RESEARCH METHODOLOGY
(SQG2613)

Literature Review

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Senior Lecturer,
Department of Biotechnology and Medical Engineering
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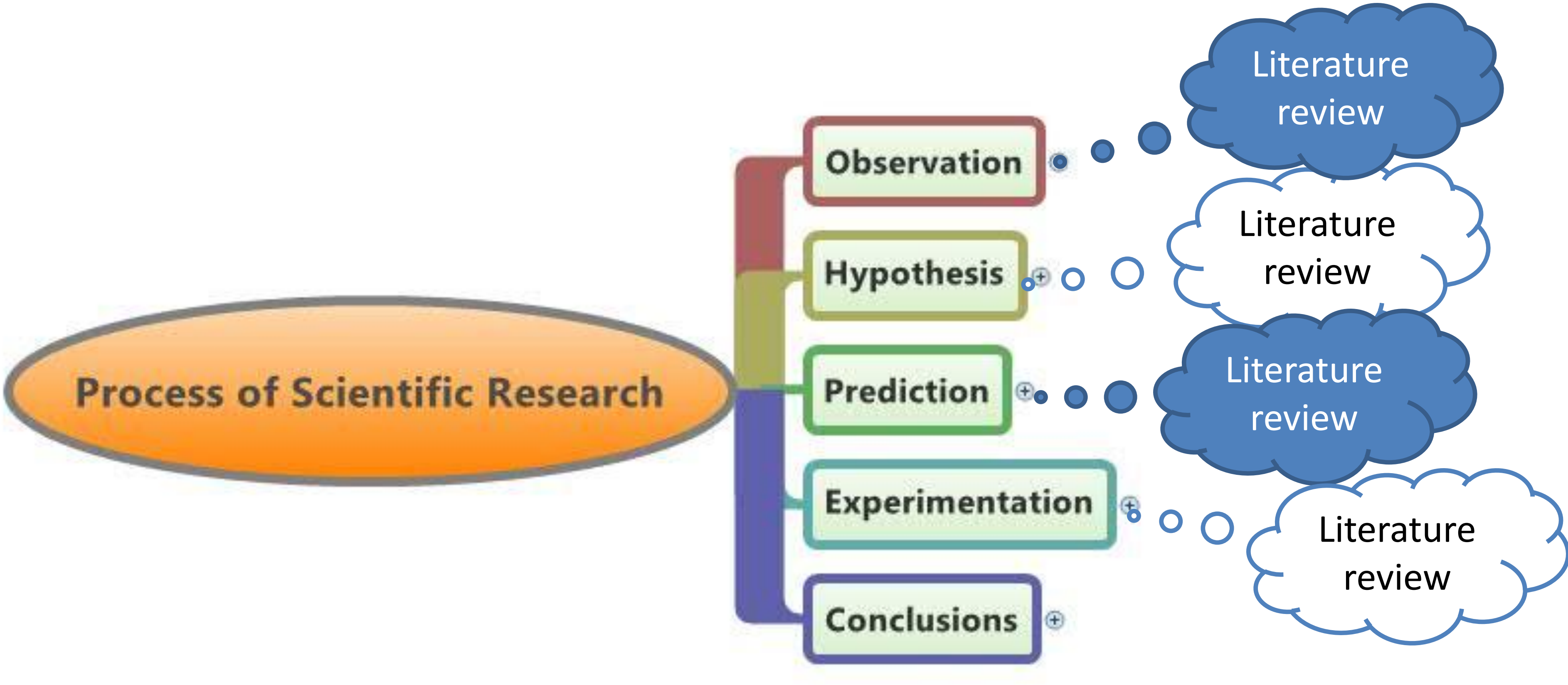
Literature Review


Process of Scientific Research

Observation

Hypothesis

Prediction

Experimentation

Conclusions

Literature review

Literature review

Literature review

Literature review

OBSERVATION

-Obtain information- | **-Literature review-** | -problem-

HYPOTHESIS

-knowledge- | **-literature review-** | -experience-

PREDICTION

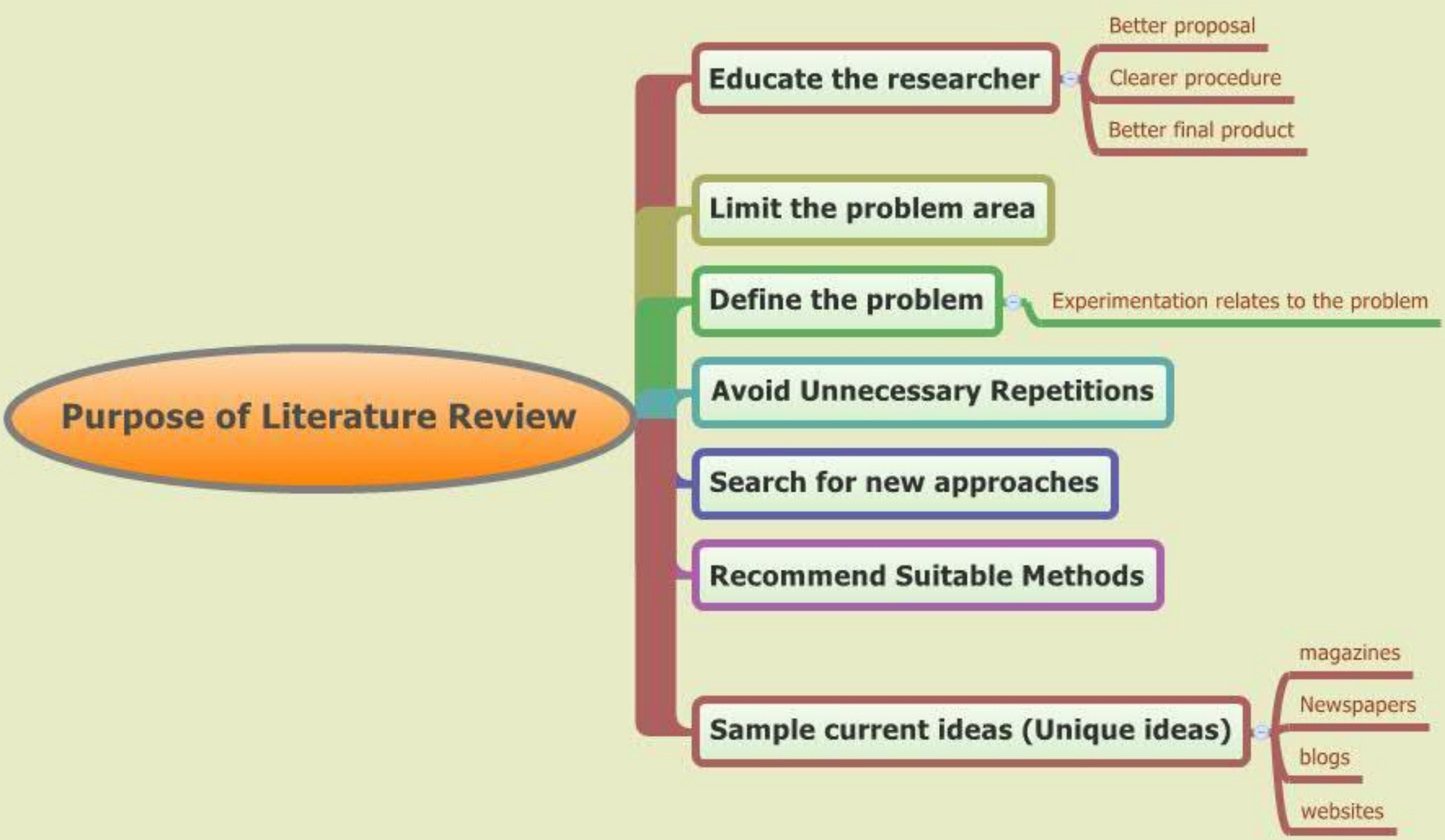
-scientific knowledge- | **-literature review-**

EXPERIMENT

scientific approach- | -record/ documentation- | -instrument- | **-literature review-**

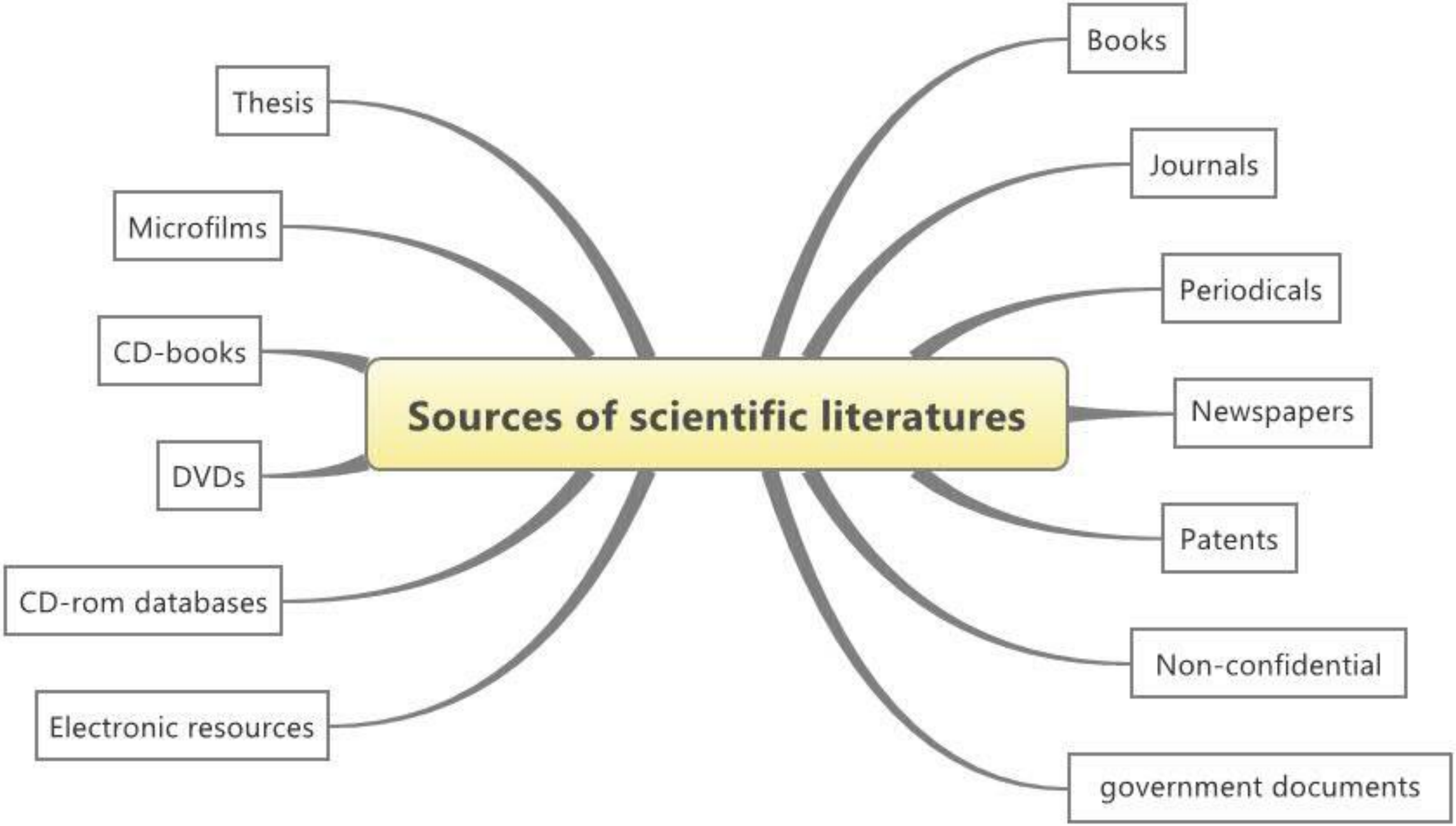
CONCLUSION

-report- | -paper- | -journal- | -patent- | etc



Purpose of Literature Review

- Educate the researcher
  - Better proposal
  - Clearer procedure
  - Better final product
- Limit the problem area
- Define the problem
  - Experimentation relates to the problem
- Avoid Unnecessary Repetitions
- Search for new approaches
- Recommend Suitable Methods
- Sample current ideas (Unique ideas)
  - magazines
  - Newspapers
  - blogs
  - websites

