *Berrypicking*

- Citation Searching

Conduct an extensive and systematic search using relevant keywords.

4. Evaluate and Select Relevant Information

Critically assess the quality, reliability, and relevance of the sources found. This involves reviewing titles and abstracts to decide if the material is suitable for the research (use abstracts to determine if the full text is worth reading for your specific topic).

5. Organize and Document Information

Store the selected documents and compile their full bibliographic information (author, title, publication date, publisher, etc.) in an organized manner, often using bibliographic management software.

6. Analyze and Synthesize Information

Read the collected literature thoroughly, take notes, and analyze the data to identify common findings, methodologies, and findings. Look for recurring themes, trends, debates, and contradictions across different studies. Synthesize this information to build a coherent narrative rather than just summarizing each source individually.

7. Identify gaps and establish your research's place

Based on your analysis, pinpoint areas that are under-researched or where existing findings are conflicting. This step helps justify the need for your own research and shows how it will contribute to the broader academic conversation.

8. Outline your literature review's structure

Organize the synthesized information logically. Common organizational methods include thematic (by topic), chronological (by publication date), or methodological (by research methods used) approaches.

9. Write and Cite

Following your outline, draft your literature review, organizing information logically and citing sources correctly using styles like APA style to give credit to original authors and avoid plagiarism.

10. Revise and Edit

Proofread for clarity, grammar, and spelling errors. Ensure your argument is logical and that your review meets all assignment guidelines.

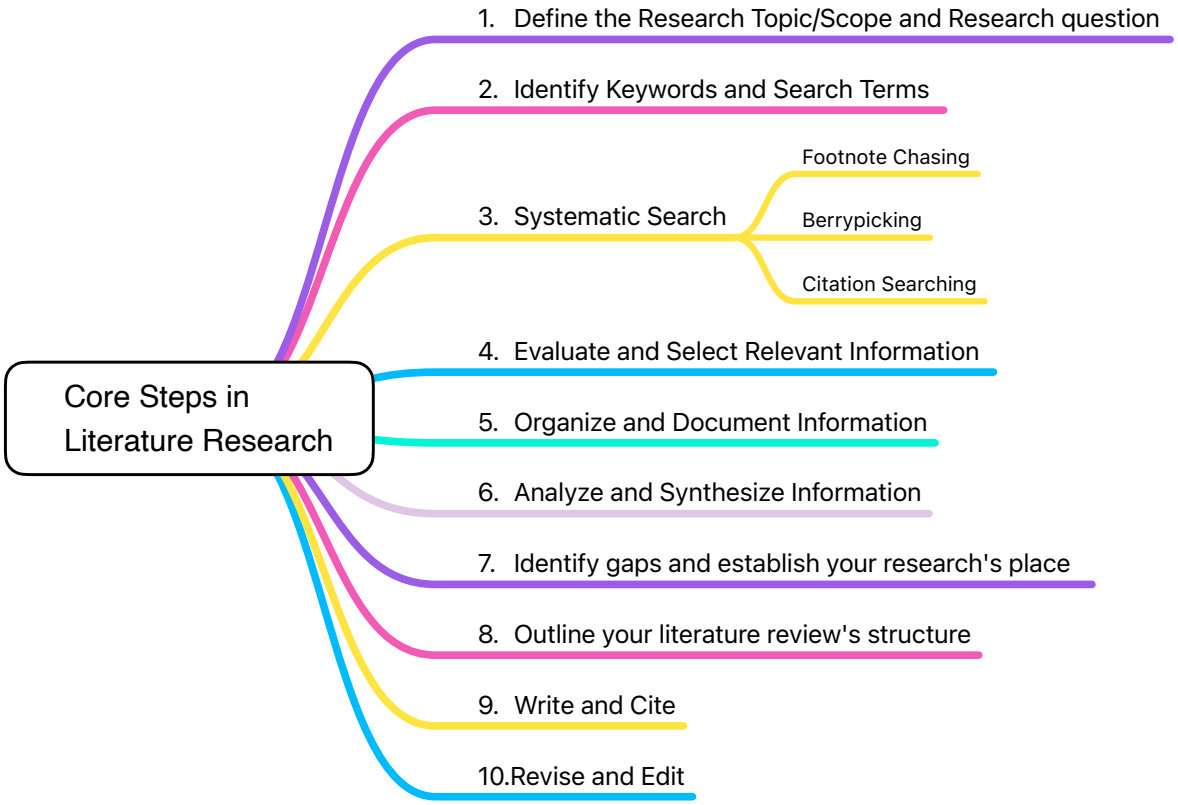

FIGURE 1: CORE STEPS IN LITERATURE RESEARCH

Key Strategies

Footnote Chasing

Also known as **backward citation tracking** or **backward chaining**.
Using the bibliographies/reference lists of highly relevant articles to find other original sources of information.

Berrypicking

Adapt your search as you discover new keywords and concepts.

Citation Searching

Also known as **forward citation searching** or **forward chaining**.
Using a citation index to find newer articles that have cited a foundational work, helping to track how a field has evolved.

By following a systematic approach, researchers can effectively navigate the vast amount of existing literature to build a solid foundation for their own original contributions.

The Importance of the Bibliographic Research

- Establishes foundational knowledge and context.
- Identifies gaps in current research.

- Informs research methods and techniques.
- Provides a basis for new contributions.

Chapter Two Outline

Objectives

Types of Scientific Literature

- Primary Literature (First-hand Accounts)
  - Research Articles
  - Theses & Dissertations
  - Conference Papers/Proceedings
  - Patents
  - Technical Reports
- Secondary Literature (Summaries & Analysis)
  - Review Articles
  - Textbooks
  - Books/Edited Volumes
- Tertiary Literature (Broad Overviews)

Encyclopedias & Handbooks

  - Encyclopedias & Handbooks
  - Other Forms
    - *Grey Literature*
    - *Popular Science*
    - *Trade Publications*
    - *Opinion Pieces*

Chapter Two

Types of Scientific Literature

While the research article is the workhorse of the scientific literature, it is by no means the only. Presented below the various scientific literature types that scientists may use in their work.

Objectives

- Identify the various types of scientific literature.
- Distinguished between primary, secondary, and tertiary literature to better categorize evidence.

Types of Scientific Literature (Bibliography)

Scientific literature includes primary sources (original research like journal articles, patents, dissertations), secondary sources (reviews, textbooks summarizing primary research), tertiary sources (encyclopedias, fact books), and grey literature (technical reports, conference papers, theses, government documents, working papers). It also encompasses popular science (magazines, online articles) for general audiences and trade publications for professionals, differing mainly by audience and peer-review rigor.

1. ***Primary Literature (First-hand Accounts)***
   a. *Research Articles*
   Peer-reviewed papers in journals with methods, results, and discussion sections.

   b. *Theses & Dissertations*
   Detailed accounts of original research for advanced degrees.

   c. *Conference Papers/Proceedings*
   Presented at academic conferences, often with early findings.

   d. *Patents*
   Legal documents describing new inventions.

   e. *Technical Reports*
   Formal reports from research organizations or government bodies.

2. ***Secondary Literature (Summaries & Analysis)***
   a. *Review Articles*
   Synthesize and analyze multiple primary studies on a topic.

   b. *Textbooks*
   Broad overviews of a field, consolidating established knowledge.

c. Books/Edited Volumes
Comprehensive works, sometimes with chapters by different authors.

3. Tertiary Literature (Broad Overviews)
a. Encyclopedias & Handbooks
Provide general information and facts.

b. Other Forms
Grey Literature: Material outside traditional publishing, like preprints, manuals, and newsletters, is not always indexed.

Popular Science: Articles in magazines for a general audience.

Trade Publications: Aimed at professionals in a specific field, summarizing research and industry news.

Opinion Pieces: Letters, commentaries, or editorials based on expert opinion or brief data.

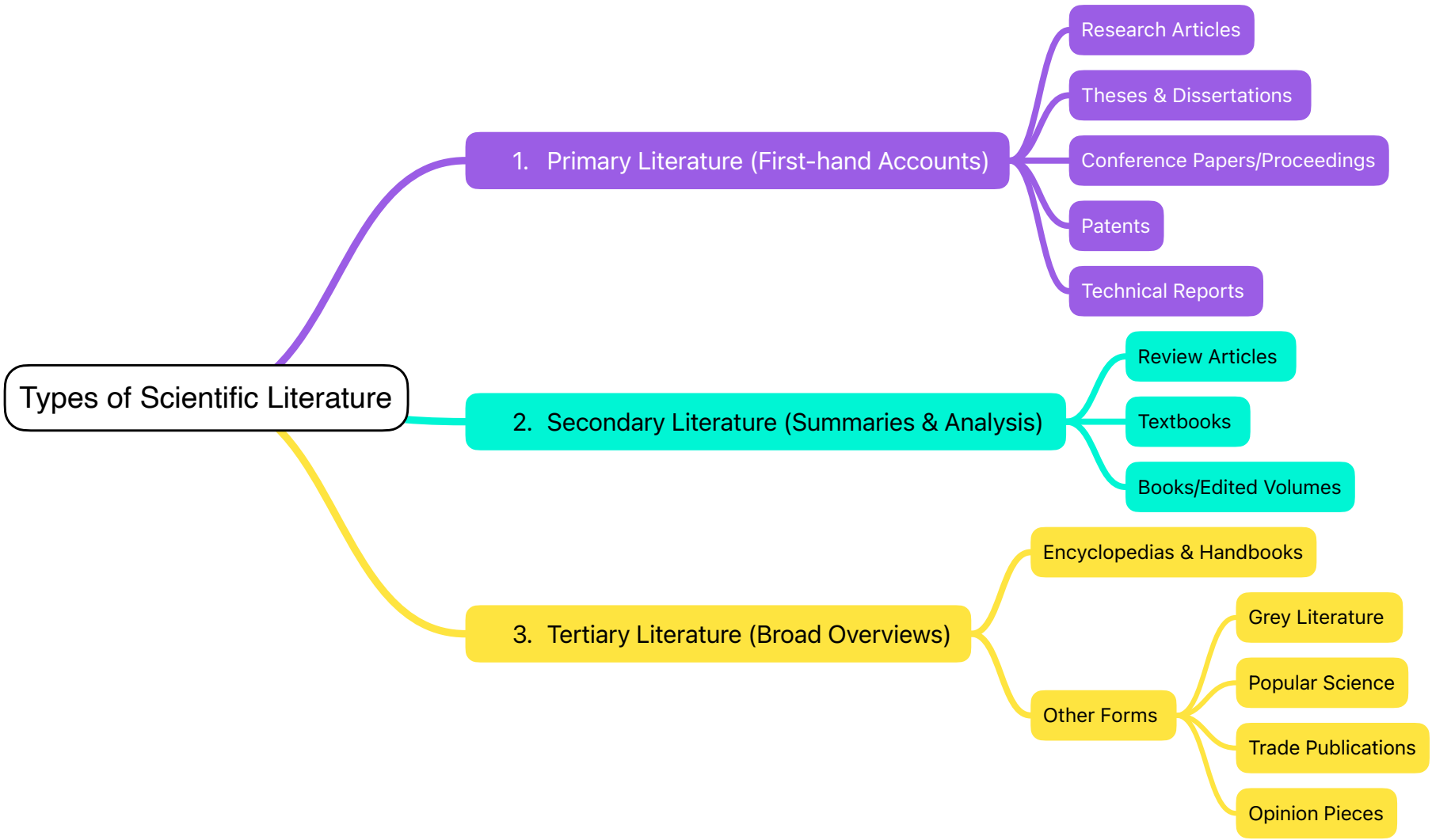

FIGURE 2: TYPE OF SCIENTIFIC LITERATURE

Chapter Three Outline

Objectives

Scientific Article Definition

What is the purpose of a scientific article?

Structure of a Scientific Article

- Title
- Author List
- Author Affiliations
- Abstract
- Keywords
- Introduction
- Methodology
- Results
- Discussion
- Conclusion
- Acknowledgments
- References

Exercises

Corrections

Assignment

Chapter Three

Structure of a Scientific Article

All scientific papers have the same general format. They are divided into distinct sections and each section contains a specific type of information.

Objectives

Before learn the academic writing of scientific articles, students need to know the structure of a scientific Article. So, by the end of this lesson, students will:

- Identify different parts of a scientific article.
- Identify the importance of writing scientific articles.

Scientific Article

It is an article that reports the **methods** and **results** of an **original scientific study** performed by the authors. The kind of study may vary (it could be an experiment, survey, interview, or any other kind of studies), but in all cases, raw data have been collected and analyzed by the authors, and conclusions are drawn from the results of that analysis.

Purpose of a Scientific Article

Scientific papers are for sharing your own original research work with other scientists or for reviewing the research conducted by others. As such, they are critical to the evolution of modern science, in which the work of one scientist builds upon that of others.

Structure of a Scientific Article

1. Title

The title of a scientific article should be a concise, specific and informative noun phrase. Abbreviations or formulae should be avoided where possible.

2. Author List

- Authors' full first and last names must be provided.
- There is the **main author** and **the co-authors**.
- At least one author should be designated as the **corresponding author**.
- The **email address** of the corresponding authors should be provided in the scientific article.
- **Corresponding author role:** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials.

3. Authors Affiliations

- Each author must be affiliated with at least one institute.
- If the author's affiliation has changed after the study was finished and before the paper was accepted, the current affiliation should be indicated as well.

- The affiliation should be organized in the style: Department, University/Organizational affiliation, City, Country.
- In general, the affiliation of authors could be:
  - University
  - Center of Research
  - Institute
  - Hospital

4. Abstract

The abstract section of your research paper should include the following:

1. Purpose
2. Scope (Methods)
3. Results
4. Conclusion

5. Keywords

Each scientific article must contain 3 to 6 keywords that are pertinent to the subject.

6. Introduction

This section provides an overview of the research background, outlining the objectives and significance of the study in relation to existing research in the field.

7. Methodology

This section provides a comprehensive description of the research methodology to enable others to replicate the work.

