



## A Bioinformatic Studies of *Moringaoleifera* L. as A Gout Drug

Eko Nevriansyah, Deasycha Novelidia Pramesta<sup>a</sup>, Rezi Aulia Busman<sup>b</sup>, Silvi Handri<sup>c</sup>

<sup>a</sup>Magister Programme of Biochemistry, Postgraduate, Universitas De La Salle, Philippines

<sup>a,b</sup>Department of Department of Chemistry, Faculty of Mathematics and Natural Science, Universitas Negeri Padang, Jl. Prof. Dr. Hamka, Air Tawar Barat, Padang Utara, West Sumatera, Indonesian

<sup>c</sup>Magister Programme of Educational Chemistry, Postgraduate, Faculty of Mathematics and Natural Science, Universitas Negeri Padang, Jl. Prof. Dr. Hamka, Air Tawar Barat, Padang Utara, West Sumatera, Indonesian

\*Coresponding email: deasychanovelidia19@gmail.com

### ABSTRACT

*Moringaoleifera* Lam. (MO) is a plant that has been widely known for its usefulness by the people of Indonesia which is called Moringa. MO belongs to the Moringaceae family. Moringa plant is a local food material that has the potential to be developed to cure uric acid naturally, because the moringa leaves contain active compounds, namely phlovonoids and alkaloids which can prevent the formation of uric acid, besides that Moringa leaves can also be used as anti-inflammatory (inflammation) and analgesic (pain reliever). Gout is a disease of purine metabolic waste products that come from the food we eat. This disorder is associated with the accumulation of urosal crystals monosodium monohydrate and in the later stages of degeneration of joint cartilage, the incidence of gout is 1-2%, especially occurs at the age of 30-40 years and 20 times more often in men than in women. The method used is a computational study using various bioinformatics applications. From the research results, it was found that the active compound in Moringa leaves is effective as a uric acid drug.

**Keywords:** Alkaloids; Curcuma; *Moringaoleifera* lam. (MO); Phlovonoids; Uric acid

### 1. INTRODUCTION

Moringa (*Moringaoleifera* or MO) is a plant that is recognized to have many uses both nationally and internationally. In Indonesia, MO is used for the fulfillment of food, medicine, cosmetic ingredients and cultural customary rituals [1-4]. It is noted that MO is used to treat fever, thrush, cough, stamina booster, convulsions, heartburn, headache, cholesterol, malnutrition, gout, diabetes, goiter, jaundice, rheumatism, rheumatic pain and typhus [5-7]. The part of the MO plant that is often used in Indonesia is the leaves. The leaves are usually used for food, traditional medicine, and traditional ritual ingredients. One of the uses of leaves for the treatment of jaundice is by drinking finely ground Moringa leaves, added with coconut water, filtered, and added with honey. It was noted that MO leaves contain more vitamin A than carrots, more calcium from milk, more iron from spinach, more vitamin C from oranges and more potassium from bananas. Utilization of roots to treat goiter, cholesterol, cough, fever, gout, diabetes and thrush (8-12). MO stems are used for animal feed, medicine for stomach aches, coughs and fever. MO fruit is usually used as a vegetable. The seeds are used to treat stomach aches. The many benefits of MO in human life make MO a plant with the nicknames as Amazing Tree and The Miracle Tree [8-12].

Uric acid is a disease of purine metabolic waste that comes from the food scraps we consume. Uric acid is a compound that exists because of the results of purine metabolism in the body.  
<https://journals.inparagonsociety.org/index.php/aritmetika>

Meanwhile, purines are compounds found in several types of food, both vegetable and animal. Several types of foods that are animal-based and high in purines include offal (liver, spleen, tripe), livestock (beef, horse and mutton), processed (corned beef, sardines, jerky cheese, etc.), poultry (duck meat, turkey and also goose), seafood (crab, shrimp, sardines, shellfish, etc.). Purines themselves are substances that are found in every food ingredient that comes from the body of living things. In other words, in the body of a living being [13-16].

