

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Review Article on Role of Medicinal Plant in Gout.

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ABSTRACT

Increased uric acid accumulation and / or reduced excretion in humans is closely related to the pathogenesis of gout and hyperuricemia. High purine diets are strongly affected. Uric acid is present in both high-grade plants and microorganisms dependent on a wide variety of species. Urate degradation enzymes are found in both plants and microorganisms but the ways in which the plant degrades uric acid have been found to differ from one another. High-yielding plants produce various metabolites that can inhibit xanthine oxidase and xanthine oxidoreductase, thus preventing the inclusion of hypoxanthine in xanthine and uric acid in purine metabolism. However, microorganisms produce a group of enzymes Uricase, allantoinase, allantoinase and urease, causing a decrease in uric acid in ammonia. In humans, researchers found that several mutations caused pseudo gene silencing (Silencing) the gene for urease in ancestral monkeys present as soluble crystalloid peroxisomes. This is in contrast to microorganisms where uric acid is present in the cytoplasm or peroxisomes. In addition, many regenerative uricase surfaces with higher activity than wild uricase can be successfully created for many bacteria. The current review concerns the emergence of uric acid in plants and other organisms especially microorganisms in addition to processes in which extracts of plants, metabolites and enzymes can reduce uric acid in the blood. Genetics and uric acid code for plants and microorganisms are also revealed. Gout is a metabolic disease associated with high uric acid levels in the blood. The disease is treated with other drugs that aim to reduce serum urate levels. However, the use of various drugs leads to the appearance of other side effects, which is why it is important to use alternative therapies based on natural sources. Purpose research identify alternative therapies, their side effects, and other herbs used to treat gout in Morocco with the aim of making them more effective. We communicated with various English publications in PubMed, Web of Science, and Science Direct published between 1991 and 2019 using the following keywords "drugs," "gout," "Morocco," "medicinal plants," "in vitro," and "in vivo." Classify the drugs, according to their operating procedures, and cite other species reported in the Moroccan pharmacy as anti-cancer effects.

Keywords: URAT1, xanthine oxidase, crystal deposition, uric acid, kidney disease, hypertension, diabetes, Plant.

<https://doi.org/10.33887/rjpbcs/2022.13.1.29>

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INTRODUCTION

Gout is an incurable disease, also known as "the plague of kings." Sir Alfred Baring Garrod discovered in 1848 [1].) A disease characterized by the insertion of urate crystals into several tissues [2]. It affects many joints, especially in attacking the arms, knees, and ankles [3]. In particular, The disease is associated with many risk factors such as hyperuricemia, genetic factors, metabolism syndrome, dietary factors, alcohol consumption, osteoarthritis, kidney failure, urination, and other medications [4]. the main cause of hyperuricemia is imbalance level of production and release of uric acid. Purines are mainly destroyed by a hepatic enzyme called xanthine oxidase which is involved in the appearance of Hyperuricemia. A high purine diet that leads to purine metabolism promotes excessive drinking, as well as tumor lysis syndrome associated with the conversion of large numbers of cells, The normal level of uric acid in the blood is between 3–7 mg / 100 mL, which is needed by both human and animal bodies as an antioxidant and prevents damage to the blood vessels to protect it. Low purine plant-based foods, often needed to treat gout. The average daily diet for adults in the United States contains about 600–1000 mg of purines. Recent research has shown that vegetable purines (fruits and vegetables) have a higher risk of uric acid accumulation but lower than that of meat and fish [5]. Generally, gout is treated with other drugs to reduce serum urate levels by blocking xanthine oxidase in the liver. Among those treatments, we have febuxostat and allopurinol [9]. Colchicine extracted by *Colchicum autumnale* is another form of treatment for gout [10]. Unfortunately, these drugs have a variety of side effects. For example, allopurinol causes nephrolithiasis, kidney toxicity, liver necrosis, an allergy [11]. In this regard, people are looking for better alternatives based on the use of medicinal plants because of their availability, easy access, and people believe that natural products are harmless [12]. Morocco is characterized by a variety of plants, and contains 4200 species of which 800 are considered medicinal plants [13]. The medicinal plants of this country have been used traditionally treating several problems such as gout. In fact, a few plants were reported in pharmacopeia as antigout products, and most of them showed by testing this activity.

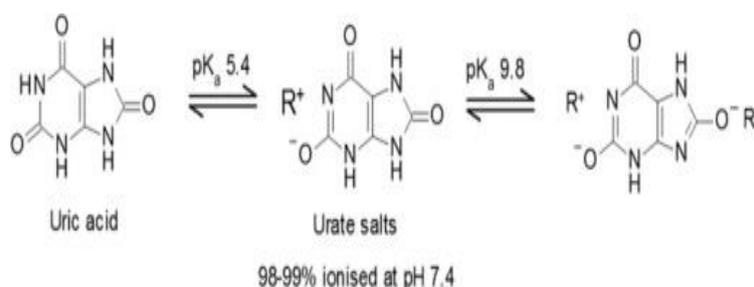
Medical Treatment

The goal of controlling gout is based on reducing and maintaining serum urate at a normal dose (<6.0 mg / d) [9]. Generally, there are three methods used to achieve this purpose. First allows the inhibition of xanthine oxidase enzyme (allopurinol and febuxostat) and inhibits the production of uric acid and its precursor. The second is intended to improve the release of uric acid. The third strategy is based on the administration of uricase compounds to convert uric acid into allantoin [7].