8. Results

It presents the experimental findings. Tables and figures may be included in this section.

9. Discussion

The findings and their implications should be discussed and/or compared with those of other studies. Future research directions may also be recommended in this section.

10. Conclusion

This is an optional section that can be included if the discussion is very long or complicated.

11. Acknowledgments

List here those who provided help during the research (e.g., providing fund, providing language help, writing assistance or proofreading the article, assistance in the lab as technicians, etc.).

12. References

- There are over 1,000 different styles of references.
- These styles each have their own different formatting methods, as well as their own styles for the bibliography.

- The most common bibliography styles are the American Psychological Association (APA) and the Chicago Manual of Style. While those are the most common, others available include Harvard and Oxford.
- The most common types of references include journal articles, books, book sections or chapters, dissertations, monographs, and webpages. For example, for a journal article, the parts of a reference in the sequence include authors, article title, journal title, date of publication, volume, issue, and location/pagination.
- Each journal has its own modification of the format for each part, and the punctuation marks, or their lack of, between the parts.

Reference styles

An example:

Article

Comparison of Four Plant-Based Bio-Coagulants Performances against Alum and Ferric Chloride in the Turbidity Improvement of Bentonite Synthetic Water

Amina Hadadi [1], Ali Imessaoudene [1], Jean-Claude Bollinger [2], Aymen Amine Assadi [3], Abdeltif Amrane [3] and Lotfi Mouni [1,*]

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(Hadidi et al., 2022)

- ***APA Reference Style***

  Hadadi, A., Imessaoudene, A., Bollinger, J. C., Assadi, A. A., Amrane, A., & Mouni, L. (2022). Comparison of Four Plant-Based Bio-Coagulants Performances against Alum and Ferric Chloride in the Turbidity Improvement of Bentonite Synthetic Water. *Water (Switzerland)*, *14*(20).

- ***Chicago Reference Style***

  Hadadi, Amina, Ali Imessaoudene, Jean Claude Bollinger, Aymen Amine Assadi, Abdeltif Amrane, and Lotfi Mouni. "Comparison of Four Plant-Based Bio-Coagulants Performances against Alum and Ferric Chloride in the Turbidity Improvement of Bentonite Synthetic Water." *Water*, 14, no. 20 (2022).

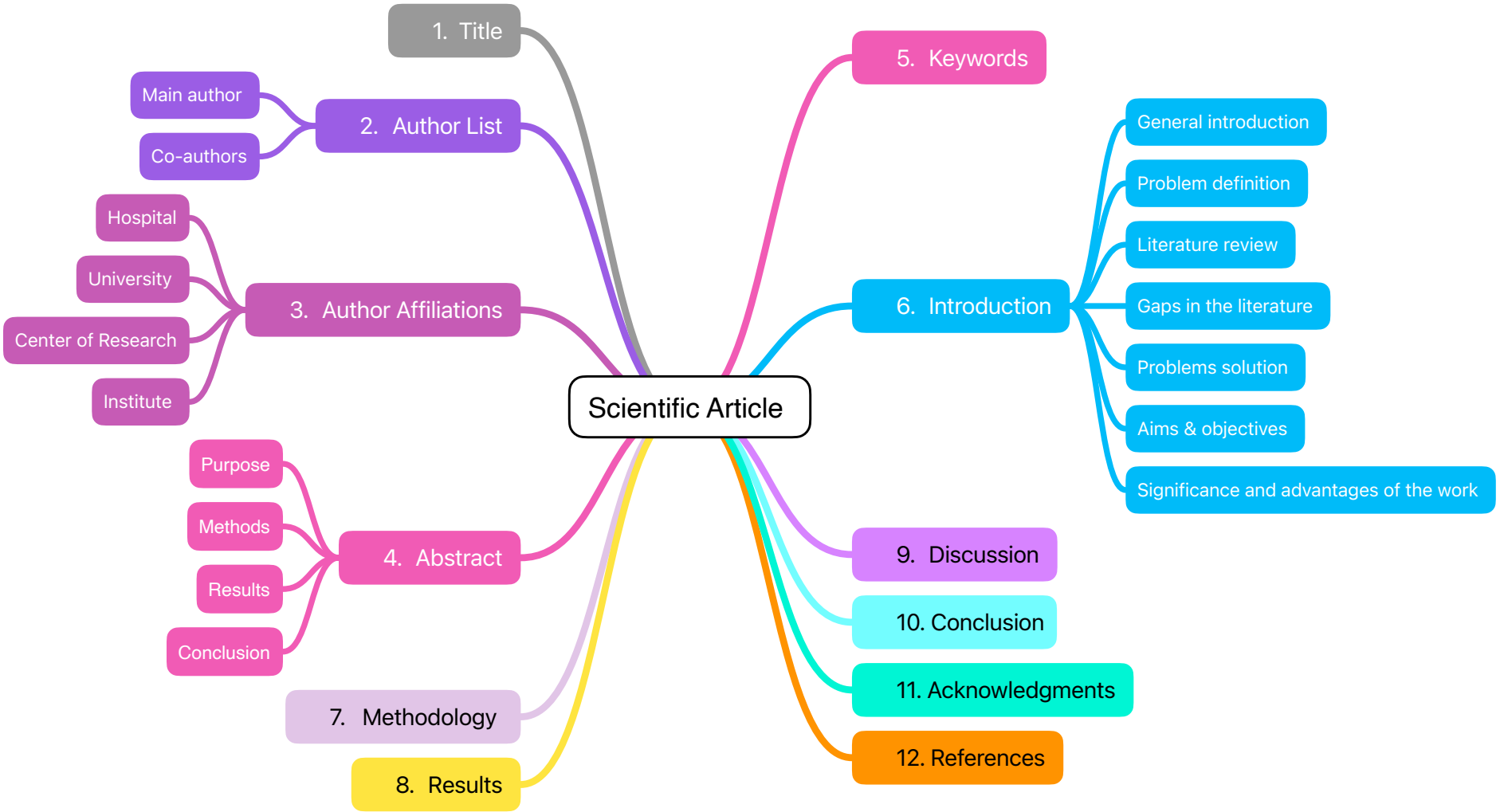

FIGURE 3: STRUCTURE OF A SCIENTIFIC ARTICLE

Exercises

Exercise 1

From the following scientific articles:

- Who is the main author?
- Who are the co-authors?
- Who is the corresponding author?
- What is the affiliation(s) of the corresponding author(s)?
- What is the affiliation(s) of the authors?
- What is the name of journal?

Article 1:

Biotechnology Reports 26 (2020) e00445

Contents lists available at ScienceDirect

Biotechnology Reports

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

Use of barley straw as a support for the production of conidiospores of *Trichoderma harzianum*

M.G. Serna-Díaz[b], Y. Mercado-Flores[a], A. Jiménez-González[a], M.A. Anducho-Reyes[a], J. Medina-Marín[b], J.C. Seck Tuoh-Mora[b], A. Téllez-Jurado[a,*]

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Keywords:
Barley straw
Conidiospores production
Conidiospores viability
Trichoderma harzianum

ABSTRACT

In this work was to evaluate the conidiospores production of *Trichoderma harzianum* using barley straw as substrate. Four growth conditions were used; washed and unwashed barley straw and washed and unwashed barley straw supplemented with mineral salts. The highest spore production was observed when washed barley straw supplemented with mineral salts with 1.56×10^{10} conidiospores/gram of dry matter (gdm) at 216 h of cultivation was used. The effect of substrate moisture on spore production was studied, three initial moisture levels of the substrate were tested and it was observed that a humidity of 80 % of the substrate improves the production of conidiospores reaching a concentration of 2.35×10^{10} conidiospores/gdm at 136 h. Finally, conidiospores viability was evaluated for 12 months by keeping them on the conidia and substrate, and viability of 71 % of the conidiospores was observed, so this maintenance method is an excellent means of conserving the conidiospores viability.

(Serna-Díaz et al., 2020)

Article 2

GEOMICROBIOLOGY JOURNAL
2016, VOL. 33, NOS. 3–4, 283–288
http://dx.doi.org/10.1080/01490451.2015.1048394

Taylor & Francis
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Heavy Metal Tolerance and Biotransformation of Toxic Metal Compounds by New Isolates of Wood-Rotting Fungi from Thailand

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ABSTRACT

Eighteen isolates of wood-rotting fungi isolated from Thailand were screened for the ability to produce metal-containing crystals from zinc, copper, cadmium and lead salts-amended culture medium. Five isolates (MR40, KYO, WR3, WR4 and WR5) were able to produce mycogenic crystals in 0.5% (w/v) heavy metal compound amended plates. The crystals were further investigated by scanning electron microscopy equipped with energy dispersive X-ray microanalysis (SEM-EDXA) and identified by X-ray powder diffraction (XRPD). The selected fungi were found to be capable of transforming zinc sulfate ($ZnSO_4 \cdot 7H_2O$) into zinc oxalate dihydrate ($C_2O_2Zn \cdot 2H_2O$), copper sulfate ($CuSO_4 \cdot 5H_2O$) into copper oxalate hydrate ($C_2CuO_4 \cdot xH_2O$), cadmium sulfate ($3CdSO_4 \cdot 8H_2O$) into cadmium oxalate trihydrate ($C_2CdO_4 \cdot 3H_2O$) and lead nitrate ($Pb(NO_3)_2$) into lead oxalate (PbC_2O_4). Two of the selected strains (*Fomitopsis cf. meliae* and *Ganoderma aff. steyaertanum*) have not been previously reported to have heavy metal compound transformation abilities. These results provide further evidence that wood-rotting fungi can remove heavy metals from a metal-amended substrate by precipitation as metal oxalates: wood-rotting fungi could therefore be applied for detoxification of heavy metal pollution.

ARTICLE HISTORY
Received March 2015
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KEYWORDS
Bioremediation; biotransformation; heavy metal; wood-rotting fungi

(Kaewdoung et al., 2016)

Article 3

Brazilian Journal of Microbiology (2004) 35:330-332
ISSN 1517-8382

SCANNING ELECTRON MICROSCOPY OF CONIDIA OF *TRICHODERMA STROMATICUM*, A BIOCONTROL AGENT OF WITCHES' BROOM DISEASE OF COCOA

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[1]Embrapa, Centro Nacional de Pesquisa de Monitoramento e Avaliação de Impacto Ambiental, Jaguariúna, SP, Brasil; [2]Birkbeck College, London University, London, UK

Submitted: June 14, 2004; Returned to Authors: August 19, 2004; Approved: November 26, 2004

SHORT COMMUNICATION

ABSTRACT

A field emission electron microscope (SEM) was used to study the conidia surface of *Trichoderma stromaticum*, a biocontrol of witches broom disease of cocoa. Surface features of conidia were difficult distinguish by light microscope. Conidia appeared to be verrugose and minutely roughened, but the nature of the roughening was not easy to discern. It was common to observe sheath-like structures that completely covered groups of conidia, and also details of wide cells that form the pustules.

Key words: Biological control, cocoa, *Crinipellis pernisiosa*, morphology of conidia

(Melo et al., 2004)

Article 4

THE GC-MS DETERMINATION OF CHEMICAL CONSTITUENTS FROM HARPAGOPHYTUM PROCUMBENS DC ROOTS

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Abstract: The present work is devoted to the study of the component composition of the volatile fraction of the heptanoic extract from Harpagophytum procumbens roots ("Starwest Botanicals", USA).
For this purpose the use of gas chromatography-mass spectrometry (GC-MS) was proposed. The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The quantitative content of the components was calculated by the method of the internal standard. The components with the probability of coincidence for mass spectra of more than 90 % were taken into account.
As a result of the study more than 31 substances have been identified. Among the main groups of compounds the presence of aromatic hydrocarbons, esters and fatty acids, as well as alkanes and alkenes should be mentioned. Hexadecanoic acid (29.92 mg/kg), Octadec-9-enoic acid (21.39 mg/kg), 8-[4-[N-Aziridyl]butyl]amino-2,6-dimethyl-2,6-octadiene (6.46 mg/kg), Pentacosane (5.85 mg/kg), Hexadecanoic acid, trimethylsilyl ester (4.53 mg/kg) prevail in terms of quantity. Based on the results obtained the conclusion can be made that Harpagophytum procumbens DC is a promising herbal source for obtaining active ingredients with the anti-inflammatory, regenerative, analgesic, immunostimulating properties.
Keywords: Harpagophytum procumbens DC, chemical constituents, chemical structure, gas chromatography combined with mass spectrometry.

1. Introduction

The modern stage of using herbal medicinal products is based not only on the rational use of the current experience, but also on achievements of pharmacy in the field of studying the composition and peculiarities of the biological activity of medicinal plants [1]. As a result of the numerous studies conducted it has been proven that medicinal plant raw material (MPRM) and drugs based on them contain unique combinations of biologically active substances providing a wide range of the therapeutic action [2].

Harpagophytum procumbens DC (Devil's claw) belongs to the Pedaliaceae family and is also known as grapple plant, wood spider, and harpago. It is native to the southern part of the African continent and may be found in the Kalahari Sands of Namibia, South Africa, Angola, Zambia, and Zimbabwe [3]. It has historically been used to treat several symptoms such as fever, malaria, indigestion and pain [4]. In addition, it was demonstrated that H. procumbens extracts have beneficial effects in the case of rheumatic diseases according to animal and clinical studies [5]. There have been reports verifying the anti-inflammatory effects of H. procumbens extracts on acute or sub-chronic inflammation in a rat mode [6].

Preparation of the analytical test

Grind the accurate weight (approximately 0.500 g) to the powder (355) and place in a 20 ml vial with addition of the internal standard – tridecane. Take the standard in the amount of 50 µg per the accurate weight with the subsequent determination of the resulting concentration of the internal standard used for the final calculations. Dissolve the sample in 20 ml of water R and distill volatile compounds under reflux at the temperature of 100 °C for 4 h. Extract the resulting aqueous extract with heptane R with the subsequent concentration in the flow of nitrogen gas (100 ml/min) to the residual volume of the solution of 10 µl. Carry out further sample concentration to the volume of 2 µl directly in the syringe.