Gout is related to food intake patterns, so one way to prevent it is by controlling food intake patterns. If you do not control the intake pattern, uric acid levels in the blood will be excessive and cause a buildup of uric acid crystals which, if formed in joint fluid, will cause gout. Obesity is one of the supporting factors for gout. Gout is closely related to obesity. Consumption of fatty foods, coconut milk, offal and lifestyle. Obese people tend to have high uric acid levels in the blood. Until now there is no theory that can explain why uric acid levels in obese people are high. However, in most studies, uric acid levels in obese people tend to be higher than normal [17-20].

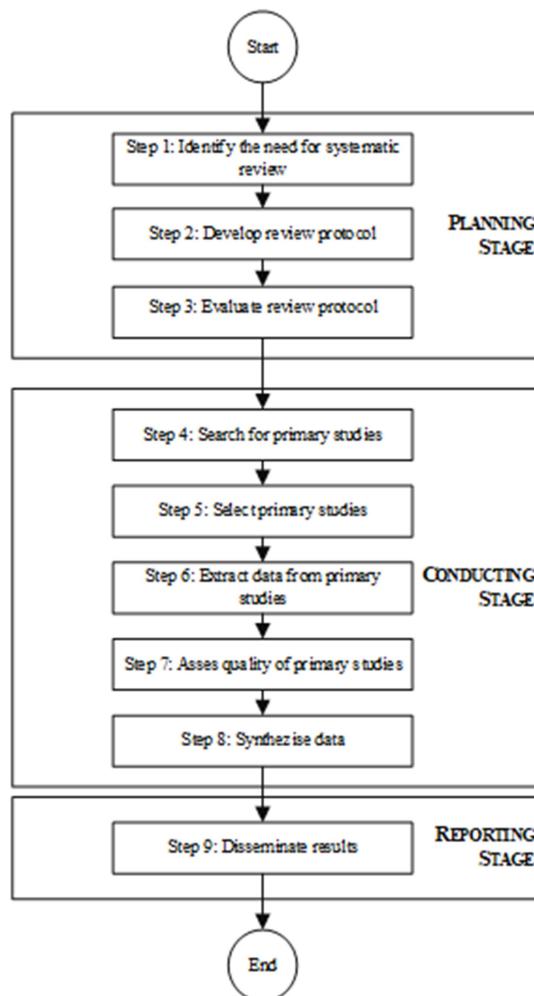
## 2. LITERATURE REVIEW

Uric acid is the end product of purine metabolism that occurs in the human body. Purine intake in the body derived from the food consumed, both of animal and vegetable origin. Uric acid is mostly derived from the metabolism of endogenous purine nucleotides, guanylic acid (GMP), inosinic acid (IMP), & Adenylic Acid (AMP). This reaction is assisted by an enzyme called xanthine oxidase. The enzyme comes from the kidneys and intestines so that it can convert hypoxanthine and guanine into xanthine. If there is interference with the kidneys, the uric acid in the blood. The body, especially the blood, will increase or be caused by high intake of purines in food. This disorder is called hyperuricemia which can lead to nephrolithiasis, and also the formation of needle-like crystals in body tissues which causes swelling and joint pain that develops into gouty arthritis. One of the plants that are thought to have a therapeutic effect in reducing uric acid levels is Moringa leaves. This plant is widely used by the general public, especially in Indonesia. Moringa leaves are widely used as traditional medicine to cure several medical and non-medical diseases. Chemical compounds contained in Moringa leaves include tannins, steroids, triterpenoids, flavonoids, saponins, anthraquinones and alkaloids [21-23].

Sashidhara *et al.*, (2009) reported that Moringa leaves have anti-inflammatory, antioxidant, antitumor, antiallergic, antiviral, and antiangiogenic activities. Some researchers state that flavonoid compounds are thought to be effective in inhibiting the formation of uric acid and have anti-inflammatory and analgesic properties [24-25]. This is because flavonoids can inhibit the activity of the xanthine oxidase enzyme through interaction with the enzyme on the side group and the mechanism of inhibition mechanisms. In vitro, several flavonoid compounds can inhibit the xanthine oxidase enzyme including flavonoids, luteolin, apigenin, quercetin and mirestin [26-30].

