



Review Article

Study progress on moringa seed oil with microemulsion: bibliometrics analysis of year 2012–2023

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ABSTRACT

Transdermal drug delivery systems increase the effectiveness of a drug substance, and one of them is a microemulsion. Moringa oil has anti-inflammatory, antioxidant, and antibacterial activity. The purpose of this study is to conduct a bibliometric analysis research on moringa oil formulated as microemulsions. A total of 5 English articles from the Scopus databases from 2012 to 2023 US sources were used in the bibliometrics analysis of *Moringa oleifera* seeds oil related to microemulsions. The bibliometrics analysis shows research trends, including the most used keywords depicted in visualizations using the VOSViewer application, article publishers, affiliations, and the author's country of origin. The most used keywords are microemulsions, microemulsion, *Moringa oleifera*, antioxidant activities, and antioxidants. The most publishers are Key Engineering Materials, the most affiliated are Chiang Mai University and Thamasat University, and most authors are from Thailand. The study of microemulsion formulations of Moringa seed oil has yet to be widely carried out but has been cited by other researchers.

1. Introduction

Moringa oleifera belongs to the *Moringaceae* family (Roland, 2020). This plant originates from India and has spread to tropical and subtropical countries (Leone et al., 2015). *Moringa oleifera* is known as a miracle plant because all the parts of this plant are beneficial (Prajapati et al., 2022). The moringa seed is one

part of the Moringa plant contains around 35-40% oil. Moringa seed oil is liquid at room temperature, golden-yellow in color, and distinctively aromatic. This seed oil has excellent qualities similar to olive oil and is slow to go rancid (Tsaknis et al., 1998). The main contents of moringa oil are fatty acid and oleic acid, which are the highest. In addition, there are sterol, phytosterol and mineral (Leone et al., 2016; Fu et al., 2021).

Moringa oil has a wide range of uses, including as a cooking ingredient (Dzokoto et al., 2017), lubricant, alternative biodiesel (Azad et al., 2015), and cosmetic ingredient (Plant, 2020). The pharmacological effect of moringa oil is antihyperlipidemic (Olatosin et al., 2018), anti-inflammatory, antibacterial, and antioxidant (Otunola & Afolayan, 2018), it has an anti-alopecia effect too (Korassa et al., 2022). Moringa oil is a type of oil fat extracted from the seed of the *Moringa oleifera* tree. It has a wide range of uses, including as a cooking ingredient (Dzokoto et al., 2017), lubricant, alternative biodiesel (Azad et al., 2015), and cosmetic ingredient (Plant, 2020). Moringa oil contains beneficial ingredients such as fatty acids, sterol group compounds, and tocopherols with anti-inflammatory and antioxidant properties (Leone et al., 2016).

Various routes have been non-invasive recently. This is an alternative to conventional injection needles. Transdermal drug delivery systems (TDDS) are the most interesting method. It has low resistance, is easy to use, is comfortable, and has a high level of user compliance. TDDS can be applied to drug therapy, the treatment industry's skin, and cosmetics. The TDDS method mainly involves local routes to prevent the accumulation of local drug concentrations in tissues not targeted by drugs (Jeong et al., 2021). There are various TDDS methods, one of them being microemulsion.

Microemulsions are thermodynamically stable colloidal drug carrier systems that are transparent and widely used by scientists for effective drug delivery to all parts of the skin. Microemulsion mixtures are isotropic spontaneously from substances lipophilic and hydrophilic, which are stabilized by suitable surfactants and co-surfactants. Easy manufacture, a long stability period, enhanced solubility, biocompatibility, a skin-friendly appearance, and affinity for hydrophilic and lipophilic drug substances make it superior for drug delivery. Topical administration of most active compounds is compromised by skin permeability limited by the skin barrier. In this order, the microemulsion represents the system carrier drug, which is thrifty, low-cost, comfortable, and successful in delivering the drug to the skin (Pathan et al., 2012).

A bibliographic analysis of research on Moringa seed oil formulated into microemulsions was conducted to determine whether this research was interesting. Bibliometric mapping benefits the scientific community and the public because it can help transform publication metadata into maps or visualizations. A bibliometric methodology was applied to provide a retrospective overview of the journal (Donthu et al., 2021).

2. Materials and Methods

The tool used is the VOSViewer application (1.6.19) to analyze bibliometrics. Study data was obtained from the Scopus database, downloaded on August 14, 2023. Study data relating to *Moringa oleifera* seed oil and microemulsion were taken from a database within a specified period, namely, articles obtained in 2012–2022, which were then downloaded in RIS form. The data was limited to English and then analysed using the VOSViewer software application (1.6.19). The results of this tool are used to map keywords, clusters, authors, and networks between authors. Download from Scopus in CSV form, and you can see the number of articles, the author's name, the author's affiliation, and the number of citations for each piece.