Gas Chromatography – Mass Spectroscopy Analysis

The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The column used was HP-5MS – the capillary column with the size of 30 m × × 0.25 mm and the layer thickness of 0.25 mm.

Helium gas (99.999 %) was used as a carrier gas at a constant flow rate of 1ml/min, and the injection volume of 2µl (the split ratio – 1:50). The temperature

(Kriukova et al., 2017)

Correction

From the following scientific articles:

- The main author: is the first author
- The co-authors: are individuals who collaborate to write a scientific article.
- The corresponding author: usually the author that provided by his/her email address (his role have been mentioned above)
- What is the affiliation(s) of the author(s)?
  - That usually mentioned by small numbers or alphabets.
  - Sometimes stars mentioned by small.
  - Sometimes just mention the name of organisation if all authors from a same organisation.
- What is the affiliation(s) of the corresponding author(s)?
- What is the name of journal?

Article 1


Publisher
Biotechnology Reports 26 (2020) e00445
Contents lists available at ScienceDirect
Journal Name
Biotechnology Reports
journal homepage: www.elsevier.com/locate/btre
ELSEVIER
Title of a Scientific Article
Use of barley straw as a support for the production of conidiospores of Trichoderma harzianum
M.G. Serna-Díaz[b], Y. Mercado-Flores[a], A. Jiménez-González[a], M.A. Anducho-Reyes[a], J. Medina-Marín[b], J.C. Seck Tuoh-Mora[b], A. Téllez-Jurado[a,*]
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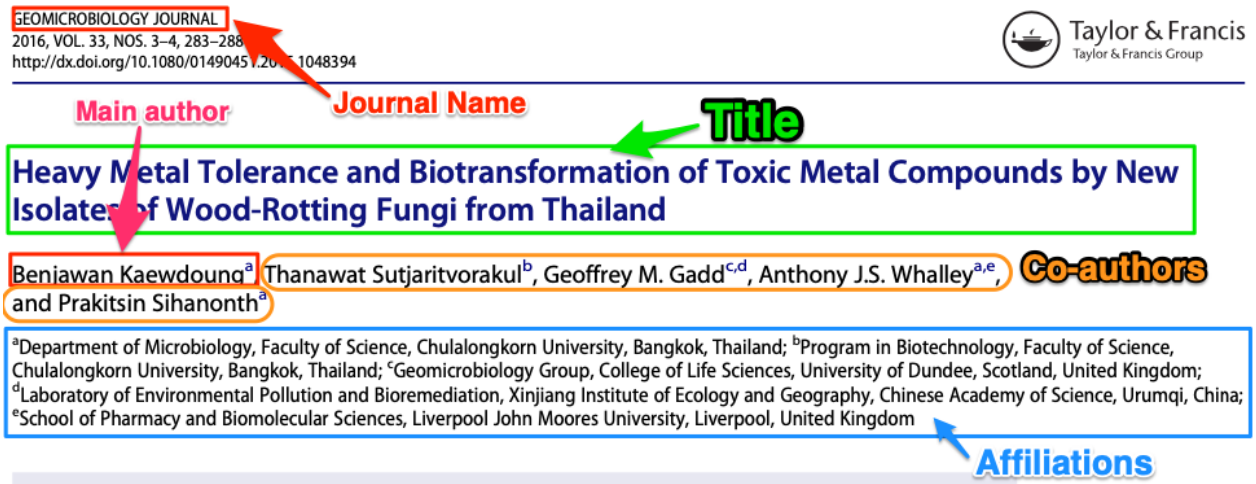
Article 2



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Taylor & Francis
Taylor & Francis Group

Main author

Journal Name

Title

Heavy Metal Tolerance and Biotransformation of Toxic Metal Compounds by New Isolates of Wood-Rotting Fungi from Thailand

Benjawan Kaewdoung[a] Thanawat Sutjaritvorakul[b], Geoffrey M. Gadd[c,d], Anthony J.S. Whalley[a,e], and Prakitsin Sihanonth[a]

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Affiliations

ABSTRACT

Eighteen isolates of wood-rotting fungi isolated from Thailand were screened for the ability to produce metal-containing crystals from zinc, copper, cadmium and lead salts-amended culture medium. Five isolates (MR40, KYO, WR3, WR4 and WR5) were able to produce mycogenic crystals in 0.5% (w/v) heavy metal compound amended plates. The crystals were further investigated by scanning electron microscopy equipped with energy dispersive X-ray microanalysis (SEM-EDXA) and identified by X-ray powder diffraction (XRPD). The selected fungi were found to be capable of transforming zinc sulfate ($ZnSO_4 \cdot 7H_2O$) into zinc oxalate dihydrate ($C_2O_2Zn \cdot 2H_2O$), copper sulfate ($CuSO_4 \cdot 5H_2O$) into copper oxalate hydrate ($C_2CuO_4 \cdot xH_2O$), cadmium sulfate ($3CdSO_4 \cdot 8H_2O$) into cadmium oxalate trihydrate ($C_2CdO_4 \cdot 3H_2O$) and lead nitrate ($Pb(NO_3)_2$) into lead oxalate (PbC_2O_4). Two of the selected strains (*Fomitopsis cf. meliae* and *Ganoderma aff. steyaertanum*) have not been previously reported to have heavy metal compound transformation abilities. These results provide further evidence that wood-rotting fungi can remove heavy metals from a metal-amended substrate by precipitation as metal oxalates: wood-rotting fungi could therefore be applied for detoxification of heavy metal pollution.

ARTICLE HISTORY
Received March 2015
Accepted April 2015

KEYWORDS
Bioremediation; biotransformation; heavy metal; wood-rotting fungi

GEOMICROBIOLOGY JOURNAL
2016, VOL. 33, NOS. 3–4, 283–288
http://dx.doi.org/10.1080/01490451.2015.1048394

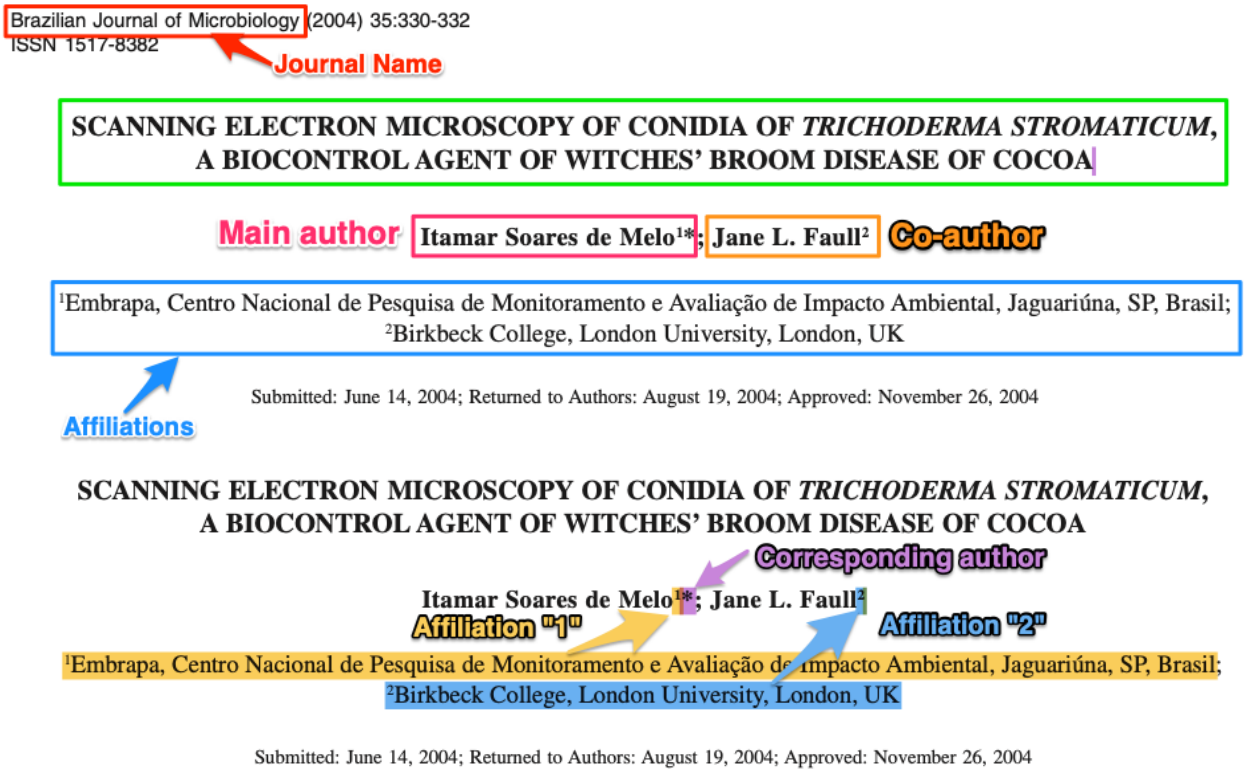
Taylor & Francis
Taylor & Francis Group

Heavy Metal Tolerance and Biotransformation of Toxic Metal Compounds by New Isolates of Wood-Rotting Fungi from Thailand

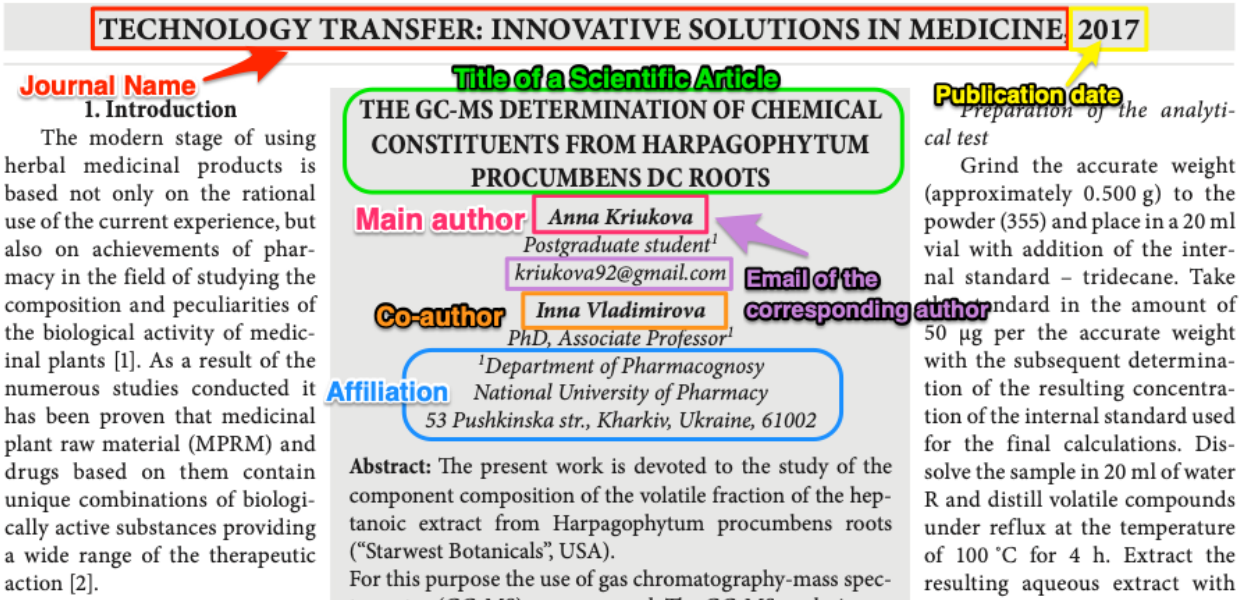
Benjawan Kaewd[illegible]g[a], Thanawat Sutjaritvorakul[b], Geoffrey M. Gadd[c,d], Anthony J.S. Whalley[a,e], and Prakitsin Si[illegible]nth[a]

[a]Department of Microbiology, Faculty of Scie[illegible], Chulalongkorn University, Ban[illegible]kok, Thailand; [b]Program in Bi[illegible]echnology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand; [c]Geomicrobiology Group, Colle[illegible]e of Life Sciences, University [illegible] Dundee, Scotland, United Kingdom; [d]Laboratory of Environmental Pollution and Bioremediation, Xinjiang Institute of Ecology and Geograph[illegible], Chinese Academy of Science, Urumqi, China; [e]School of Pharmacy and Biomolecular Sciences, Liverpool John Moores University, Liverpool, United Kingdom

Article 3



Article 4



Exercise 2

Using parentheses ( ) to specify the characteristics of the abstract in the following abstracts.

Abstract 1

Mercado-Flores[a], A. Jiménez-González[a], M.A. Anducho-Reyes[a], Seck Tuoh-Mora[b], A. Téllez-Jurado[a,*]

chnic University of Pachuca, Carretera Pachuca-Cd. Sahagún, Km 20, ExHacienda De Santa Bárbara, C.P. 43830,

s University of Hidalgo State, Carretera Pachuca-Tulancingo, Km 4.5, Col. Carboneras, C.P. 42184, Mineral De La

ABSTRACT

020

In this work was to evaluate the conidiospores production of *Trichoderma harzianum* using barley straw as substrate. Four growth conditions were used; washed and unwashed barley straw and washed and unwashed barley straw supplemented with mineral salts. The highest spore production was observed when washed barley straw supplemented with mineral salts with 1.56×10^{10} conidiospores/gram of dry matter (gdm) at 216 h of cultivation was used. The effect of substrate moisture on spore production was studied, three initial moisture levels of the substrate were tested and it was observed that a humidity of 80 % of the substrate improves the production of conidiospores reaching a concentration of 2.35×10^{10} conidiospores/gdm at 136 h. Finally, conidiospores viability was evaluated for 12 months by keeping them on the conidia and substrate, and viability of 71 % of the conidiospores was observed, so this maintenance method is an excellent means of conserving the conidiospores viability.

