EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 11
Year: 2026

ETHNOPHARMACOLOGICAL STUDY OF ANTI-OSTEOARTHRITIS IN THE RENGASDENGKLOK REGION, KARAWANG, WEST JAVA, INDONESIA

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DOI: https://doi.org/10.5281/zenodo.23912133

How to cite this Article: Dinar Ropiah, Dhena Wildatunisa, Fanny Khansa Gunawan, Husniah, Icha Hanita, Kania Indrawati, Amelia Lestari Putri, Aysha Rizki Ramadani, Dinar Anita Listiany, Namah, Risma Avrilliyani, Sopie Herlina, Sulis Salsa Pijriah, Syifa Maptuha, Tasya Agrestia, Zahwa Destriani, Maulana Yusuf Alkandahri* (2026). Ethnopharmacological Study Of Anti-Osteoarthritis In The Rengasdengklok Region, Karawang, West Java, Indonesia. European Journal of Biomedical and Pharmaceutical Sciences, 13(11), 329–332.

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Article Received on 05/10/2026 **Article Revised on 25/10/2026** **Article Published on 03/11/2026**

ABSTRACT

Osteoarthritis (OA) is a widespread chronic degenerative disease marked by the deterioration of articular cartilage, modifications in subchondral bone, and a spectrum of symptoms, including pain, stiffness, and disability. Ultimately, this condition impairs the patient's quality of life. This research aims to document and preserve the use of ethnomedicine to treat OA by people in the Rengasdengklok, Karawang, West Java, Indonesia. Fieldwork was carried out from April to May 2026 using direct interviews, questionnaires, and discussions. Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature. The plant types obtained were grouped into families according to the Cronquist classification system. Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org). This research reports that 30 plant species are commonly used by people in the Rengasdengklok Region to treat OA. Among the various plant parts used, leaves (56.7%) are most frequently used in making medicines, followed by rhizomes (16.7%), seed (10.0%), fruit (6.7%), stem, flower, and rind (respectively 3.3%). Meanwhile, the most frequently used preparation methods were decoction (83.3%) and infusion (16.7%). The results of this research confirm that people in the Rengasdengklok Region still rely heavily on medicinal plants for their health care system, especially for the treatment of OA with the most frequently used parts of the leaves and their use in decoctions and infusions.

KEYWORDS: Traditional medicine, Ethnomedicinal plants, Rengasdengklok, Osteoarthritis.

INTRODUCTION

Osteoarthritis (OA) is a common chronic degenerative disease characterized by progressive and degenerative damage to the cartilage, ligaments, and muscles comprising the joints.[1] The pathological symptoms of OA include the progressive loss and destruction of articular cartilage, thickening of the subchondral bone, formation of osteophytes, inflammation of the synovium, degeneration of the ligaments and menisci of the knee, and hypertrophy of the joint capsule.[2] These eventually lead to chronic pain, joint instability, stiffness, and disability, impeding the patient's quality of life, particularly in old age.[3] The pathology of OA has not been elucidated because it involves a chronic and complex process of various factors. The imbalance between the synthesis and degradation of the extracellular matrix in the articular cartilage is considered a major pathology of OA.[4] OA has been considered to be an evolutionary 'mismatched' disease related to modern lifestyles, including low physical activity and excessive nutritional intake, both of which lead to obesity. These factors lead to accelerated cartilage degeneration and synovial inflammation, increased gut leakage, and low-grade systemic inflammation, leading to local joint damage.[5] Several studies have suggested that inflammatory mediators such as inflammatory cytokines are involved in the onset and progression of OA.[6,7] OA has a complex and

multifaceted etiology, making it difficult to cure completely. Currently, most medications for OA are non-steroidal anti-inflammatory drugs (NSAIDs) and glucocorticoids. These medications primarily alleviate OA pain but do not delay the progress of OA or improve joint function.[8] The prolonged use of these medications can lead to serious side effects, including bleeding and gastric ulcers. Accordingly, there is increasing interest in natural products that can alleviate OA symptoms without adverse side effects, even after long-term use.[9]

Currently, research to obtain new anti-OA drugs derived from natural ingredients continues to be carried out, one of which is through exploring active compounds from natural ingredients, especially medicinal plants which have traditionally been used by people to treat OA in various regions in Indonesia.[10-12] One of the Region in Indonesia that still uses herbal plants as an alternative treatment, especially to treat OA, is the Rengasdengklok Region. This research aims to obtain detailed information about the use of herbal plants as an alternative therapy for OA in Rengasdengklok Region, Karawang, West Java, Indonesia using a field survey method.

MATERIALS AND METHODS

Study Area

Rengasdengklok is located in Karawang Regency, West Java, Indonesia, with an area of 33.46 km^2. This area has an altitude of 10 meters above sea level with an average maximum air temperature of 35°C and a minimum of 26°C (humidity: approximately 57%). Moreover, it is located between 06°08′51″ South Latitude and 107°18′44″ East Longitude. This area is a tropical climate area that is mostly inhabited by Sundanese tribes (85%) and other tribes (15%). Vegetation in the study area is in humid conditions with an average rainfall of 1,300 mm/year.

Data Collection

An extensive field survey was conducted to gather information on medicinal plants traditionally used by the Sundanese community in the study area. Data collection involved several field visits carried out from April to May 2026 in the Rengasdengklok Region, Karawang, West Java, Indonesia. Ethnomedicinal information was obtained from middle-aged and elderly traditional practitioners through direct interviews, questionnaires, and discussions conducted in their local language, Sundanese. The information documented included the local names of medicinal plants, the plant parts utilized, preparation techniques, and routes of administration, such as infusion, paste, juice, and decoction. All relevant data on the medicinal plants identified during the survey were systematically recorded for further analysis.

