**State-of-the-art Review**

Articles that provide concise and precise updates on the latest advances in a specific research area. These articles should offer a critical and structured synthesis of the existing literature, identifying trends, challenges, and future opportunities in the field of study.

**Title (**English**)**

(The title should be a brief statement that clearly describes the objective or central topic of the study. Avoid redundancies or generic terms.

(no more than 18 words – no abbreviations – do not use phrases such as “a study” or “an investigation” – whenever possible, avoid including city or institution names; focus on the study’s objective)

***Título*** *(Español)*

Author11, Author22, Author*n* (Name and last name of each author)

1 Affiliation of each author (Name of the Institution, Faculty-optional, Department-optional, City, Country, postal code)

official email, ORCID of each author in the order listed on line 8 (one row per author)

**Abstract**: A single paragraph of up to 250 words with short and complete sentences, conveying a clear and direct message. It should include the following information: 1. Objective of the study: Clearly state the research objective, hypothesis, or research question.2. Methodology: Describe the most important methodological aspects with sufficient detail to communicate how the objective was achieved, the hypothesis was verified, or the research question was answered. 3. Results: Summarize the key findings obtained through the implemented methodology. 4. Conclusion: Present a logically derived conclusion supported by the study’s data. 5. Significance: Highlight the most relevant finding and the key message that the authors want the reader to remember.

**Keywords**: Provide five keywords, separated by commas and arranged alphabetically. Some of these keywords should be present in the title and should serve as generalized descriptors of the study's topic.

***Resumen****: Aquí el resumen en Español*

***Palabras clave****: Escribir las palabras clave en Español utilizando el mismo orden de las Keywords detalladas previamente en Inglés.*

# **Introduction**

The introduction should be presented as a single block of text without unnecessary subdivisions. In this section, the author must provide a general overview of the topic, allowing the reader to understand the context, importance, and relevance of the research area. It is essential to include recent references, preferably from the last five years, to ensure that the information is up to date and aligned with current scientific advancements. However, older studies may be cited if they are fundamental to understanding the evolution of the topic.

First, the author should present the current state of knowledge on the subject, highlighting key aspects of the existing literature that are directly related to the purpose of the review. The information should be presented clearly and concisely, avoiding irrelevant or redundant data.

Next, the main gaps in current knowledge, existing controversies, or areas requiring further development should be identified. This includes analyzing the limitations of previous research and emphasizing the need for a more updated and integrated perspective on the topic. It is crucial to explain why this review is necessary and what it contributes to the field.

Finally, the introduction should conclude with a clear statement of the review's purpose, formulated in a specific and direct manner. This section should specify the review approach (e.g., systematic, narrative, or critical review), defining its scope and specific objectives. The introduction should naturally transition into the methodology section, preparing the reader to understand the process of data collection and analysis.

#  **Methodology**

The methodology of this review article must be described in a clear, detailed, and structured manner, allowing the reader to fully understand how the process of searching, selecting, analyzing, and synthesizing the existing literature was conducted. It is essential that this section provides precise information on the criteria and strategies used to ensure the validity and reproducibility of the review.

First, the information search process should be explained, specifying the scientific databases consulted, such as Scopus, Web of Science, PubMed, IEEE Xplore, or Google Scholar. It is important to detail the keywords used in the search, including the Boolean operators applied to combine terms effectively. Additionally, the time frame considered in the review should be stated, with a justification for its selection based on the relevance of the topic. The inclusion and exclusion criteria must also be clearly defined, specifying aspects such as document type, language, accessibility, and thematic focus.

Next, the process of selecting relevant studies should be described. To ensure transparency and rigor, it is recommended to follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which structures the selection process into several stages: identification of articles, removal of duplicates, screening of titles and abstracts, full-text evaluation, and final inclusion of studies in the review. Including a PRISMA flow diagram can be useful to clearly visualize the selection process.

Subsequently, the extraction and analysis of the obtained data should be explained. It is crucial to mention the key variables extracted from each study, such as authorship, publication year, methodology used, and main findings reported. Moreover, the tools used to organize and analyze the information should be described, such as bibliometric mapping software (e.g., VOSviewer) or qualitative analysis tools (e.g., NVivo). If a quality assessment of the included studies was performed, the instruments or guidelines applied should be specified, such as the Jadad scale or the CASP (Critical Appraisal Skills Programme) checklist.