(Serna-Díaz et al., 2020)

Abstract 2

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Taylor & Francis
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Benjawan Kaewdoung[a], Thanawat Sutjaritvorakul[b], Geoffrey M. Gadd[c,d], Anthony J.S. Whalley[a,e], and Prakitsin Sihanonth[a]

[a]Department of Microbiology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand; [b]Program in Biotechnology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand; [c]Geomicrobiology Group, College of Life Sciences, University of Dundee, Scotland, United Kingdom; [d]Laboratory of Environmental Pollution and Bioremediation, Xinjiang Institute of Ecology and Geography, Chinese Academy of Science, Urumqi, China; [e]School of Pharmacy and Biomolecular Sciences, Liverpool John Moores University, Liverpool, United Kingdom

ABSTRACT

Eighteen isolates of wood-rotting fungi isolated from Thailand were screened for the ability to produce metal-containing crystals from zinc, copper, cadmium and lead salts-amended culture medium. Five isolates (MR40, KYO, WR3, WR4 and WR5) were able to produce mycogenic crystals in 0.5% (w/v) heavy metal compound amended plates. The crystals were further investigated by scanning electron microscopy equipped with energy dispersive X-ray microanalysis (SEM-EDXA) and identified by X-ray powder diffraction (XRPD). The selected fungi were found to be capable of transforming zinc sulfate ($ZnSO_4 \cdot 7H_2O$) into zinc oxalate dihydrate ($C_2O_2Zn \cdot 2H_2O$), copper sulfate ($CuSO_4 \cdot 5H_2O$) into copper oxalate hydrate ($C_2CuO_4 \cdot xH_2O$), cadmium sulfate ($3CdSO_4 \cdot 8H_2O$) into cadmium oxalate trihydrate ($C_2CdO_4 \cdot 3H_2O$) and lead nitrate ($Pb(NO_3)_2$) into lead oxalate (PbC_2O_4). Two of the selected strains (*Fomitopsis cf. meliae* and *Ganoderma aff. steyaertanum*) have not been previously reported to have heavy metal compound transformation abilities. These results provide further evidence that wood-rotting fungi can remove heavy metals from a metal-amended substrate by precipitation as metal oxalates: wood-rotting fungi could therefore be applied for detoxification of heavy metal pollution.

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Abstract 3

THE GC-MS DETERMINATION OF CHEMICAL CONSTITUENTS FROM HARPAGOPHYTUM PROCUMBENS DC ROOTS

Anna Kriukova
Postgraduate student[1]
kriukova92@gmail.com

Inna Vladimirova
PhD, Associate Professor[1]
[1]*Department of Pharmacognosy*
National University of Pharmacy
53 Pushkinska str., Kharkiv, Ukraine, 61002

Abstract: The present work is devoted to the study of the component composition of the volatile fraction of the heptanoic extract from Harpagophytum procumbens roots ("Starwest Botanicals", USA).
For this purpose the use of gas chromatography-mass spectrometry (GC-MS) was proposed. The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The quantitative content of the components was calculated by the method of the internal standard. The components with the probability of coincidence for mass spectra of more than 90 % were taken into account.
As a result of the study more than 31 substances have been identified. Among the main groups of compounds the presence of aromatic hydrocarbons, esters and fatty acids, as well as alkanes and alkenes should be mentioned. Hexadecanoic acid (29.92 mg/kg), Octadec-9-enoic acid (21.39 mg/kg), 8-[4-[N-Aziridyl]butyl]amino-2,6-dimethyl-2,6-octadiene (6.46 mg/kg), Pentacosane (5.85 mg/kg), Hexadecanoic acid, trimethylsilyl ester (4.53 mg/kg) prevail in terms of quantity. Based on the results obtained the conclusion can be made that Harpagophytum procumbens DC is a promising herbal source for obtaining active ingredients with the anti-inflammatory, regenerative, analgesic, immunostimulating properties.
Keywords: Harpagophytum procumbens DC, chemical constituents, chemical structure, gas chromatography combined with mass spectrometry.

1. Introduction

The modern stage of using herbal medicinal products is based not only on the rational use of the current experience, but also on achievements of pharmacy in the field of studying the composition and peculiarities of the biological activity of medicinal plants [1]. As a result of the numerous studies conducted it has been proven that medicinal plant raw material (MPRM) and drugs based on them contain unique combinations of biologically active substances providing a wide range of the therapeutic action [2].

Harpagophytum procumbens DC (Devil's claw) belongs to the Pedaliaceae family and is also known as grapple plant, wood spider, and harpago. It is native to the southern part of the African continent and may be found in the Kalahari Sands of Namibia, South Africa, Angola, Zambia, and Zimbabwe [3]. It has historically been used to treat several symptoms such as fever, malaria, indigestion and pain [4]. In addition, it was demonstrated that H. procumbens extracts have beneficial effects in the case of rheumatic diseases according to animal and clinical studies [5]. There have been reports verifying the anti-inflammatory effects of H. procumbens extracts on acute or sub-chronic inflammation in a rat mode [6].

Preparation of the analytical test

Grind the accurate weight (approximately 0.500 g) to the powder (355) and place in a 20 ml vial with addition of the internal standard – tridecane. Take the standard in the amount of 50 µg per the accurate weight with the subsequent determination of the resulting concentration of the internal standard used for the final calculations. Dissolve the sample in 20 ml of water R and distill volatile compounds under reflux at the temperature of 100 °C for 4 h. Extract the resulting aqueous extract with heptane R with the subsequent concentration in the flow of nitrogen gas (100 ml/min) to the residual volume of the solution of 10 µl. Carry out further sample concentration to the volume of 2 µl directly in the syringe.

Gas Chromatography – Mass Spectroscopy Analysis

The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The column used was HP-5MS – the capillary column with the size of 30 m × × 0.25 mm and the layer thickness of 0.25 mm.

Helium gas (99.999 %) was used as a carrier gas at a constant flow rate of 1ml/min, and the injection volume of 2µl (the split ratio – 1:50). The temperature

(Kriukova et al., 2017)

Abstract 4

Brazilian Journal of Microbiology (2004) 35:330-332
ISSN 1517-8382

SCANNING ELECTRON MICROSCOPY OF CONIDIA OF *TRICHODERMA STROMATICUM*, A BIOCONTROL AGENT OF WITCHES' BROOM DISEASE OF COCOA

Itamar Soares de Melo[1]*; Jane L. Faull[2]

[1]Embrapa, Centro Nacional de Pesquisa de Monitoramento e Avaliação de Impacto Ambiental, Jaguariúna, SP, Brasil;
[2]Birkbeck College, London University, London, UK

ABSTRACT

A field emission electron microscope (SEM) was used to study the conidia surface of *Trichoderma stromaticum*, a biocontrol of witches broom disease of cocoa. Surface features of conidia were difficult distinguish by light microscope. Conidia appeared to be verrugose and minutely roughened, but the nature of the roughening was not easy to discern. It was common to observe sheath-like structures that completely covered groups of conidia, and also details of wide cells that form the pustules.

Key words: Biological control, cocoa, *Crinipellis pernisiosa*, morphology of conidia

(Melo et al., 2004)

Correction

Abstract 1

w as a support for the production of conidiospores of *ianum*

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A B S T R A C T

Purpose

020

Methods

Results

Conclusion

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Key words: Biological control, cocoa, *Crinipellis pernisiosa*, morphology of conidia

Assignment

Choose 5 Articles written by your lecturer(s), and fill up the following Table.

Name of Prof./ Dr.	Title of Article	Authors names	Corresponding Author	Affiliation/s	Journal	Link

Notes:

- The minimum 5 students.
- The minimum 5 Articles.
- Number of articles equal or more than the number of students.
- The deadline for submission this assignment is:
- Please submit your assignment to this email: radhia.nedjai@univ-annaba.dz

Assignment Correction (Students work)

Assignment TCE Scientific Article

	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
Students Names:	Boulassel Dora Mayar	Bounour Takoua	Bouzeghaia Oumeima	Laala Asma	Chabbi Rihab	Bouteraa Lina
Section:	**01**	**01**	**01**	**01**	**01**	**01**
Group:	**04**	**05**	**05**	**05**	**05**	**05**

Name of Prof./Dr.	Title of Article	Authors names	Corresponding Author	Affiliation/s	Journal	Link
Nouara Benslimane	A precipitous decline of the algerian newt *Pleurodeles poireti* Gervais, 1835 and other changes in the status of amphibians of Numidia, north-eastern Algeria	Boudjéma Samraoui[1,2],*, Farrah Samraoui[1], Nouara Benslimane[1], Ahmed Alfarhan[2] & Khaled A.S. Al-Rasheid[2]	Boudjéma Samraoui	[1]Laboratoire de Recherche des Zones Humides, Department of Biology, Guelma University, Algeria. [2] Center of Excellence for Research in Biodiversity, King Saud University, Riyadh, Saudi Arabia.	HAL	https://hal.science/hal-03530520v1
Imène Dellal	Effect of chlorothalonil on renal activity of the male rat	Imène Dellal[1] , Leila Mallem[1,2] and Cherif Abdennour[1]	Imène Dellal	[1]Laboratory of Animal Ecophysiology, Department of Biology, Faculty of Sciences, University Badji-Mokhtar-Annaba BP 12, Annaba 23000, Algeria. [2] Laboratory of Animal Ecophysiology, Department of Dental	Ecology Environment and Conservation	https://www.researchgate.net/profile/Leila-Mallem/publication/338659451_Effect_of_chlorothalonil_on_renal_activity_of_the_male_rat/links/5e21f963299bf1e1fab9e666/Effect-of-

				surgery El Zaafrania BP 205, Faculty of Medicine, University Badji-Mokhtar-Annaba BP 12, Annaba 23000, Algeria		chlorothalonil-on-renal-activity-of-the-male-rat.pdf
Walid Sakraoui	Does increasing nestboxes size affects breeding success of blue tits *(Cyanistes caeruleus)*? study in a Locality of Seraidi (Northeast, Algeria)	Walid Sakraoui[1], Zihad Bouslama[1] and Adnene Ibrahim Belabed[1]	Walid Sakraoui	Laboratory of Ecology of Terrestrial and Aquatic Systems, Faculty of Sciences, Badji Mokhtar University, Annaba, Algeria	Ecology Environment and Conservation	https://www.researchgate.net/publication/334638389_Does_increasing_nestboxes_size_affects_breeding_success_of_blue_tits_Cyanistes_caeruleus_study_in_a_Locality_of_Seraidi_Northeast_Algeria
	Ectoparasitic ecology of Algerian hedgehog *Ateleris algirus* (Lereboullet, 1842) (Erinaceidae, Mammalia) in some localities of Edough Montain (W. Annaba, Northest Algeria)	[1]Feriel Sakraoui, [2]Mehdi Boukheroufa, [3]Walid Sakraoui, [3]Mouiz El Bachir Madoui	Feriel Sakraoui	[1]Department of Biology, Faculty of Science. Badji Mokhtar University, Algeria. [2]Laboratory of biodiversity and pathology of ecosystems. Faculty of Sciences, University of El-Tarf, Algeria. [3]Laboratory of Terrestrial and Aquatic Systems. Faculty of Science. Badji Mokhtar University, Algeria.	Advances in Environmental Biology	Ectoparasitic ecology of Algerian Hedgehog ateleris algirus (Lereboullet, 1842) (Erinaceidae, Mammalia)in some localities of Edough montain (W. Annaba, Northest Algeria)

Ouazouaz Meryem	Effects of Treatment by Refined Soybean and Extra Virgin Olive Oils on Lipid Profile and Lipasic Activity in Wistar Albinos Rats	Derradj M[1], Ouazouaz M[1], Gourchala F[2], Bourouis M[3], Henchiri C[1]*	Henchiri C [1]*	[1]Laboratory of Applied Microbiology and Biochemistry, Department of Biochemistry, Badji-Mokhtar University, Annaba, Algeria. [2]Laboratory of Agro-Biotechnology and Nutrition in semi-arid area, Ibn-Khaldoun University, Tiaret, Algeria. [3]Regional Control Laboratory of the quality and repression of fraud, Algiers annex (CACQE), Algeria.	International Journal of Pharmaceutical Sciences Review and Research	https://www.researchgate.net/publication/290452511_Effects_of_treatment_by_refined_soybean_and_extra_virgin_olive_oils_on_lipid_profile_and_lipasic_activity_in_Wistar_Albinos_rats
	Evaluation of the quality and in vivo therapeutic efficacy of a generic Glimepiride manufactured in Algeria, compared to the brand name drug Amarel on alloxan diabetic rats	Meryem Ouazouaz, Meriem Derradj and Cherifa Henchiri*	Cherifa Henchiri*	Laboratory of Applied Microbiology and Biochemistry, Department of Biochemistry, BadjiMokhtar University, Annaba, Algeria	Journal of Chemical and Pharmaceutical Research	https://www.researchgate.net/publication/259008134_Evaluation_of_the_quality_and_in_vivo_therapeutic_efficacy_of_a_generic_Glimepiride_manufactured_in_Algeria_compared_to_the_brand_name_drug_Amarel_on_alloxan_diabetic_rats

Chapter Four Outline

Objective

The Steps on How to Write a Scientific Manuscript

Step 1: Write The Materials and Methods.

Step 2: Present Your Findings

Step 3: Describe Your Results

- Figures
- Tables
- Equations

Step 4: Write The Introduction

- The Literature Review
  - Describe Previous Literature
  - Describe Research Questions

Step 5: Write The Abstract

Step 6: Create The Title Page

Step 7: Write a Clear Conclusion

Step 8: Choose Keywords for Indexing

Step 9: Write The Acknowledgements

Step 10: Mention References

- The Advantages of a Constant Style of References
- Reference Manager

Exercises

Corrections

Chapter Four

Writing a Scientific Report

A scientific report should follow a structured format and adhere to specific stylistic guidelines to ensure clear and concise communication of research findings. The most widely used structure is IMRaD, which stands for Introduction, Methods, Results, and Discussion.

Objective

- To identify the different steps of the academic writing of a scientific article.

The Steps on How to Write a Scientific Manuscript

The following steps outline the process of writing a scientific manuscript:

Step 1. Write the Materials and Methods.