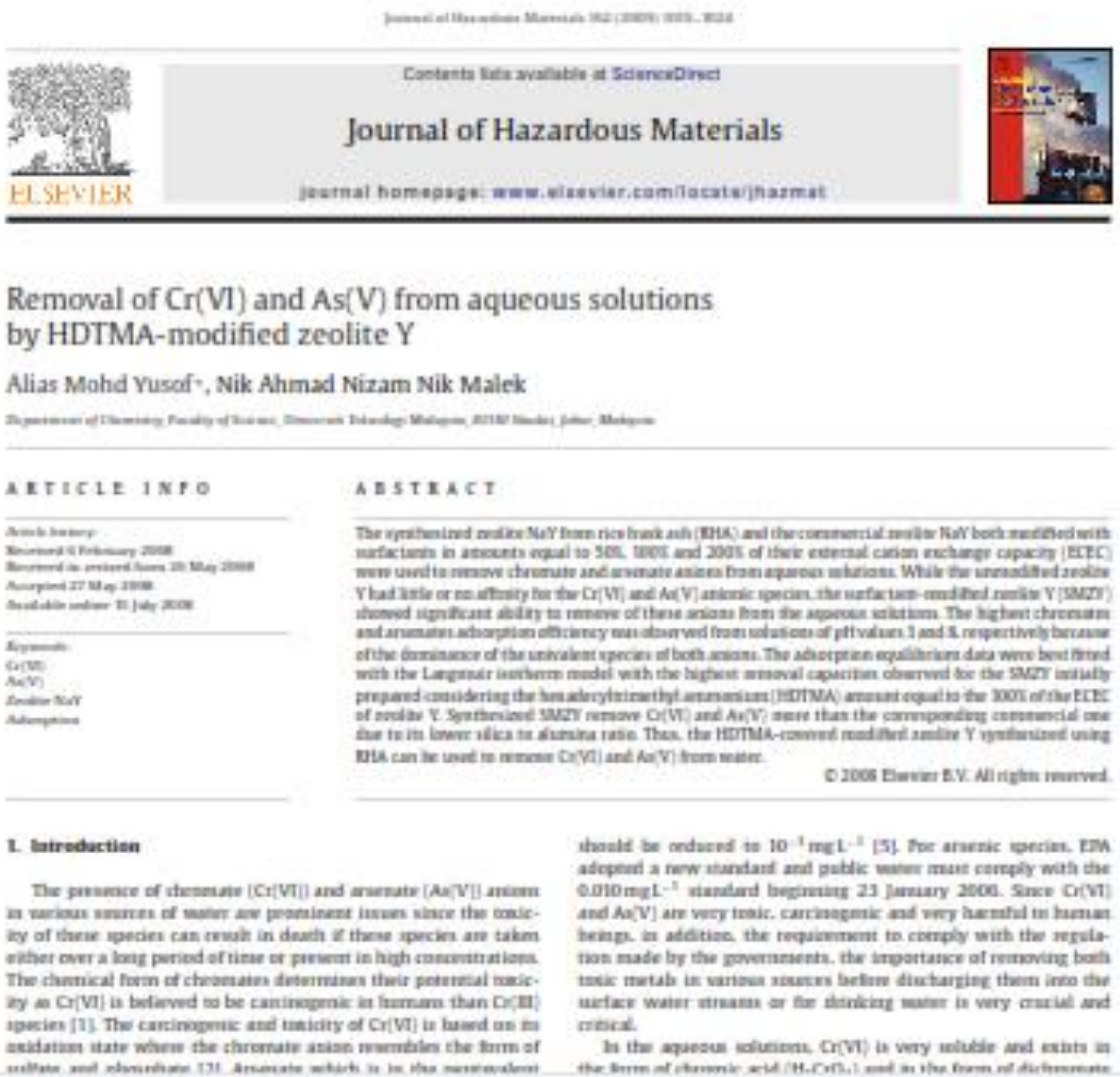


Sources of scientific literatures

- Thesis
- Microfilms
- CD-books
- DVDs
- CD-rom databases
- Electronic resources
- Books
- Journals
- Periodicals
- Newspapers
- Patents
- Non-confidential
- government documents

Learning how to use these resources properly is equally as important as learning any laboratory techniques and other technical skill.

Example of Scientific Journal



Contents lists available at ScienceDirect

Journal of Hazardous Materials

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

ELSEVIER

Removal of Cr(VI) and As(V) from aqueous solutions by HDTMA-modified zeolite Y

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As(V)
Zeolite NaY
Adsorption

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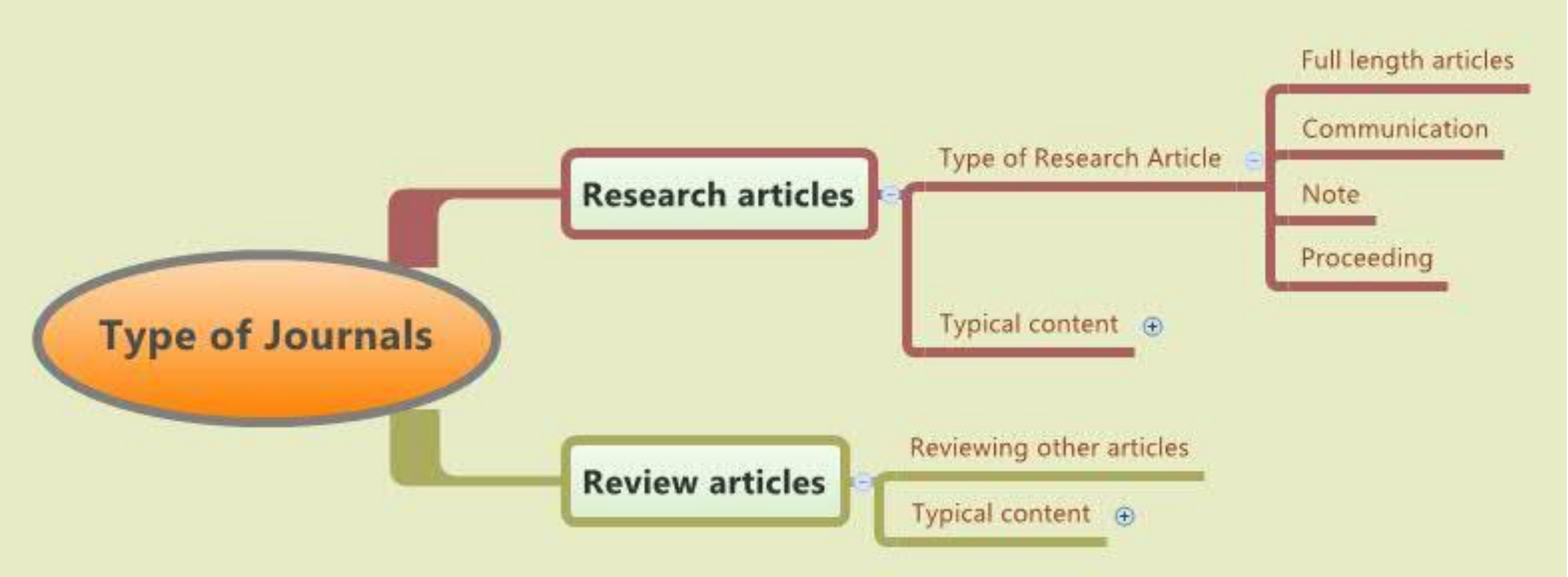