Finally, the strategy used for synthesizing the collected information should be presented. Depending on the review approach, different methods can be employed, such as thematic analysis to identify recurring patterns and trends in the literature, bibliometric mapping to visualize connections between studies, or meta-analysis in the case of quantitative reviews to combine statistical data from multiple studies.

It is important to acknowledge potential limitations of the review, such as biases in article selection, language restrictions, or limitations in data availability. Addressing these limitations demonstrates a critical approach and provides a foundation for future research in the area.

To ensure a comprehensive review of the topic, it is recommended to include a sufficient number of relevant references. Generally, at least 30 sources should be cited for a descriptive state-of-the-art review, and a minimum of 50 references for a more detailed and structured analysis of the available scientific literature. This will ensure that the review adequately covers the key developments and findings in the research field..

## **Subsection title**

All figures, tables, and equations mentioned in the text must be numbered sequentially. Figures should illustrate key concepts and synthesize relevant information, such as trends, comparisons, or patterns identified in the reviewed literature. They should be presented in a vector format, preferably in EPS or BMP, with a minimum resolution of 400 dpi to ensure high quality. Tables should include only top and bottom borders, and their content must be fully editable to facilitate use in the final publication. Information duplication between tables and text should be avoided by using tables to present key quantitative data from the analyzed studies. All measurements must strictly follow the International System of Units (SI). Decimal values should be separated by a period, and thousands should not be separated by spaces or commas. Equations must be written using a specialized equation editor and numbered sequentially to ensure clarity and precision in representing mathematical or analytical concepts relevant to the study area. Finally, special attention should be given to the presented graphs and analyses. All graphs must be created using specialized software for scientific publications, ensuring their accuracy and professionalism. They should be used to provide an effective visual representation of the data collected in the review.

# **Results**

This section should clearly and systematically present the main findings obtained from the reviewed literature, following the approach and criteria established in the methodology. The information should be organized logically and consistently with the objectives of the review, grouping the results by categories, trends, approaches, or any other relevant criterion. It is important not to include explanations or interpretations of the findings in this section, as such reflections should be reserved for the discussion section. The findings should be presented objectively, highlighting patterns, similarities, and discrepancies identified in the analyzed studies. When referring to figures, tables, or graphs, present tense should be used, as these elements represent information that the reader can directly observe. It is recommended to avoid duplicating information in different formats; qualitative or quantitative data should be appropriately synthesized in tables and figures, while the text should provide a concise description of the key points. To ensure a clear and organized presentation, it is suggested to:

1. Use the text to describe the trends and patterns observed in the reviewed literature.
2. Present numerical or categorical information in tables, ensuring they include only the most relevant data.
3. Use figures to provide a clear and effective visualization of the review findings, such as conceptual maps, trend analyses over time, or collaboration networks.

For example, a table can summarize the main methodological characteristics of the reviewed studies, while a figure could illustrate the evolution of a particular approach or technology over time.

# **Discussion**

The discussion is the section where the findings of the review are interpreted and contextualized within the framework of the existing scientific literature. It is essential to begin by highlighting the main trends and patterns identified in the reviewed studies, providing the reader with a clear understanding of the most significant contributions of the review. Next, a detailed analysis of the collected information should be conducted, explaining how the analyzed studies address the research problem, which approaches have proven to be more effective, and what limitations have been identified in the existing literature. It is important to logically argue how the synthesized findings relate to one another, identifying convergences and divergences in the approaches used by different authors.

It is recommended to compare the findings of the review with previous key studies, discussing whether the results support, expand, or contradict existing literature. If knowledge gaps are identified, it is crucial to highlight these opportunities for future research and suggest potential methodological or theoretical approaches to address them. The discussion should also address the relevance of the findings within a broader context, answering key questions such as: What impact do the analyzed studies have on advancing knowledge in the field? How do they contribute to solving practical or theoretical problems? What are the implications for professional practice or future research? Additionally, the limitations of the review should be acknowledged, including potential biases in the selection of studies, variability in the methodological approaches of the analyzed articles, or restrictions in accessing certain sources of information. Mentioning these limitations reinforces the transparency and rigor of the study and serves as a reference for more comprehensive and detailed future reviews. Finally, the discussion should conclude with a reflection summarizing the main contributions of the review, emphasizing their relevance, and offering suggestions for future research or practical applications. This will provide the reader with a clear understanding of the review’s impact within the field of study and its usefulness to the scientific community. The Table 1 presents key suggestions for writing this section.