Data Analysis

Data studies were obtained from the database Scopus, downloaded on 14 August 2023. "Search," which is *Moringa oleifera* seed oil with microemulsions. The time search was thorough and obtained various dates from 2012 until 2023. Searching databases, Scopus received results for as many as five document studies in English. Strategy search data in this study can be seen in **Figure 1**.

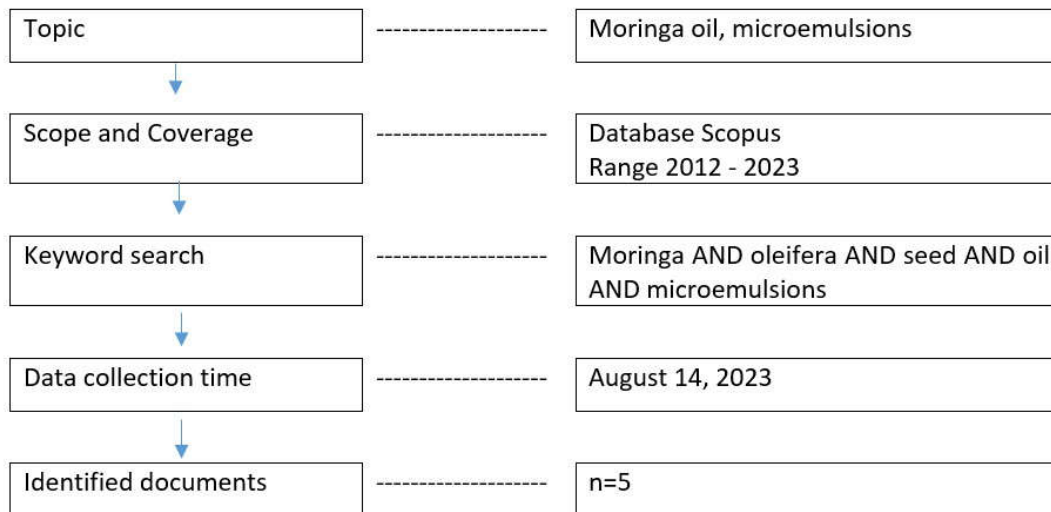


Figure 1: Strategy search data related to *Moringa oleifera* seed oil with microemulsion from 2012–2023

3. Results and Discussions

The database was taken from Scopus and analyzed using the facilities analysis contained in Scopus. VosViewer is used to view keywords that often appear in studies related to *Moringa oleifera* seed oil and microemulsion, which presents the main information about study data for the 2012 period until 2023. Type of document, average publication, citations, authors who published, and origin country of the writer. Weakness in writing is not included in the article besides the Scopus database. It, therefore, needs to reflect the number of related studies on *Moringa oleifera* seed oil and actual microemulsion. Limited data completeness from sources other than Scopus creates obstacles, so the document cannot be used as a reference (Donthu et al., 2021).

Trend publication from 2012 to 2022. During 2012–2022, five study documents in English were obtained from Scopus regarding *Moringa oleifera* seed oil with microemulsion. Study publication trends do not occur every year; in 2020, two publications were published. This illustrates that research related to *Moringa oleifera* seed oil with microemulsion is less interesting to discuss (**Figure 2a**).

Document by type. That document sourced from article 3 document, conference paper 1 document, and conference review is 1 document (**Figure 2b**).

Analysis Topic Based on Keywords Used by the Writer. Authors often use keywords that include microemulsions, microemulsion, *Moringa oleifera*, antioxidant activities, and antioxidants. **Figure 2c** shows the number of keywords used and their relationship to other keywords. The bibliometric mapping results from the VOSViewer application show that the more frequently there are pairs between two keywords, the closer the relationship between the keywords.

Source publisher article the most. An article about *Moringa oleifera* seeds oil with microemulsions has five documents; Key Engineering Materials published two, while the other three are Langmuir, Polymers, and Soft Materials, each with one article (**Figure 2d**).