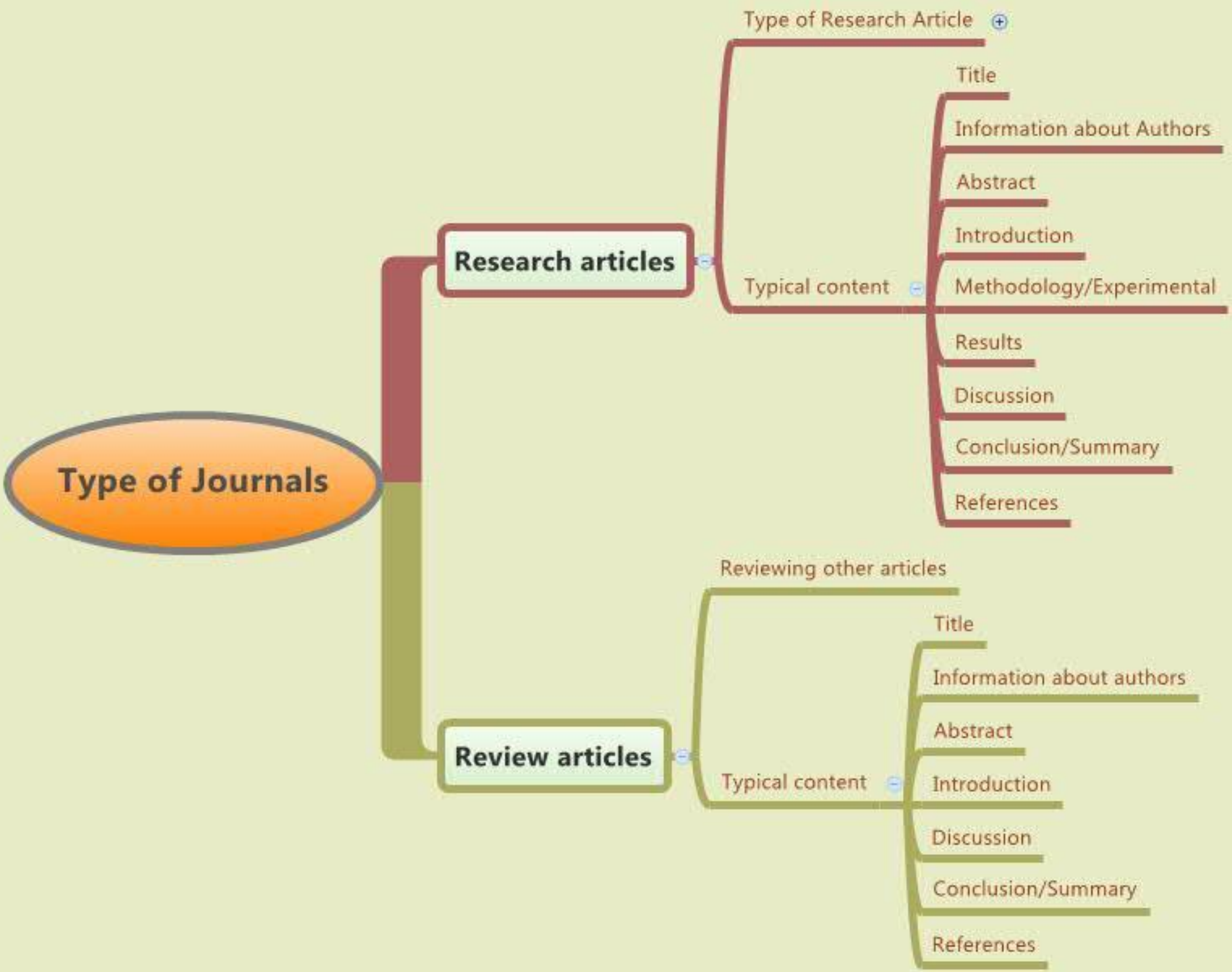
Type of Journals

Research articles

- Type of Research Article
  - Full length articles
  - Communication
  - Note
  - Proceeding
- Typical content

Review articles

- Reviewing other articles
- Typical content



- **Type of Journals**
  - **Research articles**
    - Type of Research Article
    - Typical content
      - Title
      - Information about Authors
      - Abstract
      - Introduction
      - Methodology/Experimental
      - Results
      - Discussion
      - Conclusion/Summary
      - References
  - **Review articles**
    - Reviewing other articles
    - Typical content
      - Title
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Elements in Scientific Journal

Name of Journal

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Authors' information

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In the aqueous solutions, Cr(VI) is very soluble and exists in the form of chromic acid (H_2CrO_4) and in the form of dichromate

Elements in Scientific Journal

Methodology/ Experimental

Elements in Scientific Journal

Results and Discussion

Elements in Scientific Journal

4. Conclusions

Zeolite Y basically has little or no affinity to the anion species of Cr(VI) and As(V), but the modification of zeolite Y by the cationic surfactant (HDTMA) can enhance the adsorption capacities of Cr(VI) and As(V) on the zeolite Y. The removal capacities of Cr(VI) and As(V) on SMZY are dependent on the pH of the solution whereby the highest removal capacities for Cr(VI) and As(V) are observed at pH 3 and 8, respectively. At those pH, both species were in the univalent form which only need one exchange site from the SMZY, hence, more Cr(VI) and As(V) species can be adsorbed by the SMZY. The adsorption of Cr(VI) and As(V) on the SMZY fitted well on the Langmuir isotherm equilibrium with SMZY with HDTMA amount equal to the 100% of ECEC of zeolite Y showed the highest adsorption capacity. Surfactant-modified zeolite Y derived from the synthesized zeolite Y tend to adsorb more Cr(VI) and As(V) than the commercial one. This is due to the physicochemical properties of these zeolites where the Zeo-NaY-S has lower silica to alumina ratio, higher CEC and ECEC as well as higher specific surface area compared to Zeo-NaY-C which creates more exchange sites for the adsorption process to occur. Thus, the synthesized zeolite NaY from rice husk ash treated with HDTMA can be used as a potential sorbent to remove hexavalent chromium (Cr(VI)) and pentavalent arsenic (As(V)) from water.

Acknowledgements

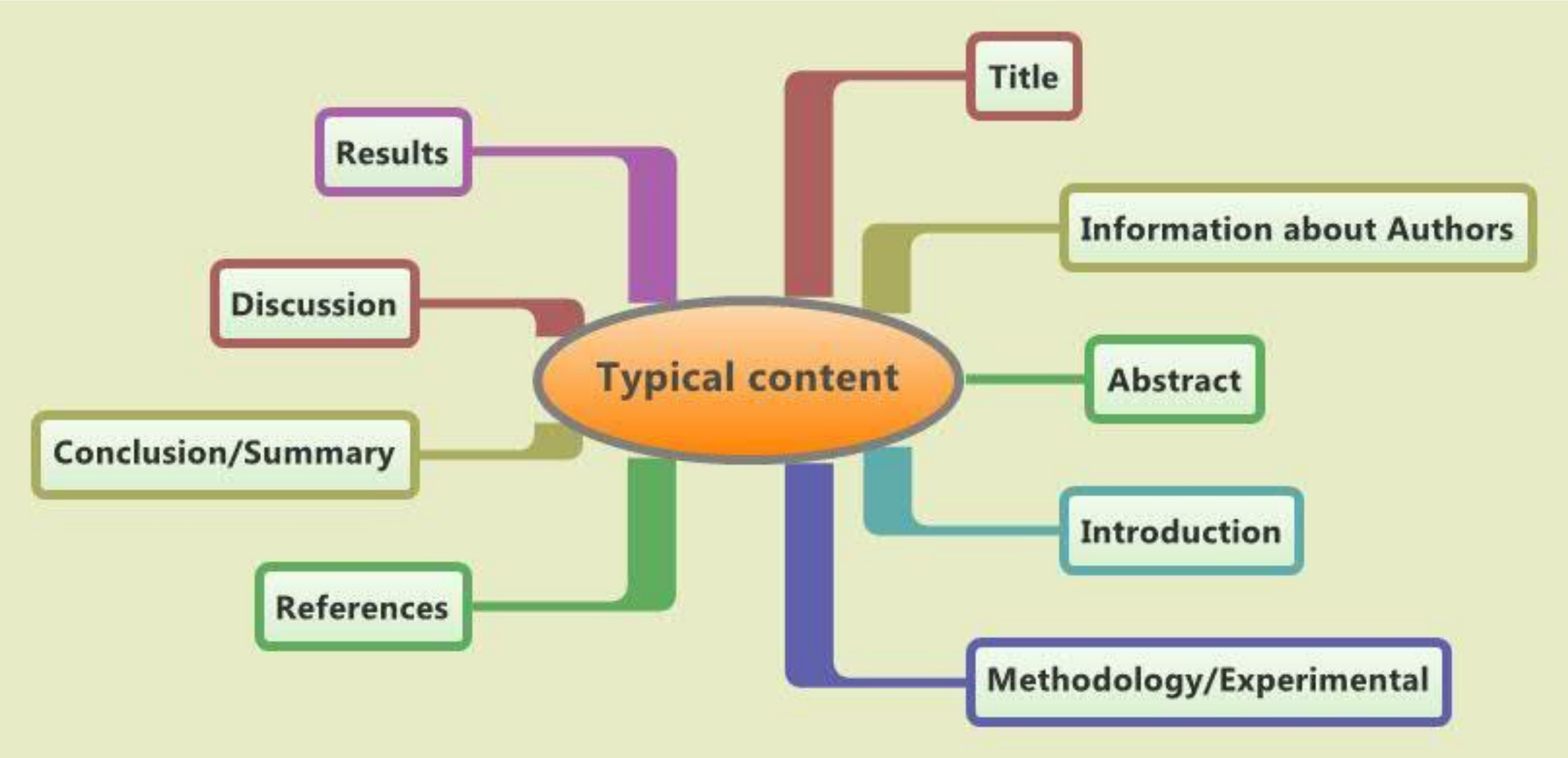
We thank the National Science Development & Research Council (MPKSN) for the financial support given under contract no. IRPA 09-02-0057-SR0005/09-0, Vot 74511, the Malaysian Nuclear Agency and the Department of Chemistry, Universiti Teknologi Malaysia.