Materials and methods are the most important part of your manuscript, and it should describe what you did in your research. Create a small section, typically of less than 1,000 words, and introduce a writing methodology that requires a lengthy explanation.

- It is essential to clearly explain the resources, materials, data, and protocols used in the study, particularly for those with restricted access.
- The names of suppliers for all antibodies used in the study should be provided.
- Additionally, the methods of statistical analysis should be clearly identified, and any statistical software programs used in the study should be appropriately cited.
- For novel methods, a detailed description is required, while well-established methods can be briefly summarized or referenced appropriately.

Step 2. Present Your Findings

The findings should include a broader or clinical context. Mainly, it should consist of 1000 words of content. And, before you start writing, determine the topics that are important to discuss in your findings.

Step 3. Describe Your Results

Discussing the results in your manuscript is the most important part of your manuscript in which you describe what you did and what you have found.

You can analyze the science and nature scientific reports and find that it is more important to mention what you did and what you found in your report.

Tables and figures may be included in this section:

a. Figures

All figures in the scientific article should have a concise noun title and a concise explanatory caption. Figures should be sequentially ordered in numerical order (e.g., Figure 1 or Figure 1A) throughout the paper.

b.Table
All tables should contain a brief noun title, while all columns should be given an explanatory heading. Tables should be sequentially ordered in numerical order (e.g., Table 1) throughout the paper and inserted in the text near their first citation.

c. Equations
Equations contained in the scientific article should be prepared by equation editors, e.g., Microsoft Equation Editor built in Word, instead of inserted as pictures.

Step 4. Write the Introduction
Mention why you did a study and why the reader must be interested in your findings. Your introduction must describe the clinical or scientific question of interest.

This section provides an overview of the research background, outlining the objectives and significance of the study in relation to existing research in the field.

The introduction section of your research paper should include the following:
- General introduction
- Problem definition
- Literature Review
- Gaps in the literature
- Problems solution
- Aims & objectives
- Significance and advantages of the study

The Literature Review
The literature review section of your research paper should include the following:
- Previous literature
- Limitations of previous research
- Research questions
- Research to be explored

a. Describe Previous Literature
The literature review shows that __
Previous research showed __
Previous studies have shown __
Several studies suggest that __
Prior research suggests that __
Most early studies as well as current work focus on __
Some authors have also suggested that __
This has been discussed by a great number of authors in the literature.
As has been previously reported in the literature, __
Several methods are reported in the literature to address this issue.
It was reported in literature that __
A recent study by __ concluded that __

Limitations of previous research
A number of questions regarding __ remain to be addressed.
A closer look to the literature on __, however, reveals a number of gaps.
This question has previously never been addressed because__
In previous studies were limited to __
These are previously unstudied because __
As far as we know, no previous research has investigated __

b. Describe Research Questions
The study addresses several further questions on __
Some of the interesting questions in this context are __
The question now is how __ can be used to explain __
Study addresses the research question __
In order to properly address this question, we __
An important question associated with __ is __
A critical open question is whether __
A still unsolved question is whether __
This remains an open question as __
This question has previously never been addressed because __
Many questions remain unanswered __
This was an important question to study as __

Step 5. Write the Abstract
The abstract tells readers what is in your research and what important things you mention. Also, by including the title you make your abstract more interesting and easier to understand. The abstract section should include the purpose, scope (methods), results and conclusion

Step 6. Create the Title Page
Title pages are also extremely important as well as popular as most editors attempt to match it with the multiple requirements. While creating the content, be specific that the title page has all the information needed by the journal.

Step 7. Write a Clear Conclusion
This section will help readers know what the actual present state of knowledge. Also, a clear conclusion section will help reviewers judge your work more easily and merit publication in your journal.

Step 8. Choose Keywords for Indexing
Keyword selection is very significant if you are publishing your journal online and you want it to be indexed. While choosing the keyword, avoid words that have a broad meaning and words that are already included in your title.

Step 9. Write the Acknowledgements
In this section, you will mention the names of people who helped prepare the microbiology research paper and thank them, but not to the extent that it doubts your authorship.

Step 10. Mention References

Here you can mention the links and references you took help to write your manuscript. This section will also demonstrate that you know how your findings relate to earlier reports and can assume that your reviewers will be the authors of the paper you mentioned in this section.

- While there are over 1,000 different styles out there **APA and Chicago** are by far the most common.

a. The Advantages of a Constant Style of References

The advantages of having a constant style within a journal are:

- The ease of reading the references at the end of each article
- The ease of finding reference parts by the reader if he/she is used to the format and plan to look up the reference.

b. Reference Managers

Reference managers like **EndNote** and **Mendeley**, are recommended if the scientific article, especially the review article, contains a large number of references.

The previous steps on how to write a scientific manuscript will make your report more valuable, lively, and engaging.

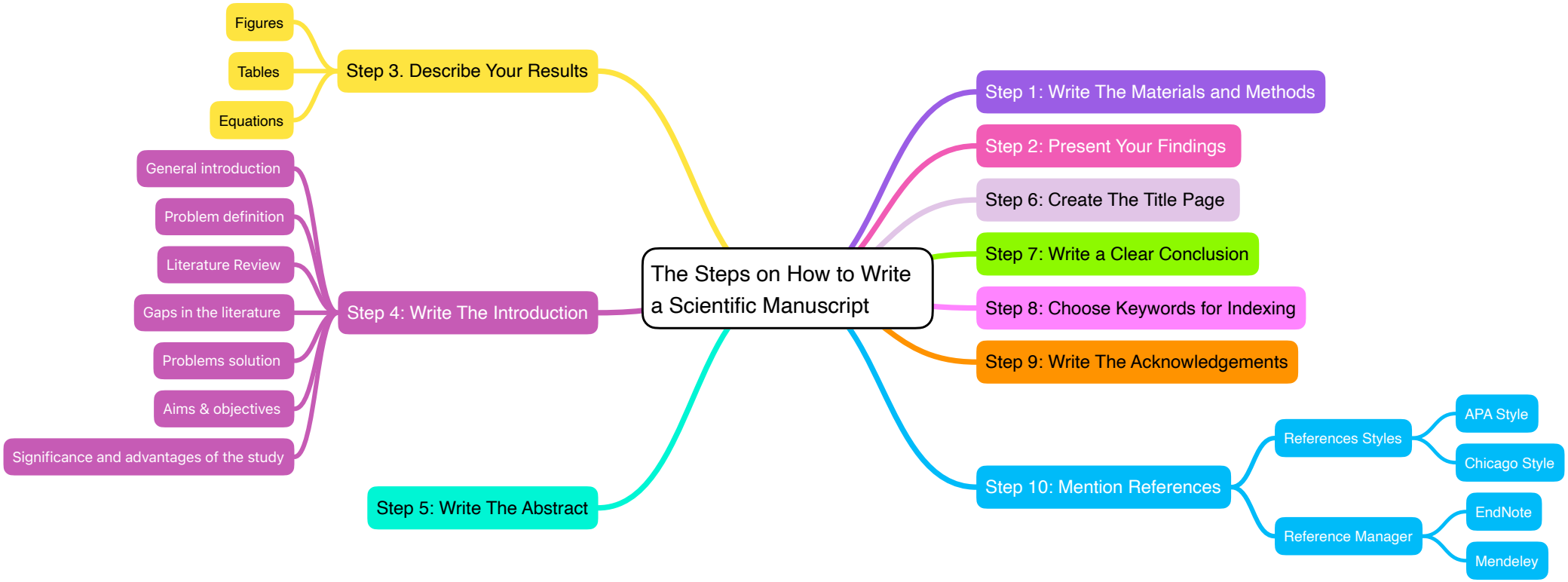

FIGURE 4: THE STEPS ON HOW TO WRITE A SCIENTIFIC MANUSCRIPT

Exercise

Write the reference of the following scientific articles based on **APA** and **Chicago styles**.

Article 1

International Food Research Journal 25(1): 345-350 (February 2018)

Journal homepage: *http://www.ifrj.upm.edu.my*

Evaluation of the ability of *Micrococcus* sp. isolated from Barada river to biodegradation of vegetable oil wastes

*Alsulaiman, A. and Ali Nizam, A.

Department of Plant Biology, Faculty of Science, Damascus University, Syria

Article history

Received: 16 November 2016
Received in revised form: 5 December 2016
Accepted: 6 December 2016

Keywords

Vegetable oil wastes
Optical density
Total viable count
Barada River
Micrococcus.

Abstract

Fifty six strains of *Micrococcus* sp. were isolated from the water samples from Barada River in Damascus. Ten isolates of *Micrococcus* sp. species were taken for the present study for investigate biodegradation ability of vegetable oil wastes under the influence of this genus. The vegetable oil wastes dependent growths of these isolates were assessed for 15 days by monitoring the gradient fluxes in pH, optical density OD and total viable count TVC in the medium. Results showed an increase in OD and TVC as well as fluctuations in pH values. The relationship between these values was studied and determined if the relationships were statistically significant, and values were compared with the results in the positive control to the same strain. Biodegradation activity of different *Micrococcus* sp. species was tested in vegetable oil wastes which showed a good activity with 1% concentration of vegetable oil wastes, but decreased in 2% and 3% concentration. The genus *Micrococcus* sp. showed a good ability to grow in different concentrations of vegetable oil wastes, that refers to the ability of the genus to use vegetable oil wastes as the only carbon source.

(Alsulaiman & Ali Nizam, 2018)

Article 2

International Journal of Herbal Medicine 2022; 10(4): 22-31

International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
www.florajournal.com
IJHM 2022; 10(4): 22-31
Received: 13-06-2022
Accepted: 23-07-2022

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Ashwagandha extraction and its health benefits

Upasana Mahato and Deoraj Sharma

DOI: https://doi.org/10.22271/flora.2022.v10.i4a.826

Abstract

Ashwagandha (*Withania somnifera*, family Solanaceae), a subtropical undershrub is very effective herb in Ayurveda (Indian medicinal system). A number of therapeutic properties of this plant are sedative, hypotensive, anti-ageing, aphrodisiac, anti-inflammatory, Bradycardia, respiration stimulating, anti-tumour and radio-sensitizing. In Indian classical medication Ashwagandha root extract is utilized as a health tonic and is additionally prescribed for some common diseases of the reproductive tract,

(Mahato & Sharma, 2022)

Article 3

Environmental Science and Pollution Research
https://doi.org/10.1007/s11356-022-20036-0

REVIEW ARTICLE

A review of plant-based coagulants for turbidity and cyanobacteria blooms removal

Widad El Bouaidi[1] · Giovanni Libralato[2] · Mountasser Douma[3] · Abdelaziz Ounas[4] · Abdelrani Yaacoubi[4] · Giusy Lofrano[5] · Luisa Albarano[2] · Marco Guida[2] · Mohammed Loudiki[1]

Received: 15 July 2021 / Accepted: 29 March 2022

Abstract
In recent years, the proliferation of Harmful Cyanobacterial Blooms (CyanoHABs) has increased with water eutrophication and climate change, impairing human health and the environment in relation to water supply. In drinking water treatment plants (DWTPs), the bio-coagulation based on natural coagulants has been studied as an eco-friendly alternative technology to conventional coagulants for both turbidity and CyanoHABs removal. Plant-based coagulants have demonstrated their coagulation efficiency in turbidity removal, as reported in several papers but its ability in cyanobacterial removal is still limited. This paper mainly reviewed the application of plant-based coagulants in DWTPs, with focus on turbidity removal, including cyanobacterial cells. The future potential uses of these green coagulants to reduce noxious effects of cyanobacterial proliferation are presented. Green coagulants advantages and limitations in DWTPs are reviewed and discussed summarizing more than 10 years of knowledge.

(El Bouaidi et al., 2022)

Article 4

Chemosphere 330 (2023) 138591

Contents lists available at ScienceDirect

Chemosphere

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

Fixed bed column experiments using cotton gin waste and walnut shells-derived biochar as low-cost solutions to removing pharmaceuticals from aqueous solutions

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[e] USDA-Agricultural Research Service, Pasture Systems and Watershed Management Research Unit, University Park, PA, 16802, USA

(Ndoun et al., 2023)

Correction

Article 1

Reference following APA style

Alsulaiman, A., & Nizam, A. A. (2018). Evaluation of the ability of *Micrococcus sp*. isolated from Barada river to biodegradation of vegetable oil wastes. International Food Research Journal, 25(1), 345-350.

Reference following Chicago style

Alsulaiman, A., and Ali A. Nizam. "Evaluation of the ability of Micrococcus sp. isolated from Barada river to biodegradation of vegetable oil wastes." *International Food Research Journal*. vol. 25, no. 1 (2018): 345-350.

Article 2

Reference of Article 2 following APA style

Mahato, U., & Sharma, D. (2022) Ashwagandha extraction and its health benefits. International Journal of Herbal Medicine. 10(4), 22-31.

Reference of Article 2 following Chicago style

Mahato, Upasana, and Deoraj Sharma. "Ashwagandha extraction and its health benefits." International Journal of Herbal Medicine. Vol. 10, no. 4 (2022): 22-31.

Article 3

Reference following APA style

El Bouaidi, W., Libralato, G., Douma, M., Ounas, A., Yaacoubi, A., Lofrano, G., ... & Loudiki, M. (2022). A review of plant-based coagulants for turbidity and cyanobacteria blooms removal. *Environmental Science and Pollution Research*, *29*(28), 42601-42615.

Or

El Bouaidi, W., Libralato, G., Douma, M., Ounas, A., Yaacoubi, A., Lofrano, et al. (2022). A review of plant-based coagulants for turbidity and cyanobacteria blooms removal. *Environmental Science and Pollution Research*, *29*(28), 42601-42615.

Reference following Chicago style

El Bouaidi, Widad, Giovanni Libralato, Mountasser Douma, Abdelaziz Ounas, Abdelrani Yaacoubi, Giusy Lofrano, Luisa Albarano, Marco Guida, and Mohammed Loudiki. "A review of plant-based coagulants for turbidity and cyanobacteria blooms removal." *Environmental Science and Pollution Research,* vol. 29, no. 28 (2022): 42601-42615.