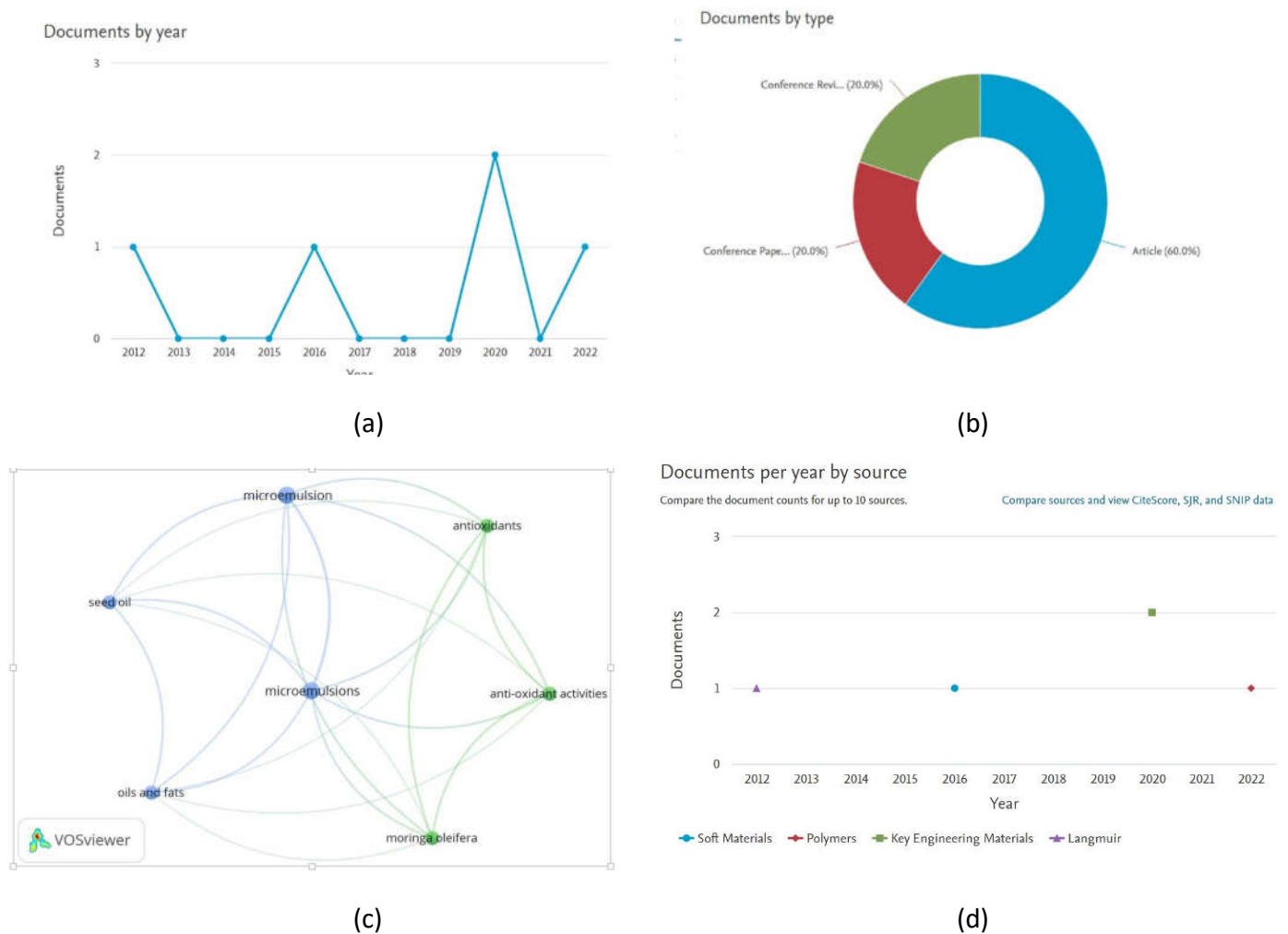


Figure 2. Amount publishing article studies (a), type source document studies (b), keyword which used writer (c), and journal which published an article (d) about *Moringa oleifera* seeds oil with microemulsions

Most Cited Article. **Table 1** shows the number of citations on each article from 2012–2023. Of the five articles, the most cited are those published by Langmuir (SJR 2022: 0.836; Q1) with 131 citations, followed by those published by Key Engineering Materials (SJR 2022: 0.171; Q4) and Soft Materials (SJR 2022:0.333; Q2) each three times. The final is polymers (SJR 2022: 0.720; Q1) with two times cited.