References

Conclusion

References

Information from Journals



Typical content

Title

Information about Authors

Abstract

Introduction

Methodology/Experimental

Results

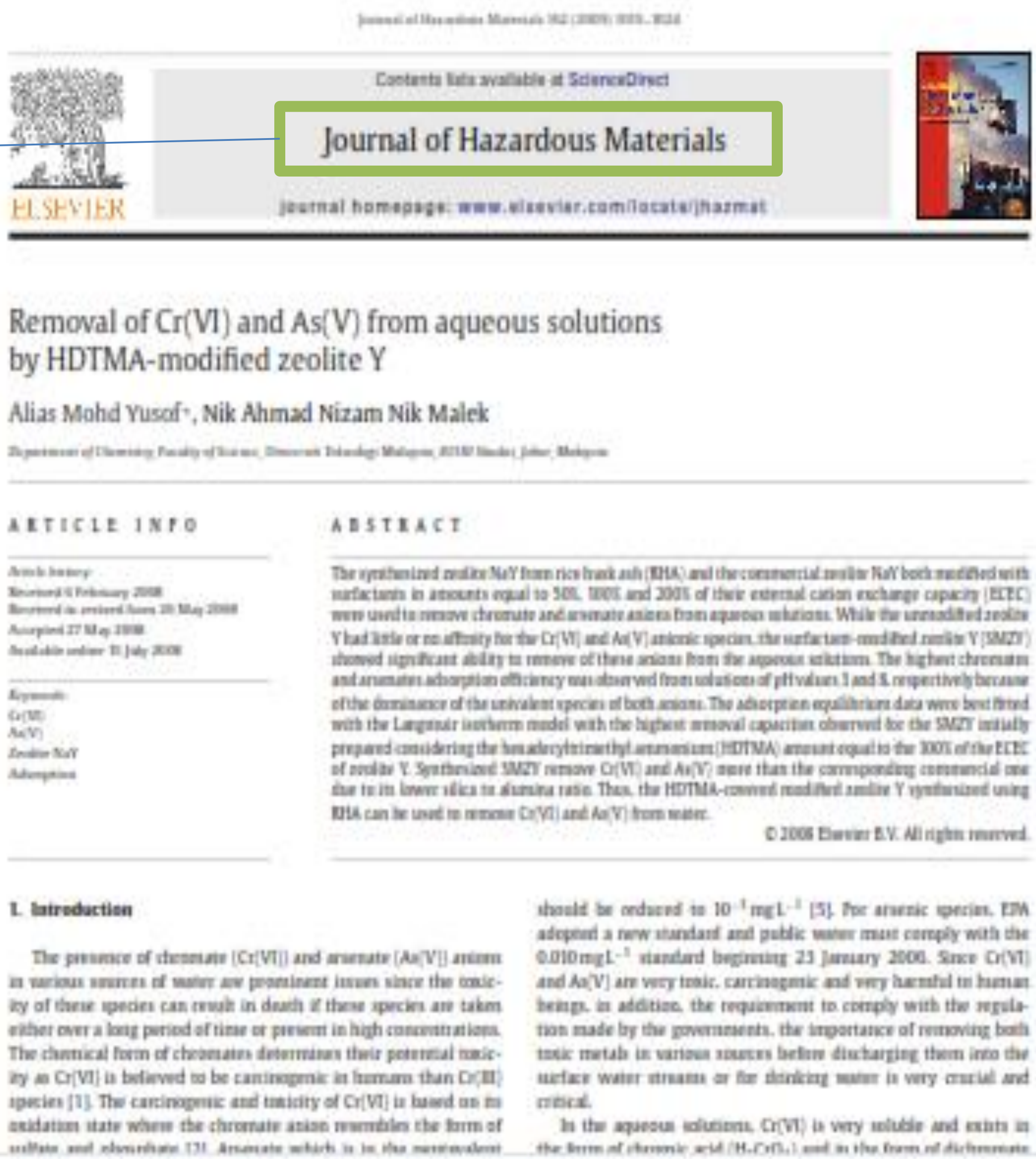
Discussion

Conclusion/Summary

References

Name of Journal

- Quality of journal
- Impact factor of journal
- Aim and scope of research area



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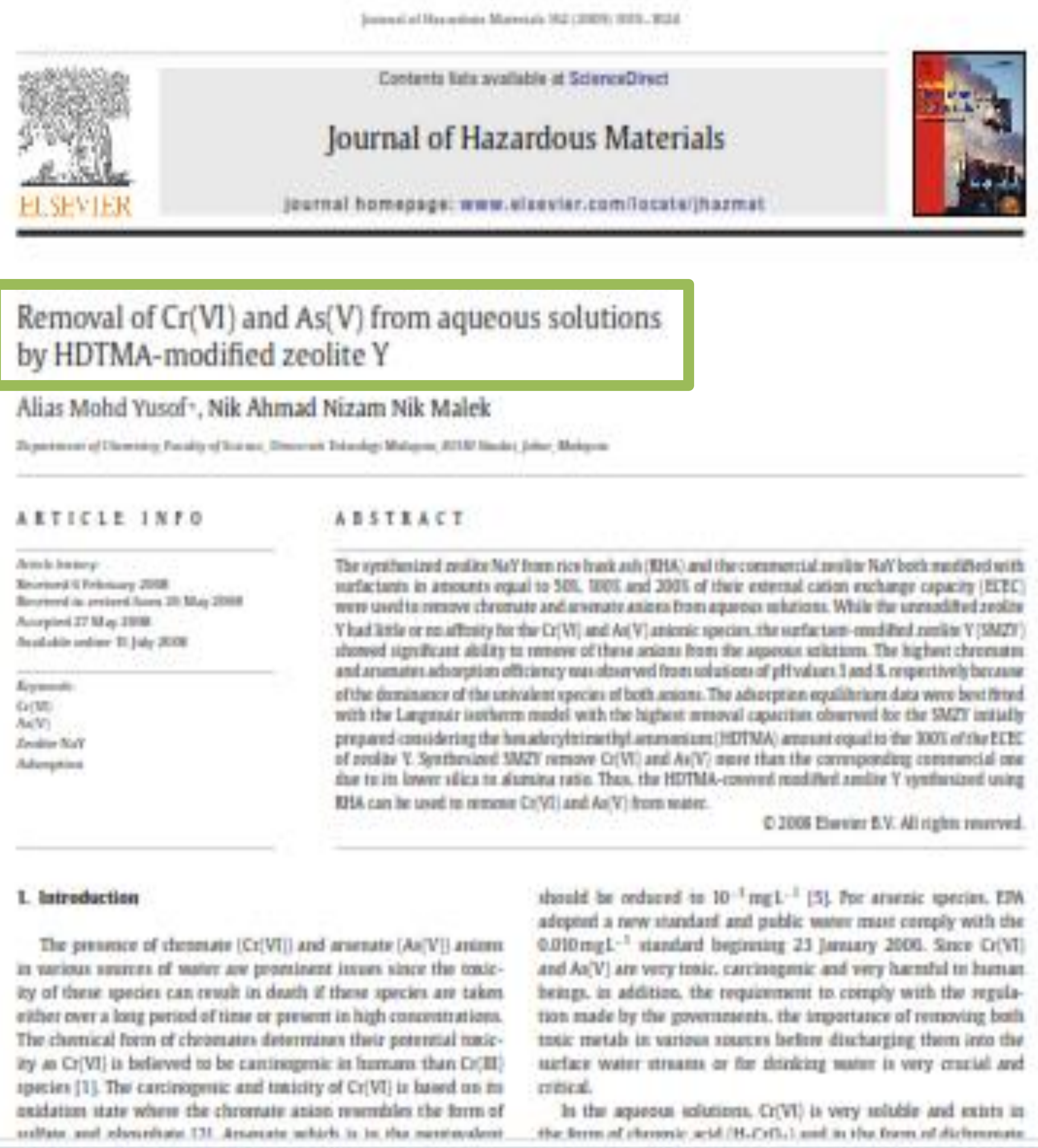
Title

- Scope of overall research
- Technology used in this research
- Keywords
- Scientific words
- Main finding



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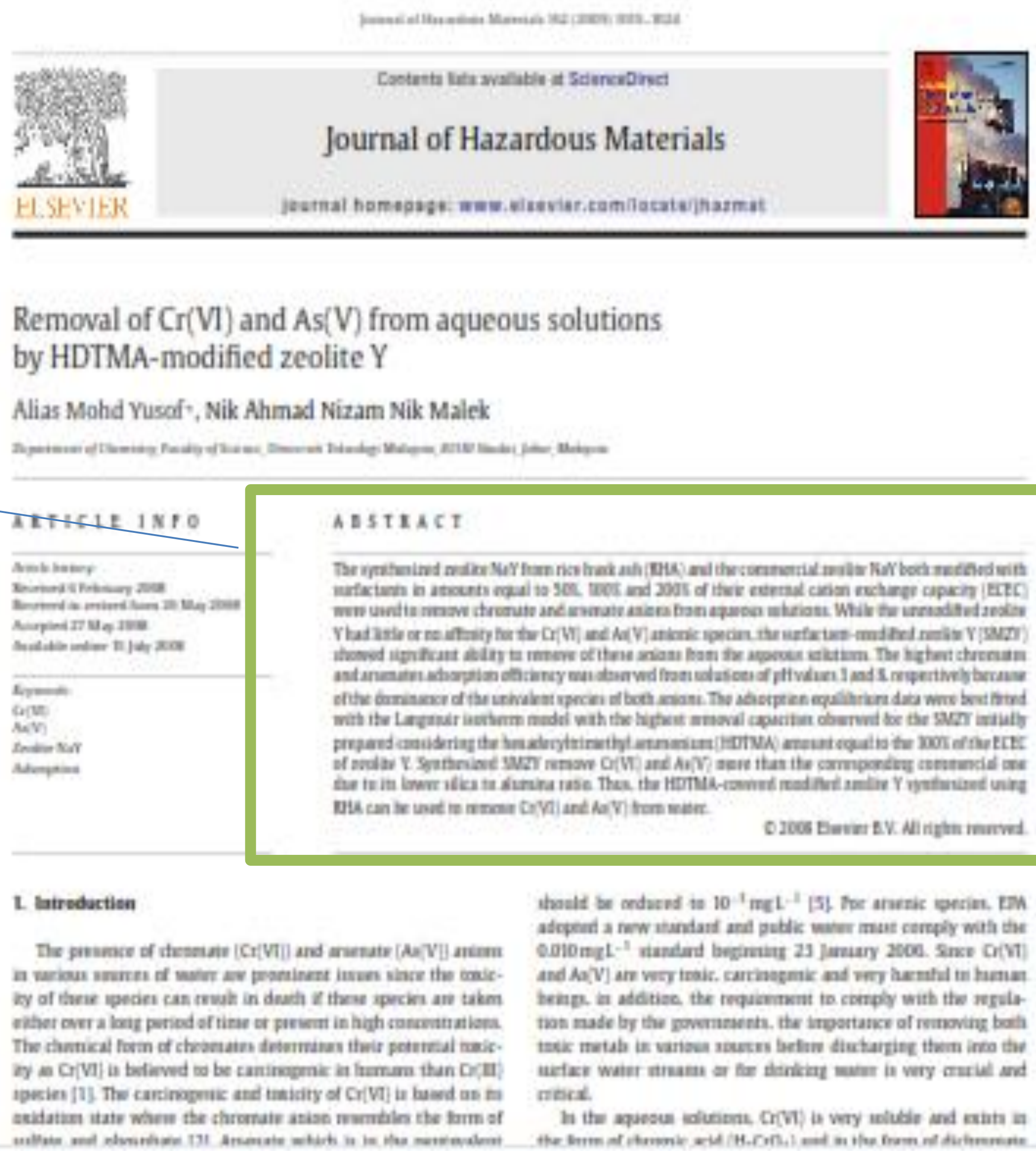
Abstract

- Abstract tells about:
  - Aims/objectives/goals of the paper.
  - Significant method.
  - Significant results.
  - Significant discussion.
  - Significant conclusion