Article 4

Reference following APA style

Ndoun, M. C., Knopf, A., Preisendanz, H. E., Vozenilek, N., Elliott, H. A., Mashtare, M. L., et al. (2023). Fixed bed column experiments using cotton gin waste and walnut shells-derived biochar as low-cost solutions to removing pharmaceuticals from aqueous solutions. Chemosphere, 330(2023).

Reference following Chicago style

Ndoun, Marlene C, Knopf, Allan, Preisendanz, Heather E, Vozenilek, Natasha, Elliott, Herschel A, Mashtare, Michael L, et al. "Fixed bed column experiments using cotton gin waste and walnut

shells-derived biochar as low-cost solutions to removing pharmaceuticals from aqueous solutions." Chemosphere, Vol. 330, no. 2023, (2023).

Chapter Five Outline

Objectives
Vocabulary Words Express the Purpose
Exercises
Corrections

Chapter Five

Research Vocabulary Words

Vocabulary words are essential for students. They help students to describe their methods, findings, and interpretations precisely in academic work. Mastering these words improves their academic writing and discussions. Furthermore, the vocabulary words have an influence on their reading skills of previous literature and their understanding of the actual meaning of other research.

Objectives

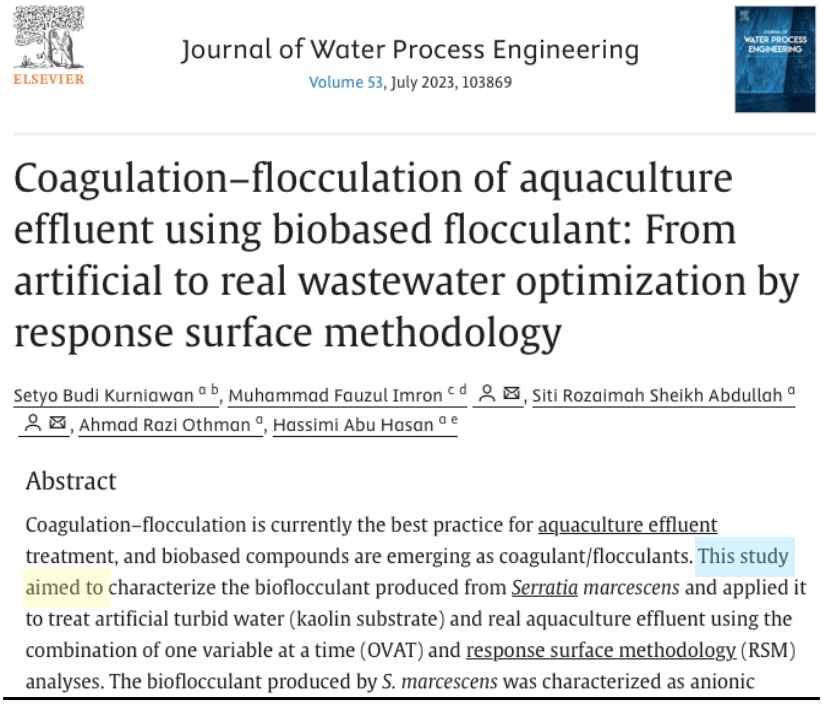
- To identify the most common research vocabulary words that are relevant to what students need to learn. This lesson helps students to record and learn new vocabulary.

Vocabulary Words Express the Purpose

To express the purpose of a paper or research

Subject	Verbs	Recommended Substitute
This paper	aimed to	This paper + [use the verb that originally followed "aims to"] or This paper + (any other verb listed above as a substitute for "explain") + who/what/when/where/how X. For example: "This paper applies X to Y," instead of, "This paper aims to apply X to Y." "This paper explores how lower sun exposure impacts moods," instead of, "This paper aims to address the impact of lower sun exposure on moods."
This study		
This research		
This investigation		
This work		

For example:



Journal of Water Process Engineering
Volume 53, July 2023, 103869

Coagulation–flocculation of aquaculture effluent using biobased flocculant: From artificial to real wastewater optimization by response surface methodology

Setyo Budi Kurniawan [a b], Muhammad Fauzul Imron [c d] ✉, Siti Rozaimah Sheikh Abdullah [a] ✉, Ahmad Razi Othman [a], Hassimi Abu Hasan [a e]

Abstract

Coagulation–flocculation is currently the best practice for aquaculture effluent treatment, and biobased compounds are emerging as coagulant/flocculants. This study aimed to characterize the bioflocculant produced from *Serratia marcescens* and applied it to treat artificial turbid water (kaolin substrate) and real aquaculture effluent using the combination of one variable at a time (OVAT) and response surface methodology (RSM) analyses. The bioflocculant produced by *S. marcescens* was characterized as anionic

(Kurniawan et al., 2023)

To Introduce the Topic of a Project or Paper

Subject	Verbs	Recommended Substitute
The paper	discusses/ presents	surveys
The study		questions
The research		highlights
The investigation		outlines
The work		features

For example:

activated carbon in an attempt to prepare carbons for various applications. In any case, the number of variables of an activation process is large and knowledge of them is very important to develop the porosity sought for a given application. In this sense, this paper presents the evolution in porosity of several series of activated carbons prepared by physical and chemical activation of lignocellulosic materials in an attempt to show the comparative behavior of both activation procedures and to clarify some mechanistic aspects. Activated carbons prepared from almond shells and olive and peach stones by partial gasification of the corresponding chars with CO_2 (uncatalysed and catalysed by iron) or a water-nitrogen mixture are compared with carbons prepared by impregnation with $ZnCl_2$ followed by a simple heat treatment.

(Rodriguez-Reinoso & Molina-Sabio, 1992)

To Describe the Analytical Scope of a Paper or Study

Subject	Verbs	Recommended Substitute
The paper	considers/ analyzes/ explains	evaluates
		interprets
The investigation		clarifies
		identifies
This study		delves into
		advances
This research		appraises
		defines
This work		dissects
		probes
Prior research/ investigations…		tests
		explores
*Adjectives to describe degree can include: briefly, thoroughly, adequately, sufficiently, inadequately, insufficiently, only partially, partially, etc.		

For example:

usually used traditionally by the communities for food medicine and cosmetics; and used as a disinfectant and to inhibit microorganisms (Megersa 2018; Varkey 2020). Therefore, this research evaluates the performance of biocoagulant active extracts from *M. stenopetala* seeds, aloe vera leaves, and cactus leaves using 1 M NaCl solution for the effective removal of turbidity and *Escherichia coli*.

(Nigussie & Habtu, 2023)

To Discuss the Results

Purpose	Subject	Original Word/ Phrase	Recommended Substitute
To draw inferences from results	The data…	suggest/ show	extrapolate
			deduce
			surmise
			approximate
	These findings…		derive
			extract
			evidence
To describe observations	[Observed event or result]…	appeared/ was observed to	manifested
			surfaced
			materialized
			yielded
			generated
			perceived
			detected
To express agreement between one finding and another	This paper/ study/ investigation	supports	substantiates
			confirms
			corroborates
			underlines

For example:

In this work, RSM showed exceptional performance in optimizing the treatment conditions for artificial and real aquaculture wastewater. However, some other optimization methods/models may suggest different results, such as artificial neural network (ANN) [99,100]. Comparison of optimized conditions between RSM and ANN would be an interesting topic [101] to enrich the knowledge on the optimization of wastewater treatment conditions.

(Setyo Budi Kurniawan et al., 2023)

To Explain the Impact of New Research/ To Conclude

Purpose	Subject	Verbs	Recommended Substitute
To explain the impact of a paper's findings	The paper	demonstrates/ shows	illustrates
	The study		proves
	The research		evidences
	The investigation		strengthens (the position that)
	The work		
To highlight a paper's conclusion	The paper	establishes/ proves	attributes
	The study		illustrates
	The research		Highlights
	The investigation		attributes
To explain how research contributes to the existing knowledge-base	The study	offers/ introduces	proffers
			conveys
	The research		promotes
	The investigation		advocates
			introduces
	The paper		reveals

For example:

5. Conclusion

The present study revealed that the levels of lead, cadmium, mercury, chromium, and nickel in cigarettes were significant, emphasizing the need for continuous monitoring of metal contamination in tobacco products. The findings highlight the health risks associated with exposure to these toxic metals, particularly their links to severe diseases such as cancer and neurological disorders. Establishing stricter regulatory standards is essential to safeguard consumers and raise public awareness about the potential dangers of smoking. Furthermore, addressing environmental pollution and soil contamination is crucial to minimizing the accumulation of toxic elements in tobacco crops and, consequently, in cigarette products.

(Chebli et al., 2025)

Exercise

- Based on the different parts of the abstract, there are specific verbs that express each part. Extract these verbs from the abstract of this scientific article.

Verbs express the Purpose	Verbs express the Methods	Verbs express the Results	Verbs express the Conclusion
- -	- -	- -	- -

Article 1

TECHNOLOGY TRANSFER: INNOVATIVE SOLUTIONS IN MEDICINE, 2017

THE GC-MS DETERMINATION OF CHEMICAL CONSTITUENTS FROM HARPAGOPHYTUM PROCUMBENS DC ROOTS

Anna Kriukova
Postgraduate student[1]
kriukova92@gmail.com

Inna Vladimirova
PhD, Associate Professor[1]
[1]Department of Pharmacognosy
National University of Pharmacy
53 Pushkinska str., Kharkiv, Ukraine, 61002

Abstract: The present work is devoted to the study of the component composition of the volatile fraction of the heptanoic extract from Harpagophytum procumbens roots ("Starwest Botanicals", USA).
For this purpose the use of gas chromatography-mass spectrometry (GC-MS) was proposed. The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The quantitative content of the components was calculated by the method of the internal standard. The components with the probability of coincidence for mass spectra of more than 90 % were taken into account.
As a result of the study more than 31 substances have been identified. Among the main groups of compounds the presence of aromatic hydrocarbons, esters and fatty acids, as well as alkanes and alkenes should be mentioned. Hexadecanoic acid (29.92 mg/kg), Octadec-9-enoic acid (21.39 mg/kg), 8-[4-[N-Aziridyl]butyl]amino-2,6-dimethyl-2,6-octadiene (6.46 mg/kg), Pentacosane (5.85 mg/kg), Hexadecanoic acid, trimethylsilyl ester (4.53 mg/kg) prevail in terms of quantity. Based on the results obtained the conclusion can be made that Harpagophytum procumbens DC is a promising herbal source for obtaining active ingredients with the anti-inflammatory, regenerative, analgesic, immunostimulating properties.
Keywords: Harpagophytum procumbens DC, chemical constituents, chemical structure, gas chromatography combined with mass spectrometry.

1. Introduction

The modern stage of using herbal medicinal products is based not only on the rational use of the current experience, but also on achievements of pharmacy in the field of studying the composition and peculiarities of the biological activity of medicinal plants [1]. As a result of the numerous studies conducted it has been proven that medicinal plant raw material (MPRM) and drugs based on them contain unique combinations of biologically active substances providing a wide range of the therapeutic action [2].

Harpagophytum procumbens DC (Devil's claw) belongs to the Pedaliaceae family and is also known as grapple plant, wood spider, and harpago. It is native to the southern part of the African continent and may be found in the Kalahari Sands of Namibia, South Africa, Angola, Zambia, and Zimbabwe [3]. It has historically been used to treat several symptoms such as fever, malaria, indigestion and pain [4]. In addition, it was demonstrated that H. procumbens extracts have beneficial effects in the case of rheumatic diseases according to animal and clinical studies [5]. There have been reports verifying the anti-inflammatory effects of H. procumbens extracts on acute or sub-chronic inflammation in a rat mode [6].

Preparation of the analytical test

Grind the accurate weight (approximately 0.500 g) to the powder (355) and place in a 20 ml vial with addition of the internal standard – tridecane. Take the standard in the amount of 50 µg per the accurate weight with the subsequent determination of the resulting concentration of the internal standard used for the final calculations. Dissolve the sample in 20 ml of water R and distill volatile compounds under reflux at the temperature of 100 °C for 4 h. Extract the resulting aqueous extract with heptane R with the subsequent concentration in the flow of nitrogen gas (100 ml/min) to the residual volume of the solution of 10 µl. Carry out further sample concentration to the volume of 2 µl directly in the syringe.

Gas Chromatography – Mass Spectroscopy Analysis

The GC-MS analysis was carried out on an Agilent 6890N/5973 inert gas chromatograph/mass selective detector (Agilent Technologies, USA). The column used was HP-5MS – the capillary column with the size of 30 m × × 0.25 mm and the layer thickness of 0.25 mm.

Helium gas (99.999 %) was used as a carrier gas at a constant flow rate of 1ml/min, and the injection volume of 2µl (the split ratio – 1:50). The temperature

(Kriukova et al., 2025)

Article 2

Assessment of toxic elements contamination in cigarettes sold in algeria and associated health risks

A.I. CHEBLI [c,d,*], Z. CHELIGHEM [a], A. ZERGUI [b], A. AMZIANE [c,d], Y. ZEBBICHE [c], A. BELLOUM [a], S. ABDENNOUR [e]

A B S T R A C T

Introduction: Tobacco consumption remains a critical public health concern globally, with Algeria among the highest tobacco-consuming countries in Africa. Cigarettes contain toxic elements like lead, cadmium, mercury, chromium, and nickel, contributing to severe health risks, including cancer and cardiovascular diseases. This study aimed to (i) determine their concentrations in Algerian cigarettes and (ii) evaluate associated non-carcinogenic and carcinogenic health risks in smokers.

Materials and Method: A total of 200 samples from 25 brands were randomly collected from various retail outlets, then analyzed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). To assess their health risks, Average Daily Dose (ADD), the Hazard Quotient; (HQ), the Hazard Index (HI), and the lifetime average daily dose (LADDi) were calculated and compared with international Studies.