**Table 1.** Writing Suggestions for the Discussion Section

|  |  |
| --- | --- |
| **Section** | **Description** |
| Introduction of the main finding | Summarize the main trends identified in the reviewed literature. Example: "Most of the analyzed studies agree that [key trend]." |
| Literature analysis | Explain how the selected studies address the topic of interest, highlighting common approaches and discrepancies. |
| Comparison with previous literature | Discuss whether the review findings support, expand, or contradict previous studies, providing relevant references. |
| Identification of gaps | Highlight areas where there is a lack of consensus or evidence, suggesting potential future directions. |
| Review limitations | Acknowledge factors that may have affected the review, such as the selection of sources, inclusion/exclusion criteria, and access to information. |
| Practical or theoretical implications | Discuss how the findings can influence the development of new theories or their practical application in various fields (industry, healthcare, technology, etc.). |
| Final conclusion | Summarize the key findings, emphasizing their impact and relevance in the research field. |

# **Conclusions**

The conclusions section should be concise yet impactful, highlighting the most relevant insights identified from the reviewed literature and directly connecting them to the objectives established at the beginning of the study. It is essential to structure this section logically, beginning with a clear summary of the main findings, which must be fully supported by the analyzed information. This summary should effectively and directly communicate the trends, patterns, and challenges identified in the study area.

Next, it is important to discuss the practical and theoretical impact of the findings, emphasizing how the review contributes to advancing knowledge in the field and how the results can be applied in various contexts, such as industry, academia, or policymaking. The impact of the findings should not be exaggerated; instead, an objective approach based on the collected evidence should be maintained.

Additionally, the conclusions section should include specific recommendations for future research, identifying potential areas for exploration that arise from the gaps or limitations detected in the literature. It is advisable to be precise when suggesting new lines of work, indicating possible methodological or theoretical approaches that could address the identified gaps.

Finally, the conclusion should close with a memorable message that summarizes the review’s impact, leaving a lasting impression on the reader. This message should encapsulate the essence of the study, underscore its significance within the broader context of the field, and highlight its contribution to the advancement of knowledge.

To ensure objectivity, it is crucial that all statements are based on concrete facts and that generalizations or overstatements of the reviewed findings are avoided.

### Acknowledgments

This section is intended to recognize the contributions of individuals, institutions, or entities that collaborated in the development of the research without being co-authors.

**Example:** The authors thank [name of person/institution] for their support in [description of contribution].

### Conflict of Interest

An explicit statement should be included indicating whether generative artificial intelligence (Gen AI) was used in the preparation of the article. If it was used, the specific tools and the scope of their use should be detailed.

**Example:** The authors report no conflicts of interest related to this research.

**Example:** The author [name] has a professional relationship with [organization], which represents a potential conflict of interest.

### Generative Artificial Intelligence (AI) Use Statement

Se debe incluir una declaración explícita indicando si se utilizó o no inteligencia artificial generativa (IA Gen) en la preparación del artículo. Si se utilizó, se deben especificar las herramientas y el alcance de su uso.

**Example:** No generative artificial intelligence was used in the preparation of this article.

**Example:** In the preparation of this article, [AI tool] was used for [description of use, e.g., initial draft generation, grammar correction, etc.]. All content was reviewed and approved by the authors.

### Funding Sources

This section should provide details about the entities or institutions that partially or fully funded the research, if applicable.

**Example:** This research was funded by [name of institution] under the project [project code/name].

### Author Contributions

For articles with multiple authors, a brief paragraph should be included specifying the individual contributions of each author, following the CRediT (Contributor Roles Taxonomy) format. The recommended format is as follows:

**Example:**

Conceptualization, X.X. and Y.Y.; methodology, X.X.; software, X.X.; validation, X.X., Y.Y., and Z.Z.; formal analysis, X.X.; investigation, X.X.; resources, X.X.; data curation, X.X.; writing—original draft preparation, X.X.; writing—review and editing, X.X.; visualization, X.X.; supervision, X.X.; project administration, X.X.; funding acquisition, Y.Y.

All authors have read and approved the published version of the manuscript.

**Important:** Authors can use automatic contribution generators based on the CRediT taxonomy, such as the one available at [https://credit.metabolomics.fgu.cas.cz/].

# **References**

They must be presented in accordance with IEEE standards.

It is recommended to review the following link: [https://www.bath.ac.uk/publications/library-guides-to-citing-referencing/attachments/ieee-style-guide.pdf].