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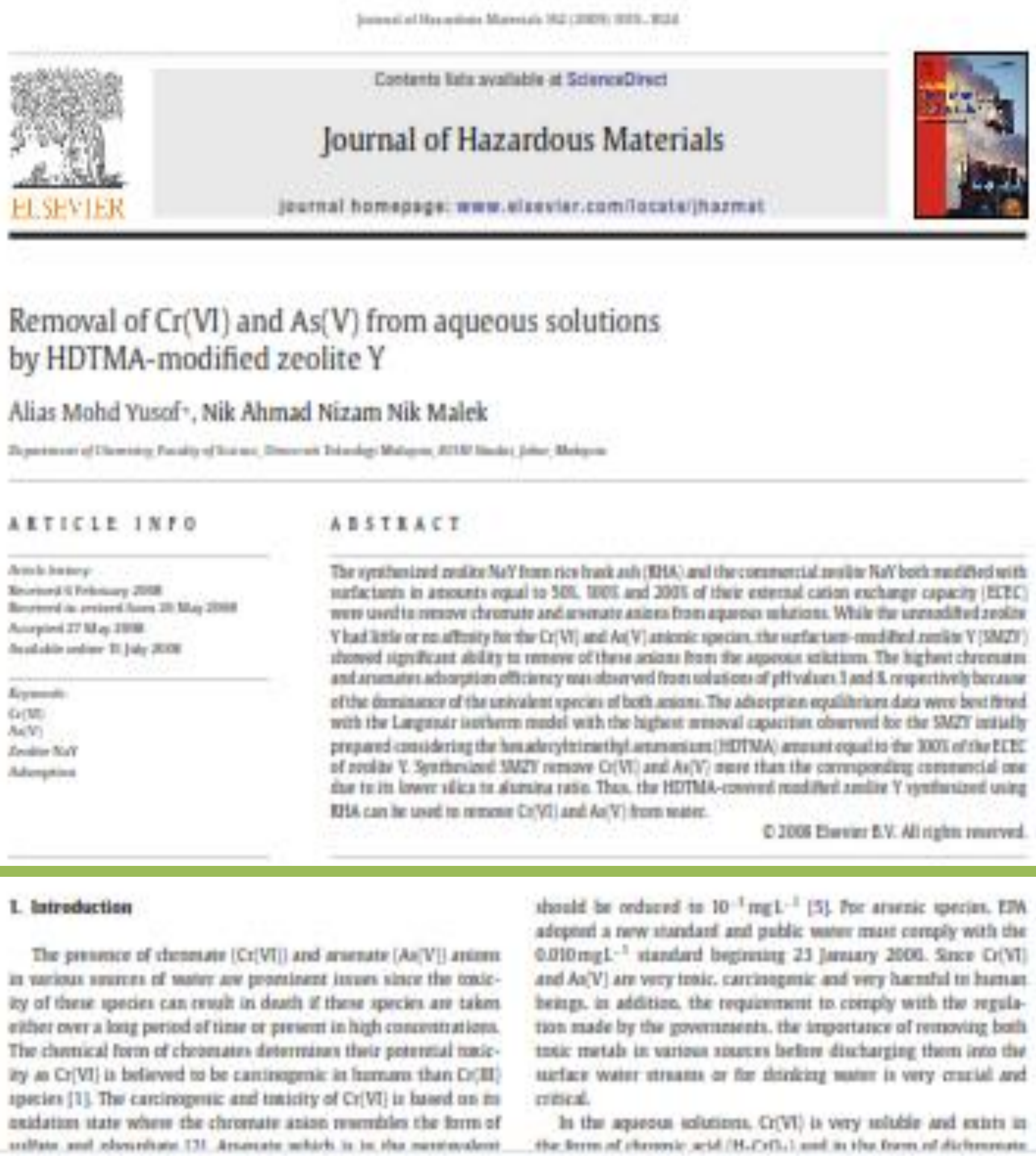
Content in Introduction

- Discussion about the problems/issues.
- Literature review – Revision of other papers reported on the same topic.
- Aims and scope of research.

Introduction



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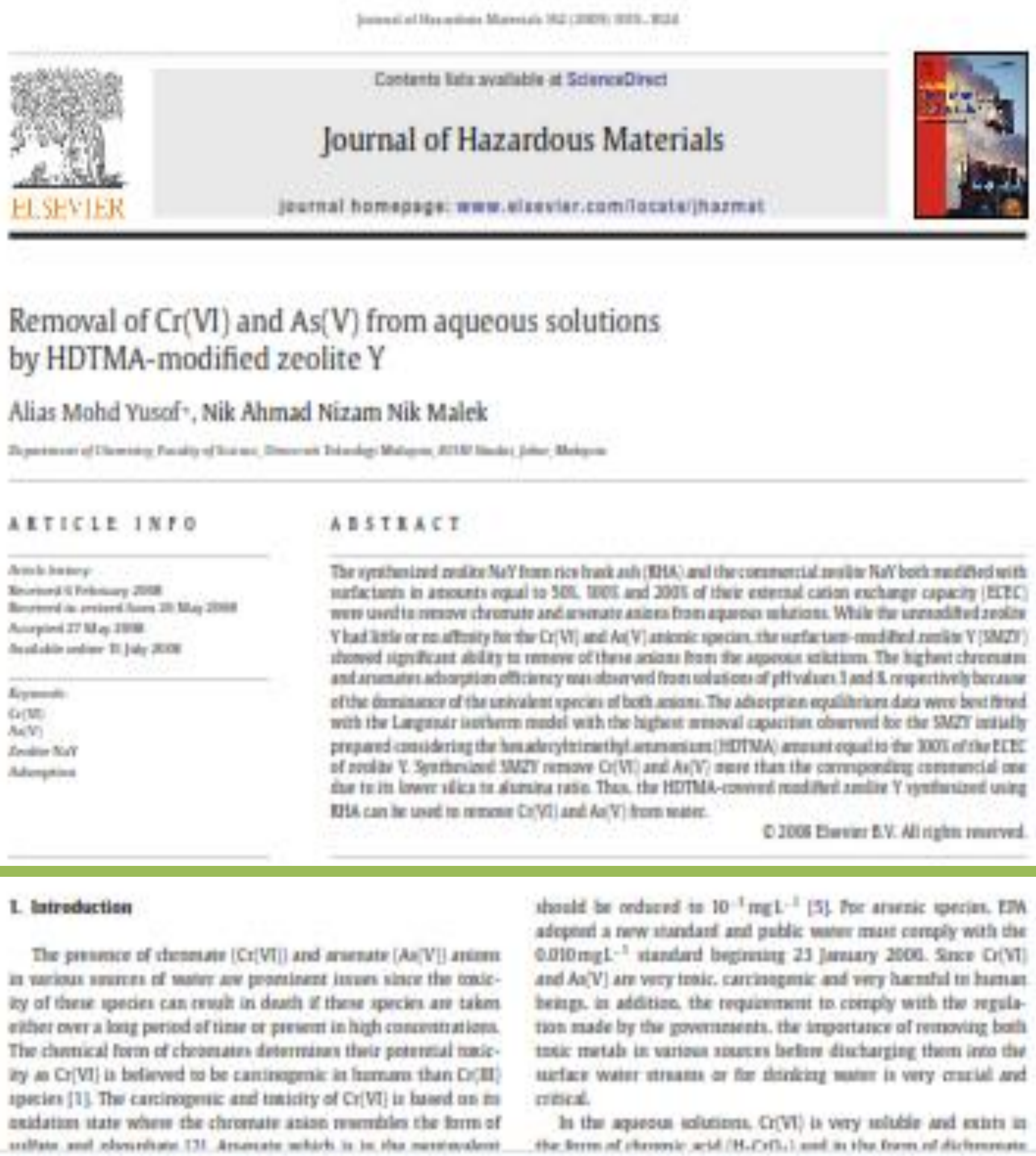
What you can get from this introduction:

- How author write about introduction.
- How author review related papers from other sources.
- Scientific term that author used.



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Introduction

Information about:

- Materials.
- Specific methods/procedure.
- Scientific methods/terms/units.
- Skills in writing methodology.

Methodology/ Experimental

4. Conclusions

Zeolite Y basically has little or no affinity to the anion species of Cr(VI) and As(V), but the modification of zeolite Y by the cationic surfactant (HDTMA) can enhance the adsorption capacities of Cr(VI) and As(V) on the zeolite Y. The removal capacities of Cr(VI) and As(V) on SMZY are dependent on the pH of the solution whereby the highest removal capacities for Cr(VI) and As(V) are observed at pH 3 and 8, respectively. At those pH, both species were in the univalent form which only need one exchange site from the SMZY, hence, more Cr(VI) and As(V) species can be adsorbed by the SMZY. The adsorption of Cr(VI) and As(V) on the SMZY fitted well on the Langmuir isotherm equilibrium with SMZY with HDTMA amount equal to the 100% of ECEC of zeolite Y showed the highest adsorption capacity. Surfactant-modified zeolite Y derived from the synthesized zeolite Y tend to adsorb more Cr(VI) and As(V) than the commercial one. This is due to the physicochemical properties of these zeolites where the Zeo-NaY-S has lower silica to alumina ratio, higher CEC and ECEC as well as higher specific surface area compared to Zeo-NaY-C which creates more exchange sites for the adsorption process to occur. Thus, the synthesized zeolite NaY from rice husk ash treated with HDTMA can be used as a potential sorbent to remove hexavalent chromium (Cr(VI)) and pentavalent arsenic (As(V)) from water.

Acknowledgements

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References

Conclusion

- Special finding from the overall results and discussion.
- Determine the novelty of the research.

- Other papers related to this works.

References

4. Conclusions

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Acknowledgements

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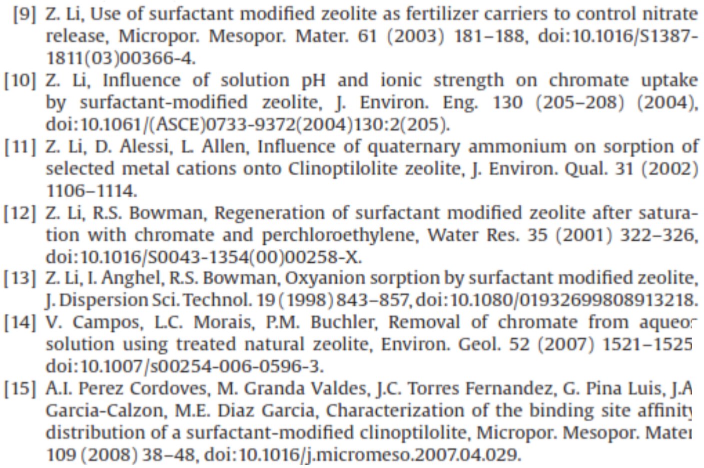
References