Table 1. Citation journal about studies on *Moringa oleifera* seed oil with microemulsions during 2012–2023

Authors	Title	Year	Source title	Vol.	Issue	Cited by	SJR
Tunit P.; Chittasupho C.; Sriyakul K.; Tungsuruthai P.; Chakkavittumrong P.; Na-Bangchang K.; Kietinun S.	Emulgels Containing <i>Perilla frutescens</i> Seed Oil, <i>Moringa oleifera</i> Seed Oil, and Mixed Seed Oil: Microemulsion and Safety Assessment	2022	Polymers	14	12	2	2022: 0.720; Q1
Lourith N.; Kanlayavattanakul M.; Ruktanonchai U.	Formulation and Stability of <i>Moringa oleifera</i> oil Microemulsion	2016	Soft Materials	14	2	3	2022: 0.333; Q2
Tunit P.; Kietinun S.; Sriyakul K.; Tungsukruthai P.; Chittasupho C.	Enhancement of Antioxidant Activity by The Combination of <i>Moringa oleifera</i> and <i>Perilla frutescens</i> Seed Oils in Microemulsion	2020	Key Engineering Materials	859	KEM	3	2022: 0.171; Q4
Okoli C.; Sanchez-Dominguez M.; Boutonnet M.; Järås S.; Civera C.; Solans C.; Kuttuva G.R.	Comparison and Functionalization Study of Microemulsion-Prepared Magnetic Iron Oxide Nanoparticles	2012	Langmuir	28	22	131	2022: 0.836; Q1

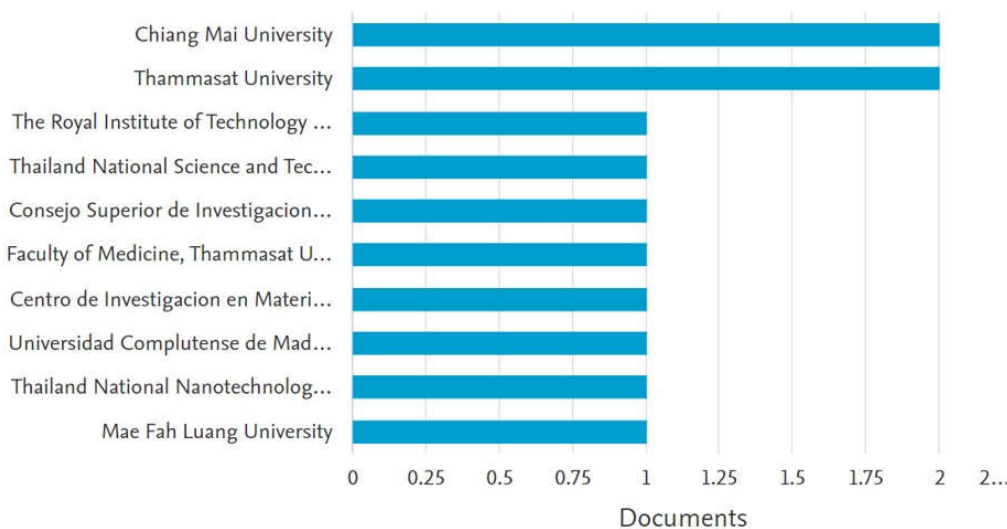


Figure 3. Author affiliation document about *Moringa oleifera* seeds oil with Microemulsions

Affiliate writer article. The two universities with the most affiliations are Chiang Mai University and Thammasat University, each with as many as two documents. In contrast, there is only one other agency with just two documents for affiliation.

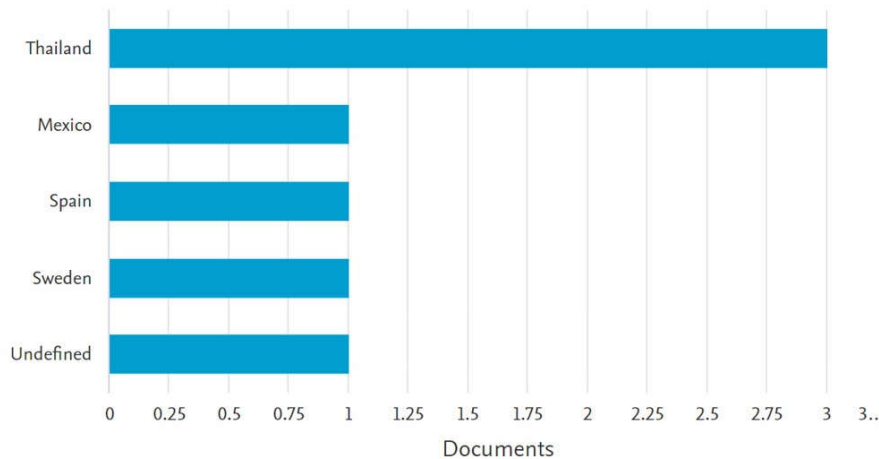


Figure 4. Country of Origin: A Writer's Article About *Moringa oleifera* Seed Oil with Microemulsions

Origin country document. Figure 4 shows the article about *Moringa oleifera* seed oil with microemulsion results. The writing writer originated from the country Thailand, and the author originated from Mexico, Spain, and Sweden, with one data.