Results and Discussion: Analysed tobacco brands sold in Algeria have found to be contaminated by Pb, Cd, Hg, Cr, and Ni. The highest levels of Pb, Cd, Hg, Cr, and Ni were 19.02 ± 0.26, 0.72 ± 0.02, 0.450 ± 0.05, 8.96 ± 0.18, and 4.93 ± 0.06 $\mu g.g^{-1}$ respectively. The limits of quantification (LOQ) were determined as follows: 0.0011 µg/g for Pb, 0.0018 µg/g for Cd, 0.0017 µg/g for Hg, 0.0013 µg/g for Cr, and 0.0014 µg/g for Ni. Recovery rates exceeded 80 % for all elements, ensuring the reliability of the analytical method. The Brand n°06 had the highest content in Pb, Hg, and Cr. This metallic contamination can be due to soil pollution as tobacco plants are highly capable of absorbing toxic elements, but also the manufacturing process and the use of flavours.The non-carcinogenic risk with HI > 1 was found in 96 % of the brands, primarily from lead and cadmium while 44 % had acceptable carcinogenic risks, mainly related to chromium.

Conclusion: This study highlights the presence of toxic elements in cigarettes sold in Algeria at levels that could pose significant health risks. Given the scarcity of data on this issue in the region, our findings emphasize the need for stricter regulations and further studies to better assess and mitigate the exposure of Algerian smokers to these toxic elements.

(Chebli et al., 2025)

Correction

Article 1

THE GC-MS DETERMINATION OF CHEMICAL CONSTITUENTS FROM HARPAGOPHYTUM PROCUMBENS DC ROOTS

Anna Kriukova
Postgraduate student[1]
kriukova92@gmail.com

Inna Vladimirova
PhD, Associate Professor[1]
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Helium gas (99.999 %) was used as a carrier gas at a constant flow rate of 1ml/min, and the injection volume of 2µl (the split

Verbs express the Purpose	Verbs express the Methods	Verbs express the Results	Verbs express the Conclusion
- Devoted	- Proposed - Was Carried out - Was Calculated - Were Taken	- Have been identified - Should be mentioned	- Can be made

Note:
It can be noted that the above words, which are colored green, are not verbs.
In "**the results obtained**", "**obtained**" is a **past participle** form of the verb "**obtain**."
Grammatically, it's being used as a past participial adjective modifying "results."
Base verb form: to obtain → obtained
Function in this phrase: adjective (describing which results)
So, "**obtained**" comes from a verb, but here it functions as **an adjective**.

In "DC is a promising …", "promising" is NOT a verb.
Base verb form: to promise
Form: promising (present participle)
Function here: adjective, describing it

"for obtaining active…"
Base verb form: to obtain

Form: obtaining (-ing form)
Function here: gerund (a verb form used as a noun)
Why? Because after "**for**", English uses **a noun**, and "**obtaining**" **names an action**.
for obtaining active … → gerund (verb → noun use)

Article 2

Assessment of toxic elements contamination in cigarettes sold in algeria and associated health risks

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A B S T R A C T

Introduction: Tobacco consumption remains a critical public health concern globally, with Algeria among the highest tobacco-consuming countries in Africa. Cigarettes contain toxic elements like lead, cadmium, mercury, chromium, and nickel, contributing to severe health risks, including cancer and cardiovascular diseases. This study aimed to (i) determine their concentrations in Algerian cigarettes and (ii) evaluate associated non-carcinogenic and carcinogenic health risks in smokers.
Materials and Method: A total of 200 samples from 25 brands were randomly collected from various retail outlets, then analyzed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). To assess their health risks, Average Daily Dose (ADD), the Hazard Quotient; (HQ), the Hazard Index (HI), and the lifetime average daily dose (LADDi) were calculated and compared with international Studies.
Results and Discussion: Analysed tobacco brands sold in Algeria have found to be contaminated by Pb, Cd, Hg, Cr, and Ni. The highest levels of Pb, Cd, Hg, Cr, and Ni were 19.02 ± 0.26, 0.72 ± 0.02, 0.450 ± 0.05, 8.96 ± 0.18, and 4.93 ± 0.06 $\mu g.g^{-1}$ respectively. The limits of quantification (LOQ) were determined as follows: 0.0011 µg/g for Pb, 0.0018 µg/g for Cd, 0.0017 µg/g for Hg, 0.0013 µg/g for Cr, and 0.0014 µg/g for Ni. Recovery rates exceeded 80 % for all elements, ensuring the reliability of the analytical method. The Brand n°06 had the highest content in Pb, Hg, and Cr. This metallic contamination can be due to soil pollution as tobacco plants are highly capable of absorbing toxic elements, but also the manufacturing process and the use of flavours.The non-carcinogenic risk with HI > 1 was found in 96 % of the brands, primarily from lead and cadmium while 44 % had acceptable carcinogenic risks, mainly related to chromium.
Conclusion: This study highlights the presence of toxic elements in cigarettes sold in Algeria at levels that could pose significant health risks. Given the scarcity of data on this issue in the region, our findings emphasize the need for stricter regulations and further studies to better assess and mitigate the exposure of Algerian smokers to these toxic elements.

Verbs express the Purpose	Verbs express the Methods	Verbs express the Results	Verbs express the Conclusion
- aimed	- Were collected - Analyzed - Were calculated - Compared	- Have found - Were determined - Was found	- Highlights - Emphasise

Chapter Six Outline

Objectives
Most Useful Biological Prefixes and Suffixes
Exercises
Corrections

Chapter Six

Most Useful Biological Prefixes and Suffixes

In biology, many terms are formed by combining Latin and Greek prefixes and suffixes. Understanding these components can help decipher the meanings of complex scientific words.

Objectives

- To identify the most useful biological **Prefixes** and **Suffixes**. At the end of this lesson, students will improve their terminology .
- Perform some exercises to assess students' abilities in identifying the correct prefixes and suffixes from biological terminologies.

Most Useful Biological Prefixes and Suffixes

Here are some common biological prefixes and suffixes:

Prefix or suffix a-	Meaning	Examples
a-	not, without	Asexual (without sex)
ab-	Away from	Abnormal (departing from normally)
-algia	Pain	Neuralgia
amyl-	starch	Amylopsin
an-	not, without	Anhydrous
ante-	before, in front of	Anterior
anti-	against, opposed to	Antitoxin
		Antibodies
aqua-	water	Aquatic
-ase	designating an enzyme	Amylase
auto-	self	Autotroph (self nourishing)
Bi-	Two, Twice	Biennial (two year life span plant)
		Biceps
		Bifocal
Bio-	Life, Living	Biology (the study of life),
Blast, blasto-	An embryonic layer or cell	Blastomere

Prefix or suffix a-	Meaning	Examples
Bronchi-	Windpipe	Bronchioles (small tubes in the lungs)
Cardi-	Heart	Cardiovascular
Carp-	Fruit	Metacarpals
Cata-	Decomposition	Catabolic
-cephal-	head	Acanthocephala
		Cephalic
Chlor-	Green	Chlorophyll
Chrom-	color	Chromosome
		Chromoplast
Circum-	Around	Circumcise
Contra-	Against	Contraception
Cyst-, -cyst	Sac or vesicle, bladder	Cystitis
		Oocyst
-cyte, cyto-	cell	Cytoplasm
-dermic	skin	Hypodermic, dermis
-ectomy	surgical removal	Mastectomy (removal of breast tissue).
di-	Two, Twice	Disaccharide
		Dichromic
dia-	through, between, Across,	Diaphragm
Diplo-	Double, twice	Diploid cell
Ecto-	Outer, external	ectoderm
em-, en-, endo-	in, into, Within, internal	embolism
		endoskeleton
-emia	blood	Leukemia
		Anemia
Epi-	Above, upon	Epiglottis
		Epidermis
Erythro-	red	Erythrocyte
Eu-	Good, true	Eukaryotic

Prefix or suffix a-	Meaning	Examples
Ex-, exo	Outer, external	Exoskeleton
Extra-	Outside, beyond	Extracellular
Gastro-	Stomach, Belly	Gastric juice
		Pneumogastric
-gen-	Produce, to give birth	Genital (of or relating to biological reproductive organs)
		Genetics
		Glycogen
glyc-	glucose, sugar	Glycosuria
		Glycolysis
Gymno-	Naked	gymnosperms (vascular plants that bear naked or unenclosed seeds)
Heme-, hemo	Blood	hemoglobin (iron containing protein in red blood cells)
		Hemorrhage
Hemi-	Half, partial	hemiparasite (organism that is able to live either as a parasite or independently)
hetero-	different, other	heterozygous (having two different alleles for a given trait)
Hepat-	Liver	hepatitis (inflammation of the liver)
homo-	alike, same	homozygous (having two alleles for a given trait that are the same)
hydro-	water	hydrolytic
hyper-	over, more than	hypersecretion
		hyperthyroidism (condition resulting from the excessive production of thyroid hormones)
Hypo-	Under, beneath, lacking	hypodermic (of or pertaining to the parts under the skin)
inter-	between, together	intercostal
		intrecellular
intra-	within	intrathoracic
		intercellular
ir-	not	irregular

Prefix or suffix a-	Meaning	Examples
iso	equal	isotonic
kin-	to move or activate	kinetic
-lac-	milk	Lactase
		Prolactin
		Lactose (milk sugar)
leuco-, leuko-	white	leucocyte
-ology	science, knowledge	physiology
-otomy	cut into	Tracheotomy (cutting into the trachea)
lymph-, lympho-	lymph	lymphocyte
-lysin, -lysis, -lytic	dissolve, destroy	hemolysis
		lysosome
Macro-	large	macromolecule
		Macrophage
melan-, melen-	black	melanoma, melena
Mega-	million	megabyte
-meter	measure	manometer
Micro-	small	Microorganism
		Microscopic
Mill-	Thousand	Milliliter
Mono-	One	Monosaccharide
		Monocyte
Myo-	muscle	myosin
		Myoglobin
Myc-	Fungi	Mycorrhize
Ocul-	Eye	Oculus (an eye)
Ovi-	Egg	oviducy, ovipositor
Olig-	Few, little	oligosaccharide (a carbohydrate that contains a small number of component sugars)

Prefix or suffix a-	Meaning	Examples
Para-	near, by, beside	parathyroid (near or within the thyroid gland)
Patho-	disease, suffering	pathogen (disease causing agent)
Photo-	Light	Photosynthesis
Phago-	to eat	phagocyte
-phil-	loving	basophil, eosinophil
-plasm-	substance	cytoplasm, plasmolysis
Pneumo-	air, lungs	pneumonia
-ped	foot	pseudoped
Poly-	many	polysaccharide
		polysome (many ribosomes attached to a messenger RNA)
Post-	after, behind	postganglionic
Pro-	before, giving rise to	proenzyme
Pre-	Before, prior	Prenatal (Occurring or existing before birth)
		Pre-mature
		Pre-mRNA
Pseudo-	FALSE	pseudoscience (practice that resembles science but is considered to be without scientific foundation)
		pseudoped
Psycho-	mind	psychology (science that deals with mental processes and behavior)
Pulmo-	lung	pulmonary
-renal	kidney	adrenal
Re-	Back again	Regeneration (Re-growth of a body part)
Rhiz-	Root	Rhizoids (root-like structures in some fungi)
Sacchar-	Sugar	disaccharide (double sugar, example: sucrose - composed of glucose and fructose)
Semi-	Half, partial, incomplete	Semi-permeable membrane
Soma-	body	somatic cell

Prefix or suffix a-	Meaning	Examples
Soma-	body	chromosome
Toxi-, Toxo-	poison	toxin
Sub-	Below, under, smaller	subspecies
Sym, Syn-	Together, with	synthesis
tetra	Four	tetrapod
Trans-	Across, through, over	Transmembrane protein
Tri	three	trisomy
Uni-	Consisting of one	unicellular
Zo-	animal	Zoology

Exercises

Exercise 1

Complete the following table using the **prefix** or **suffix**, **the meaning**, and/or **an example** of it in **a word**

PREFIX/SUFFIX	MEANING	EXAMPLE OF IT IN A WORD
	Two or **Twice**	
hyper-		
	against or **opposed to**	
-lac-		
	Few or **little**	
	Skin	
	one or **single**	

Correction

PREFIX/SUFFIX	MEANING	EXAMPLE OF IT IN A WORD
Bi-	Two or Twice	Bilayer, Bifocal
Di-		disaccharide, dichromic
Diplo-		Diploid cell
hyper-	over, more than	hypersecretion
Anti-	against or opposed to	Antibody, Antigen
Contra-		contraception
-lac-	Milk	lactase, prolactin, lactose
Oligo	Few or little	Oligosaccharide
-derm-	Skin	hypodermic, dermis
Uni-	one or single	Unicellular
Mono-		monocyte, monosaccharide

Exercise 2

Answer the following questions using the prefix and suffix lists.

- What are two prefixes that mean **one** or **single**?
- What are two suffixes that mean **cut** or **cut out**?
- What are two prefixes that mean **above** or **on**?
- What are two prefixes that mean **two or twice**?

Correction

Two prefixes that mean **one** or **single** are:

- **uni-**
- **mono-**

Two suffixes that mean **cut** or **cut out** are:

- **-ectomy**
- **-otomy**

What are two prefixes that mean **above** or **on**?

- **super-**
- **epi-**

What are two prefixes that mean **two or twice**?

- **Di**
- **Bi-**

Chapter Seven Outline

Introduction
Objectives
Definition of Plagiarism
Types of Plagiarism

- Complete Plagiarism
- Source-based Plagiarism
- Direct Plagiarism
- Self or Auto Plagiarism
- Paraphrasing Plagiarism
- Accidental Plagiarism
- Mosaic Plagiarism

Reasons for Plagiarism
Best Practices to Avoid the Plagiarism
Exercises
Corrections
Assignment

Chapter Seven

Plagiarism

Plagiarism is an extremely important topic for university students because understanding and avoiding it is fundamental to academic integrity and future professional credibility.

Objectives

- Students will be able:
  - to distinguish between different forms of plagiarism.
  - to list common reasons why plagiarism occurs.
- Students will appreciate that plagiarism is a serious breach of academic ethics, regardless of whether it is intended or unintended.