Example of literature review

List of Papers that have been cited



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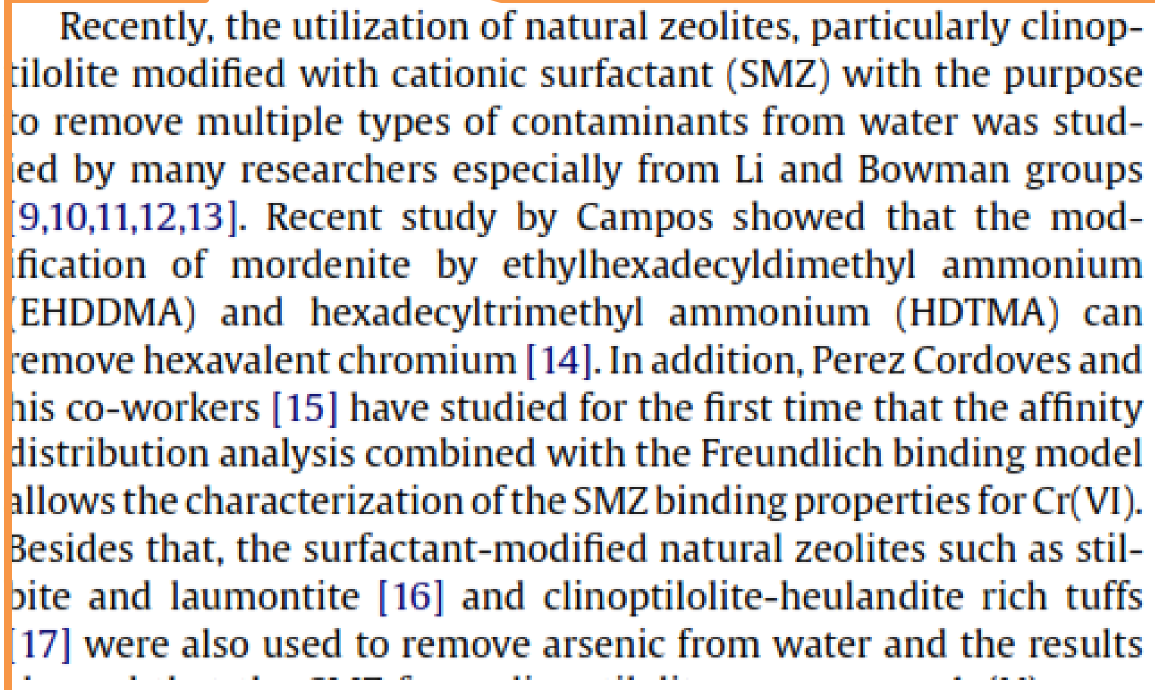
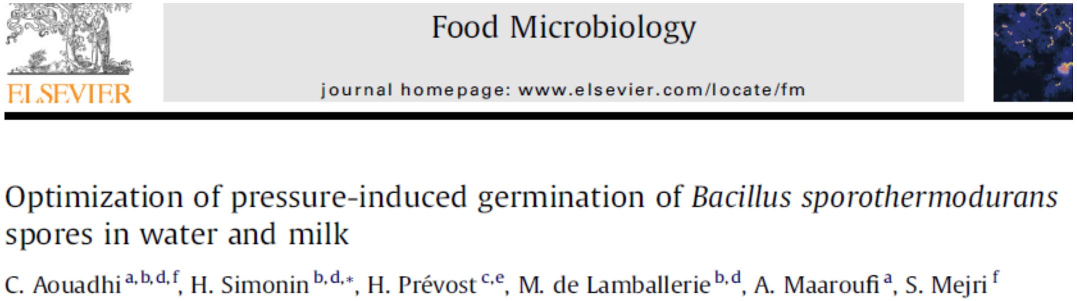


Recently, the utilization of natural zeolites, particularly clinoptilolite modified with cationic surfactant (SMZ) with the purpose to remove multiple types of contaminants from water was studied by many researchers especially from Li and Bowman groups [9,10,11,12,13]. Recent study by Campos showed that the modification of mordenite by ethylhexadecyldimethyl ammonium (EHDDMA) and hexadecyltrimethyl ammonium (HDTMA) can remove hexavalent chromium [14]. In addition, Perez Cordoves and his co-workers [15] have studied for the first time that the affinity distribution analysis combined with the Freundlich binding model allows the characterization of the SMZ binding properties for Cr(VI). Besides that, the surfactant-modified natural zeolites such as stilbite and laumontite [16] and clinoptilolite-heulandite rich tuffs [17] were also used to remove arsenic from water and the results

Example of Literature Review



Food Microbiology

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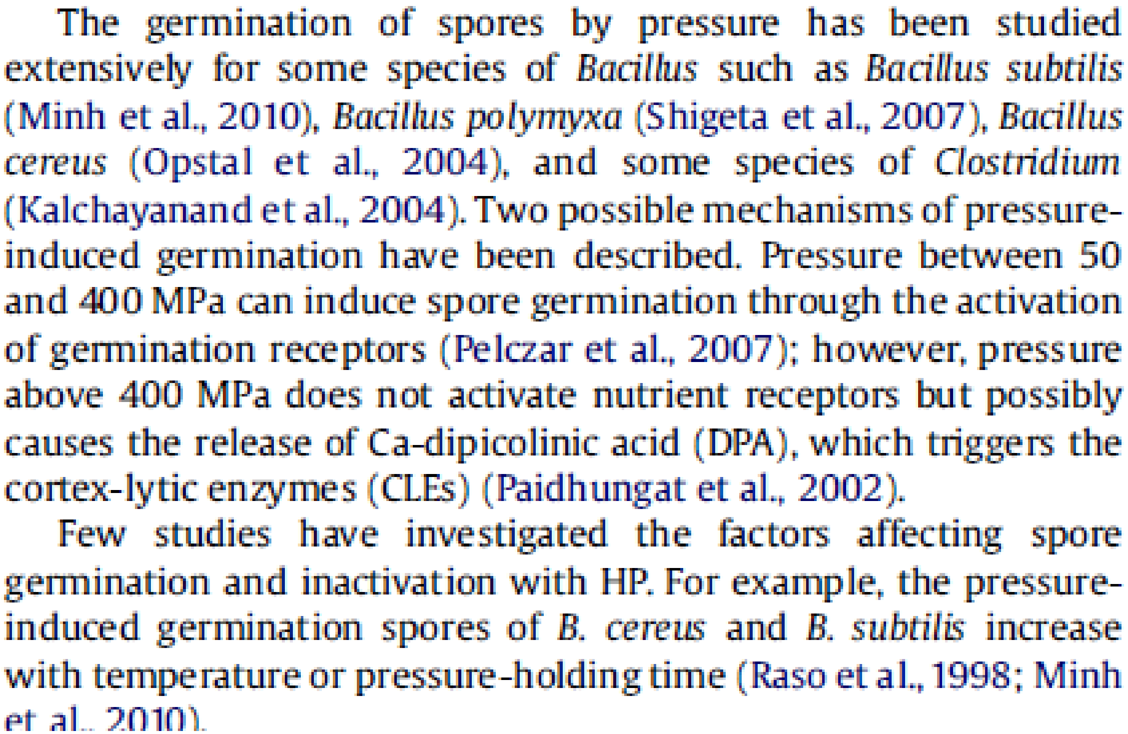
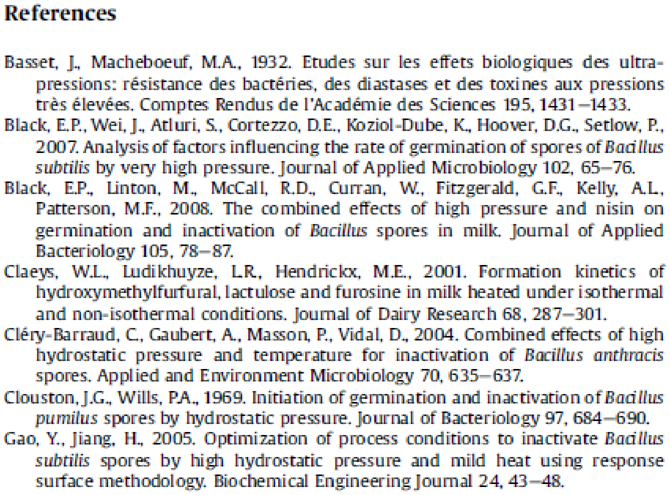
Optimization of pressure-induced germination of *Bacillus sporothermodurans* spores in water and milk

C. Aouadhi [a,b,d,f], H. Simonin [b,d,*], H. Prévost [c,e], M. de Lamballerie [b,d], A. Maaroufi [a], S. Mejri [f]



The germination of spores by pressure has been studied extensively for some species of *Bacillus* such as *Bacillus subtilis* (Minh et al., 2010), *Bacillus polymyxa* (Shigeta et al., 2007), *Bacillus cereus* (Opstal et al., 2004), and some species of *Clostridium* (Kalchayanand et al., 2004). Two possible mechanisms of pressure-induced germination have been described. Pressure between 50 and 400 MPa can induce spore germination through the activation of germination receptors (Pelczar et al., 2007); however, pressure above 400 MPa does not activate nutrient receptors but possibly causes the release of Ca-dipicolinic acid (DPA), which triggers the cortex-lytic enzymes (CLEs) (Paidhungat et al., 2002).

Few studies have investigated the factors affecting spore germination and inactivation with HP. For example, the pressure-induced germination spores of *B. cereus* and *B. subtilis* increase with temperature or pressure-holding time (Raso et al., 1998; Minh et al., 2010).



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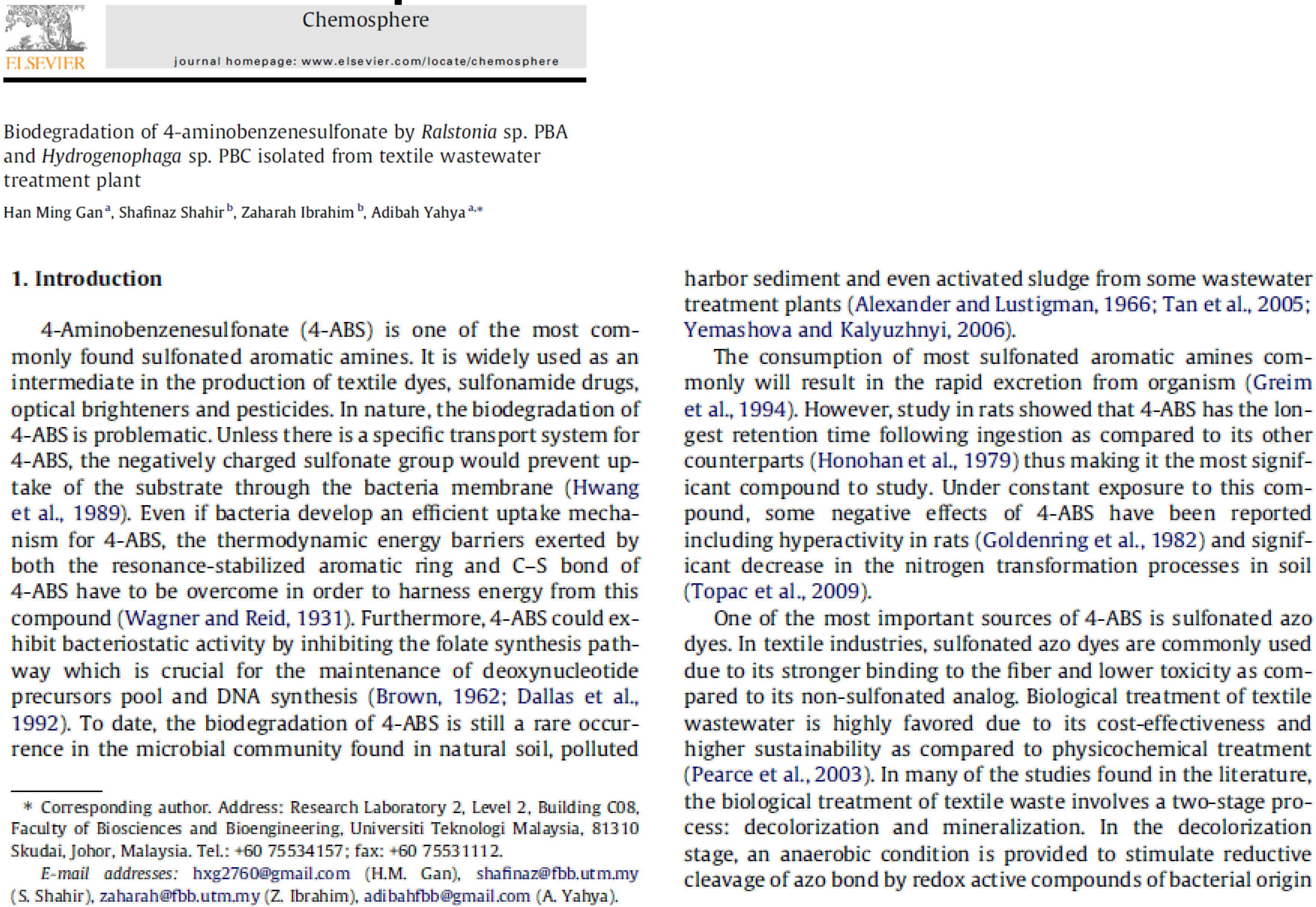