### 3. EXPERIMENTAL

This study uses the literature review method or SLR (system literature review). An approach to research research, assess and interpret and collect information about the compounds contained in Moringa leaves and their role in helping cure gout. This paper is supported by books, journals, optimization of the 3D structure of Dipeptidyl peptidase IV (DPP-4) with Chem3D using Personal laptop Model HP 14-ck0011TU Intel® Celeron® N4000 CPU 1.1GHz, 4.0GB RAM, Microsoft Windows 10 Pro 64-bit with internet connection. Software (ChemicalComputing Group ULC). Webserver <https://phytochem.nal.usda.gov/>, <https://pubchem.ncbi.nlm.nih.gov/>, <http://www.swisstargetprediction.ch/>, <https://chemdraw-pro.software.informer.com/>, the material analyzed was obtained from the Phytochem and chanoclavine databases.



**Figure 1.** Systematic Review Diagram

((Source : Courtesy of Deasycha Novelidha Pramestaa, *et al*)

#### 4. RESULTS AND DISCUSSION

Uric acid is a disease of purine metabolic wastes from the food we consume. Uric acid is a compound that exists because of its metabolic products in the body. Uric acid is the final substance of purine metabolism in the body. Several types of food originating from animal sources and high content that will be purified include, offal (liver, spleen, tripe), livestock (beef, horse and goat meat), processed (corned beef, sardines, jerky cheese, etc.), poultry. (duck, turkey and also goose), seafood (crab, shrimp, sardines, shellfish, etc.) (Andry, Saryono and Arif Setyo Upoyo, 2009). Increased uric acid levels can cause disturbances in the human body such as a sore feeling in the joints and often the appearance of very intense pain for the sufferer. This disease is often called gout or better known as gout (Andry, Saryono and Arif Setyo Upoyo, 2009).

*Moringa oleifera* Lamk (*Moringa oleifera* Lamk) is a type of plant that is often found in Indonesia, knows no season, can grow in various climates and in some areas it is usually processed for consumption. *Moringa* leaves are known as a herbal plant for antioxidants, anti-inflammatory, gout, arthritis, and others<sup>14</sup>. Plants that are believed to be able to cure various diseases, there *Moringa* leaf extract is known to be an antioxidant, hepatoprotective, immunomodulatory, and anti-inflammatory. *Moringa* leaves are very effective in curing gout naturally, because they contain active compounds, namely phlovonoids and alkaloids, which can prevent uric acid reservations. These flavonoids function as analgesics that inhibit the action of the cyclooxygenase and lipoxygenase enzymes so that they can interfere with prostaglandin synthesis and reduce pain (Suryanto, 2012). In addition, *Moringa* leaves can also be used as anti-inflammatory (inflammation) and analgesic (pain reliever). The type of alkaloid that can inhibit uric acid ordering is kholkisin, besides that these compounds can also eliminate the inflammatory reaction, if the reaction can be inhibited it can avoid the red swelling of the joints. In addition, *Moringa* leaves are rich in vitamins and minerals, as well as several phytochemical compounds including alkaloids, saponins, flavonoids, phenols, tannins, and several other phytochemical compounds. In addition, *Moringa* leaves also contain phenolic compounds such as flavonoids and tannins. One of the flavonoid compounds is quercetin, which plays a role in inhibiting xanthine oxidase activity, so that it can inhibit uric acid orders.

#### 5. CONCLUSION

Based on research that has been conducted by several people and several literature reviews, can be abbreviated as leaves of *Moringa* (*Moringa oleifera*) has the property as a uric acid drug because in *Moringa* leaves contain active compounds, namely flavonoid and alkaloid which can prevent the formation of uric acid, besides that *Moringa* leaves can also be used as anti-inflammatory (inflammation) and analgesic (pain relief).

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