4. Conclusions

The bibliometric analysis of the study progress on moringa seed oil with microemulsion during 2012-2023 revealed that the most used keywords are microemulsions, microemulsion, *Moringa oleifera*, antioxidant activities, and antioxidants. The most publishers are Key Engineering Materials, the most affiliated are Chiang Mai University and Thammasat University, and most authors are from Thailand. The study of microemulsion formulations of Moringa seed oil has yet to be widely carried out but has been cited by other researchers.

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6. References

- Azad, A. K., Rasul, M. G., Khan, M. M. K., Sharma, S. C., & Islam, R. (2015). The prospect of Moringa Seed Oil as a Sustainable Biodiesel Fuel in Australia: A Review. *Procedia Engineering*, 105, 601–606. <https://doi.org/https://doi.org/10.1016/j.proeng.2015.05.037>

- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133(March), 285–296. <https://doi.org/10.1016/j.ibusres.2021.04.070>
- Dzokoto, L., Donkor-boateng, N. A., & Owusu-darko, P. (2017). The Use of Moringa Oil for Cooking. 4(2), 1–5.
- Fu, X., Su, J., Hou, L., Zhu, P., Hou, Y., Zhang, K., Li, H., Liu, X., Jia, C., & Xu, J. (2021). Physicochemical and thermal characteristics of Moringa oleifera seed oil. *Advanced Composites and Hybrid Materials*, 4(3), 685–695. <https://doi.org/10.1007/s42114-021-00302-4>
- Jeong, W. Y., Kwon, M., Choi, H. E., & Kim, K. S. (2021). Recent advances in transdermal drug delivery systems: a review. *Biomaterials Research*, 25(1), 1–15. <https://doi.org/10.1186/s40824-021-00226-6>
- Korassa, Y. B., Saptarini, N. M., Mustarichie, R., & Hendriani, R. (2022). The Potential of Moringa (*Moringa oleifera* Lamk) Seed Oil as Anti-Alopecia. *Pharmacognosy Journal*, 14(2), 379–387. <https://doi.org/10.5530/pj.2022.14.49>
- Leone, A., Spada, A., Battezzati, A., Schiraldi, A., Aristil, J., & Bertoli, S. (2015). Cultivation, genetic, ethnopharmacology, phytochemistry and pharmacology of *Moringa oleifera* leaves: An overview. *International Journal of Molecular Sciences*, 16(6), 12791–12835. <https://doi.org/10.3390/ijms160612791>
- Leone, A., Spada, A., Battezzati, A., Schiraldi, A., Aristil, J., & Bertoli, S. (2016). *Moringa oleifera* seeds and oil: Characteristics and uses for human health. *International Journal of Molecular Sciences*, 17(12), 1–14. <https://doi.org/10.3390/ijms17122141>
- Olatosin, T. M., Ogunbiyi, Oluwagbenga John, Mustafa, A. M., & Apata, J. T. (2018). Hypolipidemic effect of moringa oleifera seed oil on high fat- diet induced hyperlipidemia in liver and heart of albino rats. *Mintage J. Pharm. Med. Scie.*, 7(1), 1–5.
- Otunola, G. A., & Afolayan, A. J. (2018). Chemical composition, antibacterial and in vitro anti-inflammatory potentials of essential oils from different plant parts of *Moringa oleifera* Lam. *American Journal of Biochemistry and Biotechnology*, 14(3), 210–220.
- Pathan, M., Zikriya, A., & Quazi, A. (2012). Microemulsion: As Exellent Drug Delivery System. *International Journal for Pharmaceutical Research Scholars*, 1, 199–210.
- Plant, M. (2020). ' The Wonder Tree ': Moringa in Cosmetics The natural ' goodness ' of moringa oil has been known for thousands of years. The Romans recognized the properties of moringa oil and used it extensively in perfumes and to protect the skin. 1 *The Egyptians als* (pp. 1–16).
- Prajapati, C., Ankola, M., Upadhyay, T. K., Sharangi, A. B., Alabdallah, N. M., Al-Saeed, F. A., Muzammil, K., & Saeed, M. (2022). Moringa oleifera: Miracle Plant with a Plethora of Medicinal, Therapeutic, and Economic Importance. *Horticulturae*, 8(6). <https://doi.org/10.3390/horticulturae8060492>
- Roland, C. (2020). Moringa oleifera, Drumstick Tree. 8235.
- Tsaknis, J., Lalas, S., Gergis, V., & Spiliotis, V. (1998). A total characterisation of Moringa oleifera Malawi seed oil. *La Rivista Italiana Delle Sostanze Grasse*, LXXV(January), 21–27.