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Biodegradation of 4-aminobenzenesulfonate by *Ralstonia* sp. PBA and *Hydrogenophaga* sp. PBC isolated from textile wastewater treatment plant

Han Ming Gan[a], Shafinaz Shahir[b], Zaharah Ibrahim[b], Adibah Yahya[a,*]

1. Introduction

4-Aminobenzenesulfonate (4-ABS) is one of the most commonly found sulfonated aromatic amines. It is widely used as an intermediate in the production of textile dyes, sulfonamide drugs, optical brighteners and pesticides. In nature, the biodegradation of 4-ABS is problematic. Unless there is a specific transport system for 4-ABS, the negatively charged sulfonate group would prevent uptake of the substrate through the bacteria membrane (Hwang et al., 1989). Even if bacteria develop an efficient uptake mechanism for 4-ABS, the thermodynamic energy barriers exerted by both the resonance-stabilized aromatic ring and C–S bond of 4-ABS have to be overcome in order to harness energy from this compound (Wagner and Reid, 1931). Furthermore, 4-ABS could exhibit bacteriostatic activity by inhibiting the folate synthesis pathway which is crucial for the maintenance of deoxynucleotide precursors pool and DNA synthesis (Brown, 1962; Dallas et al., 1992). To date, the biodegradation of 4-ABS is still a rare occurrence in the microbial community found in natural soil, polluted harbor sediment and even activated sludge from some wastewater treatment plants (Alexander and Lustigman, 1966; Tan et al., 2005; Yemashova and Kalyuzhnyi, 2006).

The consumption of most sulfonated aromatic amines commonly will result in the rapid excretion from organism (Greim et al., 1994). However, study in rats showed that 4-ABS has the longest retention time following ingestion as compared to its other counterparts (Honohan et al., 1979) thus making it the most significant compound to study. Under constant exposure to this compound, some negative effects of 4-ABS have been reported including hyperactivity in rats (Goldenring et al., 1982) and significant decrease in the nitrogen transformation processes in soil (Topac et al., 2009).

One of the most important sources of 4-ABS is sulfonated azo dyes. In textile industries, sulfonated azo dyes are commonly used due to its stronger binding to the fiber and lower toxicity as compared to its non-sulfonated analog. Biological treatment of textile wastewater is highly favored due to its cost-effectiveness and higher sustainability as compared to physicochemical treatment (Pearce et al., 2003). In many of the studies found in the literature, the biological treatment of textile waste involves a two-stage process: decolorization and mineralization. In the decolorization stage, an anaerobic condition is provided to stimulate reductive cleavage of azo bond by redox active compounds of bacterial origin

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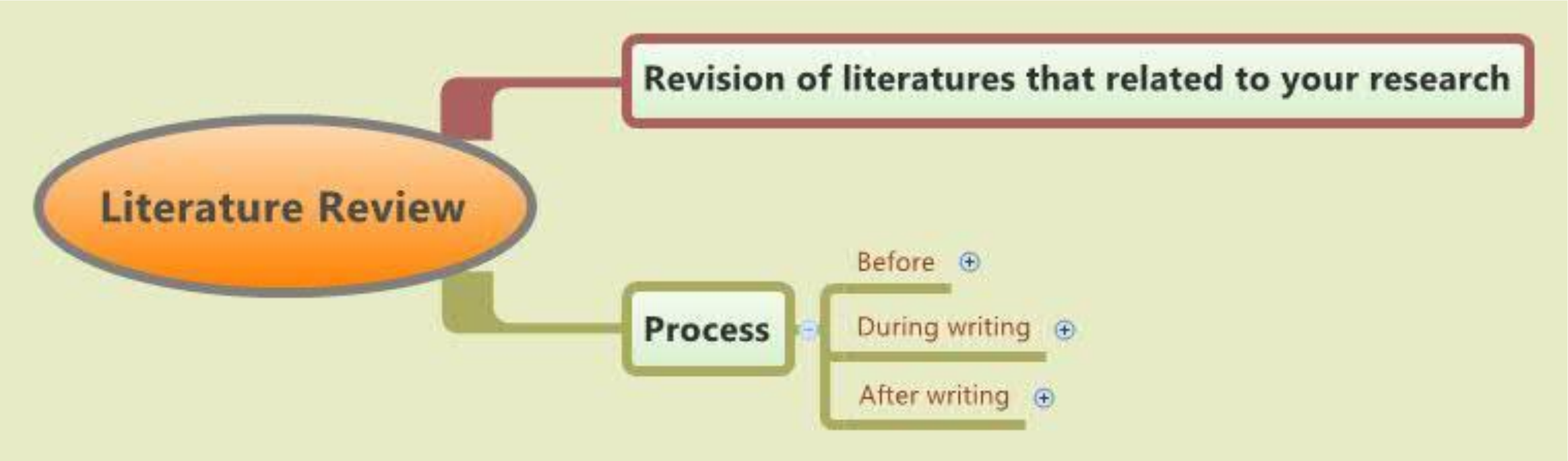
Literature review

- A good writing literature review could be achieved by:
  - Read many related recent references.
  - In each journal, literature review can be refer to introduction section.
  - Understand on writing styles and skills.
  - If you want to make a good literature review, you must read many journals.

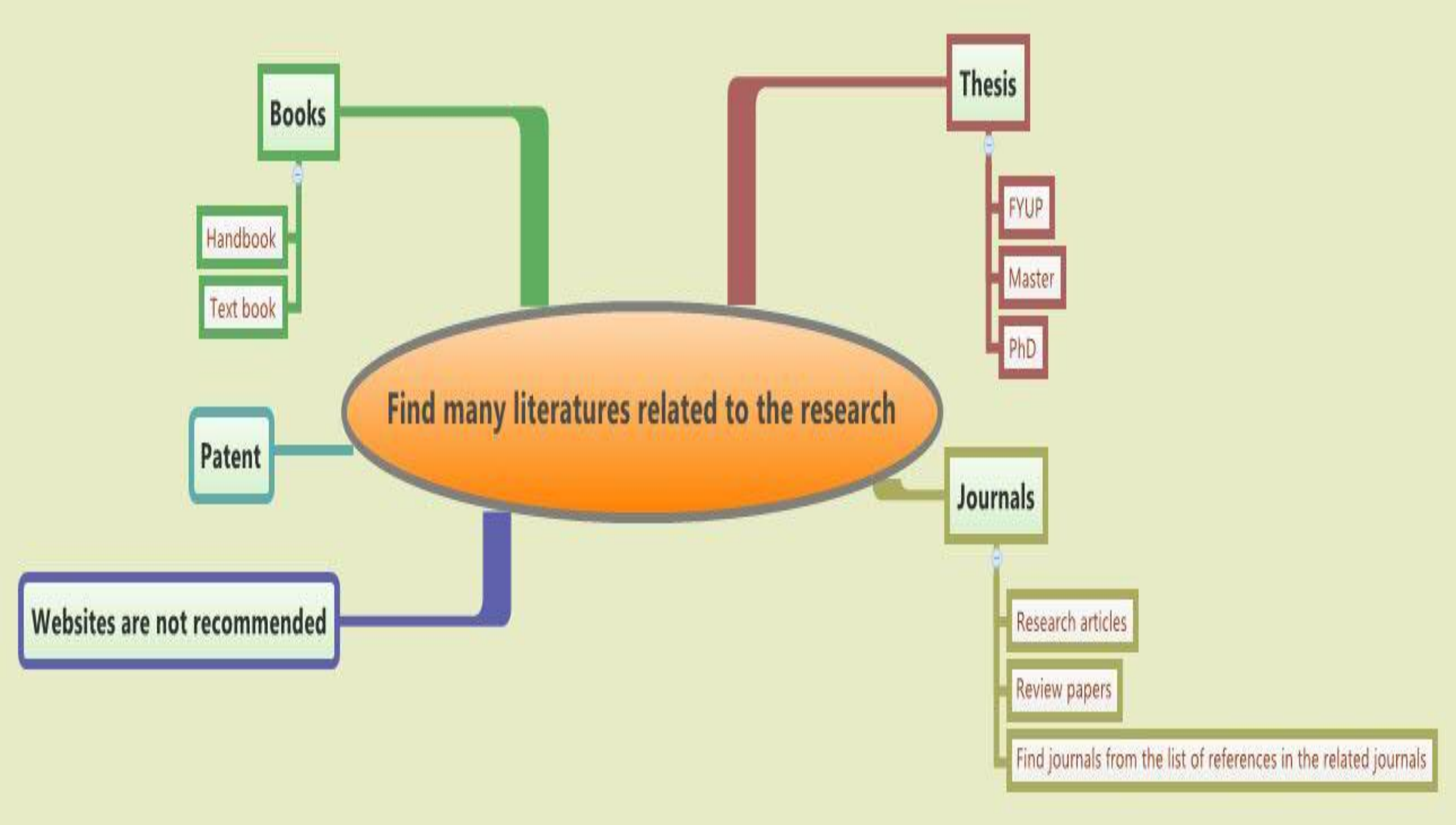
Literature review



Literature Review

- Revision of literatures that related to your research
- Process
  - Before
  - During writing
  - After writing