Definition of Plagiarism

Plagiarism is presenting someone else's work, including the work of other students, as one's own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged, unless the information is common knowledge. What is considered "common knowledge" may differ from course to course.

All of the following are considered plagiarism:

- Turning in someone else's work as your own
- Copying words or ideas from someone else without giving credit
- Failing to put a quotation in quotation marks
- Giving incorrect information about the source of a quotation
- Changing words but copying the sentence structure of a source without giving credit
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not (see our section on "fair use" rules)

Types of Plagiarism

1. ***Complete Plagiarism***

   Complete plagiarism is the most severe form of plagiarism, where a researcher takes a manuscript or study that someone else created, and submits it under his or her name. It is tantamount to intellectual theft and stealing.

2. ***Source-based Plagiarism***

   Plagiarism may occur because of the different types of sources. For example, when a researcher references a source that is incorrect or does not exist, it is a misleading citation. Plagiarism also occurs when a researcher uses a secondary source of data or information, but only cites the primary source of information. Both these types lead to an increase in the number of reference sources. This, in turn, increases the citation number of the references.

3. ***Direct Plagiarism***
   Direct or verbatim plagiarism occurs when an author copies the text of another author, word for word, without the use of quotation marks or attribution, thus passing it as his or her own. In that way, it is like complete plagiarism, but it refers to sections (rather than all) of another paper. This type of plagiarism is considered dishonest and it calls for academic disciplinary actions. It is not as common, but it is a serious infraction of academic rules and ethics.

4. ***Self or Auto Plagiarism***
   Auto-plagiarism, also known as self-plagiarism or duplication, happens when an author reuses significant portions of his or her previously published work without attribution.

5. ***Paraphrasing Plagiarism***
   The most common type of plagiarism. It involves the use of someone else's writing with some minor changes in the sentences and using it as one's own. Even if the words differ, the original idea remains the same and plagiarism occurs.

6. ***Accidental Plagiarism***
   Whether intended or unintended, there is no excuse for plagiarism and the consequences are often the same. However, plagiarism may be accidental if it occurred because of neglect, mistake, or unintentional paraphrasing.

7. ***Mosaic Plagiarism***
   Mosaic plagiarism may be more difficult to detect because it interweaves someone else's phrases or text within its own research. It is also known as patchwork plagiarism and it is intentional and dishonest.

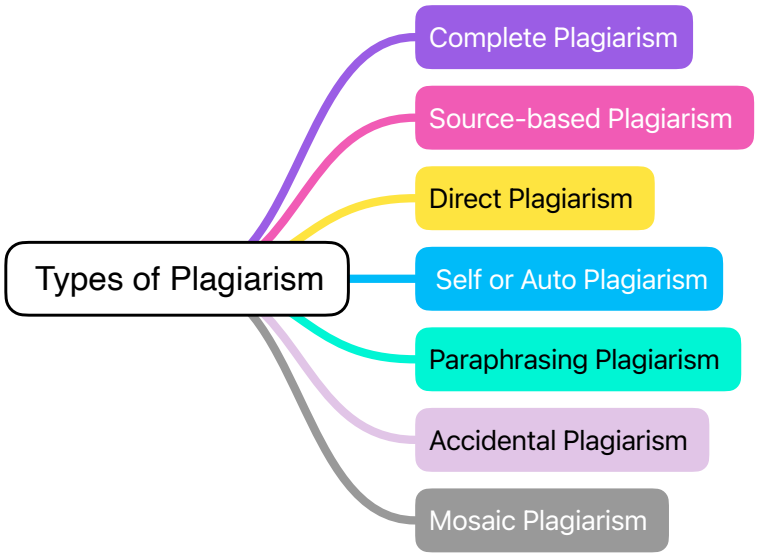

FIGURE 5: VARIOUS TYPES OF PLAGIARISM

Reasons for Plagiarism

- Lack of awareness of plagiarism
- Lack of training in report writing and citing
- Lack of time management skills
- Academic pressure
- Peer pressure
- Pressure from families and friends

Best Practices to Avoid Plagiarism

1. Cite your Source

When alluding to an idea or wording that's not your own, add a citation in your writing that identifies the full name of the source, the date it was published, and any other citation element that's required by the style guide you're adhering to.

2. Paraphrase

Paraphrasing is rewriting a source's ideas or information into your own words, without changing its meaning. But be careful—paraphrasing can slip into plagiarism if done incorrectly.

3. Present your Own Idea

Instead of parroting the source's ideas or words, explore what you have to say about it. Ask yourself what unique perspective or point you can contribute to your writing that's entirely your own.

4. Use a Plagiarism Checker

While conducting your research on a topic, some phrases or sentences might stick with you so well that you inadvertently include them in your writing without a citation. When in doubt, using an online plagiarism checking tool can help you catch these issues before submitting your work.

Exercises

Exercise 1

- Check whether the following reproduces texts from the original text that are plagiarized or not. Mention the plagiarism type in each reproduced text that has plagiarism:

Original text (from the original scientific article)	Reproduced text (to write a new article)	Type of plagiarism/ no plagiarism
Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women. (Collatuzzo et al, 2020).	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women (Collatuzzo et al, 2020).	
	About two-thirds of all occurrences of lung cancer worldwide are linked to tobacco use, making it the leading cause of cancer-related deaths worldwide. In 2020, smoking was responsible for 23.9% and 7.7% of new cancer cases in Italian men and women, respectively.	
	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women (Malezzi et al, 2020).	
	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women.	
	About two-thirds of all occurrences of lung cancer worldwide are linked to tobacco use, making it the leading cause of cancer-related deaths worldwide. In 2020, smoking was responsible for 23.9% and 7.7% of new cancer cases in Italian men and women, respectively (Collatuzzo et al, 2020).	
A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers (Chebli et al., 2025)	A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers (Ablennour et al., 2025)	
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	According to a recent study, cigarettes marketed in Algeria include high concentrations of harmful metals like lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which put smokers' health at serious risk for both cancer and non-cancer.	
	According to a recent study, cigarettes marketed in Algeria include high concentrations of harmful metals like lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which put smokers' health at serious risk for both cancer and non-cancer (Chebli et al., 2025)	
	A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers	

Correction

Original text (from the original scientific article)	Reproduced text (to write a new article)	Type of plagiarism/ no plagiarism
Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women. (Collatuzzo et al, 2020).	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women (Collatuzzo et al, 2020).	**No plagiarism**
	About two-thirds of all occurrences of lung cancer worldwide are linked to tobacco use, making it the leading cause of cancer-related deaths worldwide. In 2020, smoking was responsible for 23.9% and 7.7% of new cancer cases in Italian men and women, respectively.	**Paraphrasing Plagiarism**
	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women (Malezzi et al, 2020).	**Source-based Plagiarism**
	Tobacco smoking is globally the first cause of cancer death, and is related to approximately two-thirds of all lung cancer cases worldwide. Smoking caused 23.9% and 7.7% of new cancer cases in 2020 in Italian men and women.	**Direct Plagiarism**
	About two-thirds of all occurrences of lung cancer worldwide are linked to tobacco use, making it the leading cause of cancer-related deaths worldwide. In 2020, smoking was responsible for 23.9% and 7.7% of new cancer cases in Italian men and women, respectively (Collatuzzo et al, 2020).	**No plagiarism**
A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers (Chebli et al., 2025)	A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers (Ablennour et al., 2025).	**Source-based Plagiarism**
	A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers (Chebli et al., 2025).	**No plagiarism**
	According to a recent study, cigarettes marketed in Algeria include high concentrations of harmful metals like lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which put smokers' health at serious risk for both cancer and non-cancer.	**Paraphrasing Plagiarism**
	According to a recent study, cigarettes marketed in Algeria include high concentrations of harmful metals like lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which put smokers' health at serious risk for both cancer and non-cancer (Chebli et al., 2025).	**No plagiarism**
	A recent study found that cigarettes sold in Algeria contain significant levels of toxic elements including lead (Pb), cadmium (Cd), mercury (Hg), chromium (Cr), and nickel (Ni), which pose substantial non-carcinogenic and carcinogenic health risks to smokers.	**Direct Plagiarism**

Conclusion

In conclusion, this course provides a comprehensive framework for navigating and contributing to the scientific community with precision and integrity. Students can successfully base their work on current knowledge by becoming proficient in the Literature Research Methodology and identifying various types of scientific literature. Furthermore, students' understanding of the standard structure of a scientific article and the nuance of academic writing enables them to communicate their findings clearly and professionally. Additionally, building a strong foundation in Research Vocabulary and Biological Prefixes and Suffixes empowers students to decode and use complex terminology accurately. Ultimately, adhering to ethical standards regarding Plagiarism safeguards the credibility of the researcher and the progress of science as a whole.

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Abbreviations

APA: American Psychological Association
E.g.: For example" or "such as"
IMRaD: Introduction, Methods, Results, and Discussion
TCE: Techniques of communication and expression

Glossary

Term	Definition
Abstract	A brief summary at the beginning of a scientific article that concisely describes the purpose, scope (methods), results, and conclusion of the study.
Academic pressure	Stress related to academic performance and expectations, which can be a motivating factor for engaging in plagiarism.
Acknowledgments	A section in an article where authors formally thank individuals or organizations that provided assistance, funding, or support during the research or writing process.
Affiliation	The institution (university, research center, hospital, etc.) where an author was employed or associated while conducting the research.
Alluding	Indirectly referring to an idea or wording that originated from another source, which still requires proper citation.
APA style	A common citation and formatting style (American Psychological Association) used for references and bibliography. Other styles include Harvard, Oxford, and Chicago.
Author list	The complete list of individuals who contributed significantly to the research and the writing of the article.
Berrypicking	A non-linear search strategy where the user's information needs and search queries evolve as they gather information and follow new leads found in relevant sources.
Best practices	Recommended techniques, methods, or procedures proven to be effective in avoiding issues, such as plagiarism.
Bibliographic research methodology	The systematic process of finding, evaluating, organizing, and utilizing existing published information (literature) on a specific topic to inform new research.
Citation	The act of attributing the source of ideas, words, or expressions to the original author, which is crucial for academic integrity and avoiding plagiarism.
Citation element	Specific pieces of information required by a style guide for a reference (e.g., author name, publication date, title, publisher).
Citation searching	A search strategy involving using an existing, highly relevant article to find other sources that have cited that article since its publication.
Conference papers/ proceedings	Written documents often presenting early findings that are shared at academic conferences before or instead of formal journal publication.
Corresponding author	The designated author responsible for handling all communication throughout the refereeing and publication process, as well as addressing post-publication queries.
Dissertation	A lengthy, detailed formal document submitted in support of candidature for a doctoral degree, based on extensive original research.
Footnote chasing	A search strategy where the researcher examines the references or bibliography of a relevant source to find other useful, foundational works on the topic.

Term	Definition
Grey literature	Scientific and technical material produced outside of traditional academic publishing and distribution channels (e.g., technical reports, theses, working papers), often not indexed in commercial databases.
Hypothesis	An idea or a tentative statement/explanation that is proposed as a possible outcome for a study and is tested through research.
Interpret	To explain the meaning of information or results, often in the context of a broader theory or existing literature.
Lack of awareness	Not being informed about what constitutes plagiarism or academic misconduct.
Literature review	A section of a research paper or a standalone work that summarizes, critiques, and synthesizes existing scholarly literature on a particular topic.
Opinion pieces	Short articles, letters, or commentaries in scientific publications that express expert views or brief interpretations of data, rather than formal research findings.
Paraphrasing	Rewriting another source's ideas or information into your own words and sentence structure while maintaining the original meaning, requiring citation to avoid plagiarism.
Parroting	Slang term for mindlessly repeating or copying someone else's ideas or words without critical thought or proper attribution.
Patents	Legal documents that grant property rights for an invention, serving as a primary source of detailed technical information about new technologies.
Peer-reviewed	The process by which a scientific paper is evaluated by other experts in the same field (peers) to ensure quality, validity, and originality before publication.
Plagiarism checker	An online software tool used to scan a document and compare it against existing publications and webpages to identify potential instances of unattributed content.
Popular science	Scientific information presented in magazines, books, or online articles aimed at a general audience, often simplifying complex concepts.
Primary literature	First-hand accounts of original research, data, and discoveries, such as journal articles, patents, and dissertations.
PubMed	A free search engine accessing the MEDLINE database of citations and abstracts for biomedical and life sciences literature.
References	A list of all sources cited within the article, formatted according to a specific style guide (e.g., APA, Chicago).
Research gap	An area of missing knowledge, conflicting evidence, or under-researched topics identified during the literature review that new research can address.
Review articles	Secondary literature that synthesizes, summarizes, and analyzes multiple primary studies on a specific topic to provide an overview of the current state of knowledge.
Secondary literature	Sources that summarize, analyze, or interpret primary literature, such as textbooks and review articles.
Significance	The statistical or practical importance of research findings; rich in implication.

Term	Definition
Source	The origin of information used in research, such as a journal article, book, or webpage.
Style guide	A set of rules that dictate how a document should be formatted and how sources should be cited (e.g., APA, Chicago).
Synthesize	The process of combining information from multiple sources to form a coherent, overall understanding or argument, rather than just summarizing each source individually.
Systematic search	A methodical and structured approach to searching for information using defined keywords, databases, and strategies to ensure thorough coverage of the topic.
Technical reports	Formal documents detailing specific research processes, progress, or results, often produced by government agencies or research organizations.
Tertiary literature	Sources that provide broad, summarized, and foundational overviews of established facts, such as encyclopedias and handbooks.
Theses	Detailed written accounts of original research submitted as part of the requirements for an academic degree, such as a master's degree.
Time management skills	The ability to plan and control how one spends time on specific activities, a deficiency of which can lead to rushed work and plagiarism.
Trade publications	Magazines, journals, or online sources aimed at professionals within a specific industry, focusing on industry news, trends, and applied information.
Web of Science	A subscription-based scientific citation indexing service that provides comprehensive citation search capabilities across various disciplines.