Botanical Identification

Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature.[13] The plant types obtained were grouped into families according to the Cronquist classification system, except for Pteridophyta and Gymnospermae.[14] Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org).

Ethics Statement

All participants provided verbal consent before the interview and gave consent to publish the information they provided.

RESULTS AND DISCUSSION

Osteoarthritis is a chronic degenerative joint disease characterized by the progressive degradation of articular cartilage, subchondral bone remodeling, synovial inflammation, and joint pain. Although it is primarily associated with structural changes in the joints, inflammatory mediators and oxidative stress also contribute to disease progression. Therefore, medicinal plants containing anti-inflammatory, antioxidant, and potentially chondroprotective compounds may be relevant to the development of complementary therapeutic approaches for OA.[15] This research revealed that 30 plant species are commonly used by local people to treat osteoarthritis (Table 1). This shows that the study location is affordable in terms of biodiversity. Among the various plant parts used, leaves (56.7%) are most frequently used in making medicines, followed by rhizomes (16.7%), seed (10.0%), fruit (6.7%), stem, flower, and rind (respectively 3.3%). Meanwhile, the most frequently used preparation methods were decoction (83.3%) and infusion (16.7%). Regarding preparation methods, decoction was the predominant approach, followed by infusion. These methods are commonly used to extract water-soluble constituents from medicinal plant materials. Nevertheless, extraction efficiency depends on the plant species, the part used, the preparation conditions, and the chemical properties of its bioactive constituents.[16]

Table 1: Ethnomedicinal plants, local name, part used, mode of administration, and dosage uses in Rengasdengklok, Karawang, West Java, Indonesia.

No	Species	Family	Local name	Parts used	Mode of administration	Dosage of use
1	*Allium sativum* L.	Alliaceae	Bawang Putih	Rhizome	Infusion	50 grams once a day
2	*Alpinia purpurata* K. Schum	Zingiberaceae	Lengkuas	Rhizome	Decoction	200 grams once a day
3	*Andrographis paniculata* Nees	Acanthaceae	Sambiloto	Leaf	Decoction	100 grams once a day
4	*Annona muricata* L.	Annonaceae	Sirsak	Leaf	Decoction	150 grams once a day
5	*Anredera cordifolia* (Ten.) Steenis	Basellaceae	Binahong	Leaf	Decoction	50 grams once a day
6	*Averrhoa bilimbi* L.	Oxalidaceae	Belimbing Wuluh	Leaf	Decoction	50 grams once a day
7	*Carica papaya* L.	Caricaceae	Pepaya	Seed	Decoction	100 grams once a day
8	*Cinnamomum verum* J.Presl	Lauraceae	Kayu Manis	Stem	Decoction	150 grams once a day
9	*Clitoria ternatea* L.	Fabaceae	Telang	Flower	Decoction	300 grams once a day
10	*Coleus atropurpureus* L. Benth	Lamiaceae	Jawer Kotok	Leaf	Decoction	100 grams once a day
11	*Curcuma longa* L.	Zingiberaceae	Kunyit	Rhizome	Infusion	100 grams once a day
12	*Eleusine indica* Gaertn.	Poaceae	Rumput Belulang	Leaf	Decoction	10 grams once a day
13	*Garcinia mangostana* L.	Clusiaceae	Manggis	Rind	Infusion	250 grams once a day
14	*Gynura divaricate* DC.	Asteraceae	Daun Dewa	Leaf	Decoction	150 grams once a day
15	*Jatropha gossypiifolia* L.	Euphorbiaceae	Jarak	Leaf	Decoction	100 grams once a day
16	*Kaempferia galanga* L.	Zingiberaceae	Kencur	Rhizome	Infusion	100 grams once a day
17	*Mimosa pudica* L.	Fabaceae	Putri Malu	Leaf	Decoction	150 grams once a day
18	*Momordica charantia* L.	Cucurbitaceae	Pare	Leaf	Decoction	120 grams once a day
19	*Morinda citrifolia* L.	Rubiaceae	Mengkudu	Fruit	Infusion	100 grams once a day
20	*Moringa oleifera* Lamk.	Moringaceae	Kelor	Leaf	Decoction	200 grams once a day
21	*Myristica fragrans* Houtt.	Myristicaceae	Pala	Seed	Decoction	50 grams once a day
22	*Nigella sativa* L.	Ranunculaceae	Jinten Hitam	Seed	Decoction	200 grams once a day
23	*Orthosiphon aristatus* (Blume) Miq.	Lamiaceae	Kumis Kucing	Leaf	Decoction	150 grams once a day
24	*Phaleria macrocarpa* (Scheff.) Boerl)	Thymelaceae	Mahkota Dewa	Fruit	Decoction	180 grams once a day
25	*Physalis angulata* L.	Solanaceae	Cecendet	Leaf	Decoction	100 grams once a day
26	*Piper betle* L.	Piperaceae	Sirih	Leaf	Decoction	50 grams once a day
27	*Sida rhombifolia* L.	Malvaceae	Sidaguri	Leaf	Decoction	50 grams once a day
28	*Terminalia catappa* L.	Combretaceae	Ketapang	Leaf	Decoction	80 grams once a day
29	*Tinospora crispa* L.	Menispermaceae	Baratawali	Leaf	Decoction	50 grams once a day
30	*Zingiber officinale* Rosc.	Zingiberaceae	Jahe	Rhizome	Decoction	100 grams once a day

CONCLUSIONS

In conclusion, this study documents a diverse range of traditionally used medicinal plants that may provide leads for anti-osteoarthritis drug discovery. However, the findings establish traditional use rather than demonstrated therapeutic efficacy. Further pharmacological validation, safety evaluation, and clinical investigation are essential before these plants or their preparations can be recommended as evidence-based treatments for osteoarthritis.

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