Literature Review – Process-Before



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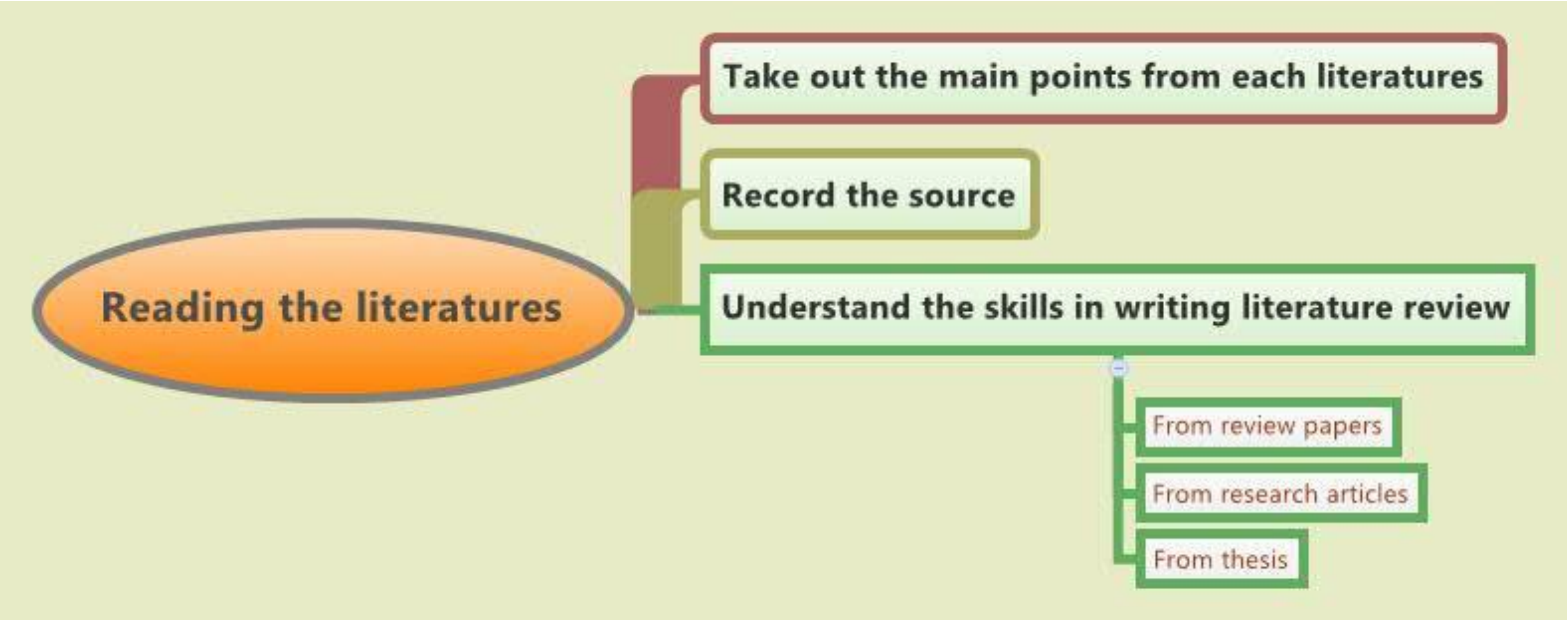
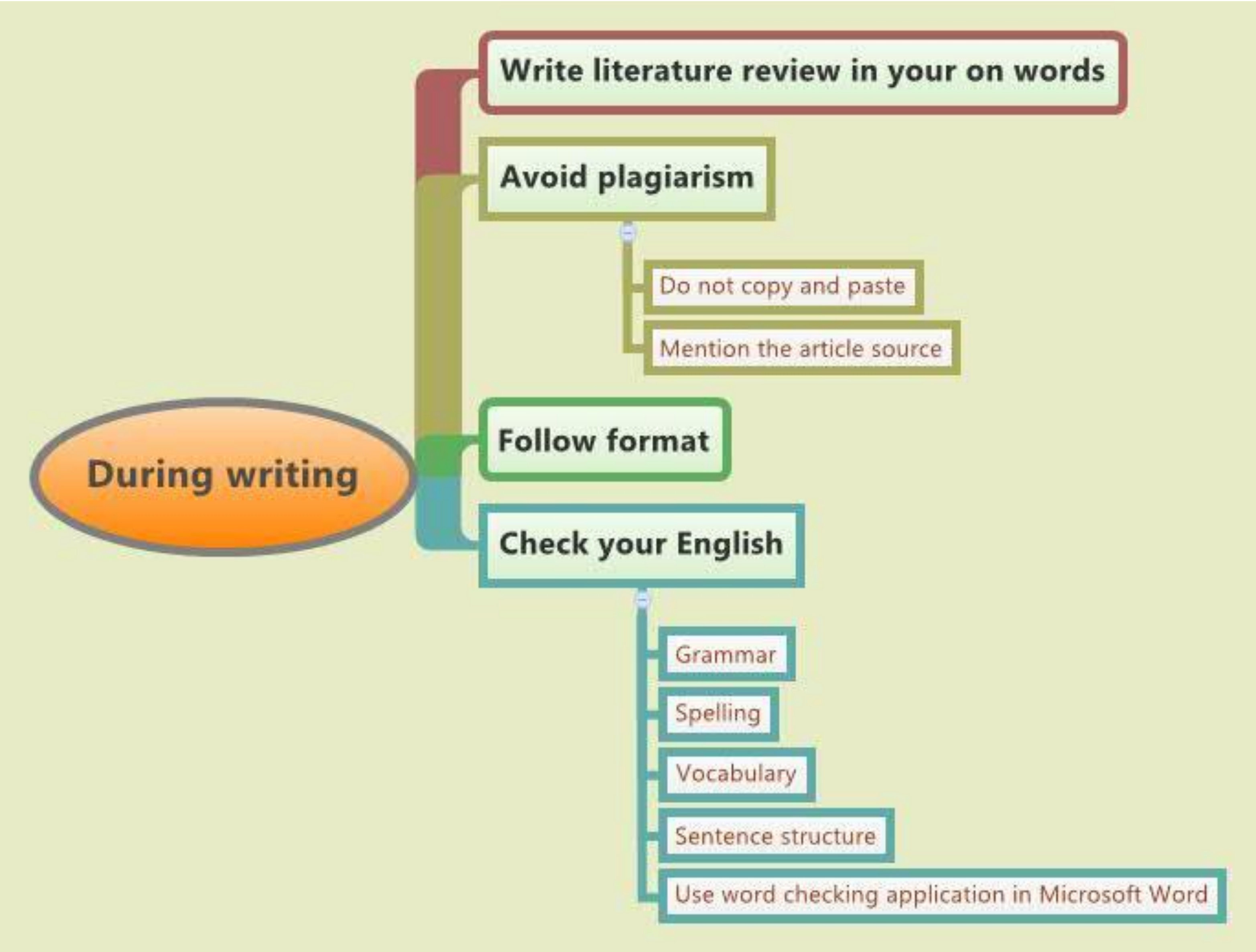


Reading the literatures

- Take out the main points from each literatures
- Record the source
- Understand the skills in writing literature review
  - From review papers
  - From research articles
  - From thesis

Literature Review – Process-Before

Literature Review – Process



During writing

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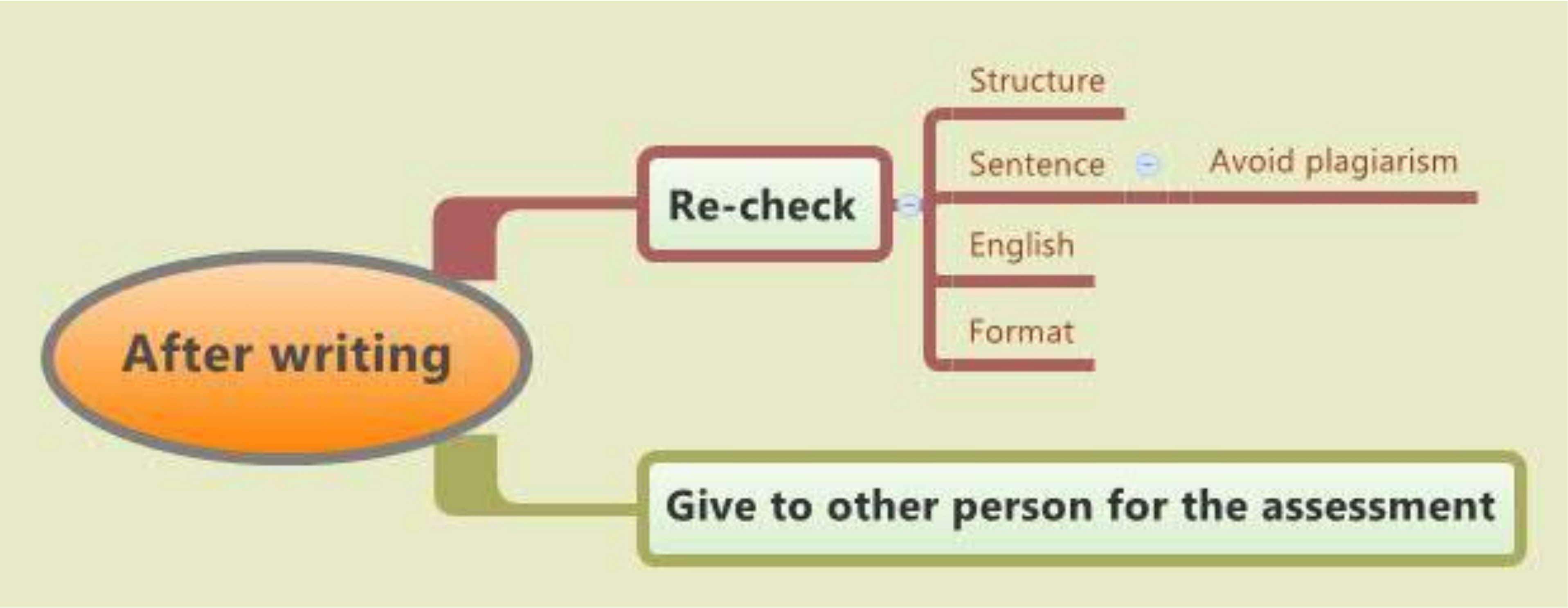
  - Mention the article source
- Follow format
- Check your English
  - Grammar
  - Spelling
  - Vocabulary
  - Sentence structure
  - Use word checking application in Microsoft Word

Literature Review – Process



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