Plants Used Traditionally to Treat Gout in Morocco

Medicinal plants have a prominent place in Moroccan phytotherapy as it contains several bio n nutrients and antioxidants responsible for their beneficial effects. Plants and their compounds can be used as an alternative medicine for gout pathology. According to experiments, there are several species of gout especially monosodium urate crystal deposition caused by a strong, potassium oxonate-induced inflammation.

Hyperuricemia, as well as inflammation caused by carrageenan. In fact, uric acid is considered a weak living acid, and can be ionized to monosodium urate crystal at pH 7.4 and at 37 ° C. As a result, uric acid and urate crystals can form on the tissues, especially the joints and kidneys, contributing to tissue damage [8]. monosodium formation urate crystals lead to the activation of macrophages which play a role in the production of inflammatory cytokines such as IL-1 β [13].

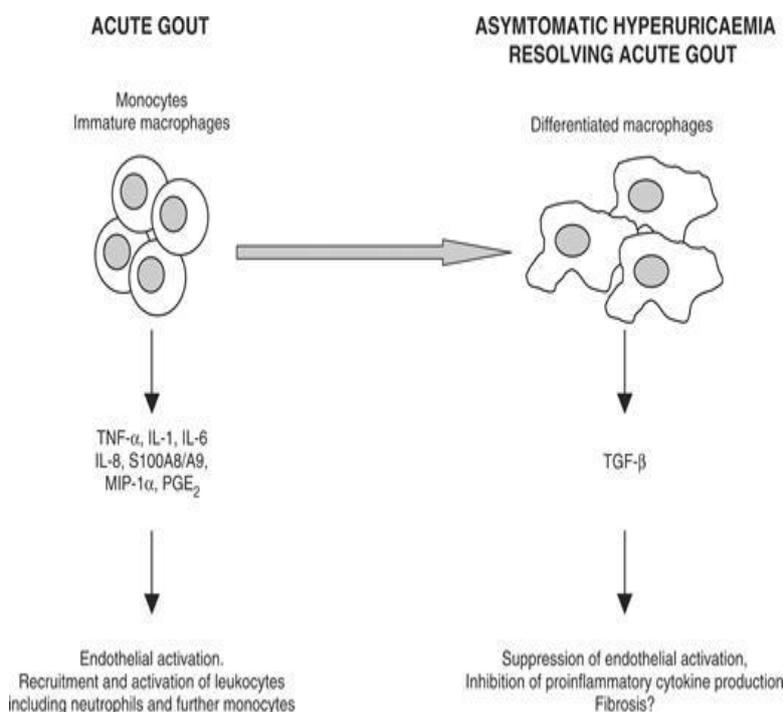


Uric acid ionization

this review, lists some of the natural resources that are traditionally used in Morocco to treat diarrhea. Table categorizes 23 species, their scientific names, families, traditionally used components, traditional method of use, experimental component, extraction methods, and experimental studies aimed at gout, and we report toxic plants. In fact, the identified plants have shown an anti-gout effect by inhibiting and inhibiting xanthine oxidase, an enzyme that converts xanthine and hypoxanthine into uric acid. Xanthine oxidase inhibitors play an important role in reducing uric acid levels, oxidative stress, and inflammation in the kidneys and are able to prevent high glomerular blood pressure, afferent arteriolar, and ischemic renal histological changes [12]. In addition, plants contain potential bioactive compounds enter the active site of xanthine oxidase, which produces a complex xanthine oxidase-bioactive compound using hydrophobic energy, which is related to the surrounding xanthine oxidase amino acid and replaces the active site, thus preventing substrate infiltration and inhibiting uric acid synthesis [6]. In this review it shows the different families the plants that are being added.



Gout in human leg



Mechanism of action of gout

Plants that are used in gout medicine

The Lamiaceae family is the dominant family of six species. Recently, it has been reported that phenolic compounds isolated from Lamiaceae herbs have anti-inflammatory and antioxidant actions [6]. In addition, species in the family had shown strong inhibition of xanthine oxidase, and it was recommended that they be used to prevent and treat diarrhea.

Caparis spinosa L is a plant that has shown a much higher inhibitory effect on xanthine oxidase activity than other plants. E chloroform and the air component of ethyl acetate extraction showed low levels of IC₅₀ (0.023 and 0.09 mg / mL, respectively), followed by extraction of root chloroform (0.32 mg / mL), meaning that these quotations have characteristics with potential activity on the effect of xanthine oxidase. However, in vitro testing is consistent with the in vitro enzymatic reaction of the enzyme xanthine oxidase [11]. It allows to directly investigating the effect of plants on the activity of inhibiting xanthine oxidase. These courses do not require the use of a maximum number of animals in the experiments. However, it does not take into account the bioavailability of active agent systems. Therefore, in vitro analysis is insufficient. Several phytochemical studies have reported the presence of alkaloids, terpenoids, saponins, phenolic compounds, carotenoids, and tocopherols in *C. spinosa L.* and must be verified by in vivo assays; using different types of test animals for gout. Colchicine is a natural drug isolated from *Colchicum autumn* [10]. For about 250 years, it was used as an anti-inflammatory agent. Currently, this alkaloid is used to treat diarrhea, neurologic impairment, and Mediterranean family fever, cirrhosis of the liver, amyloidosis, scleroderma, and Behcet's disease [16]. However, it can be toxic as it may cause intestinal obstruction and respiratory paralysis [17]. For this reason, it is recommended to treat it in accordance with medical guidelines. *El-Nagger* and *Emara* are separated from the soil uricolytic fungi are part of *Fusarium*, *Spondilocladium*, *Stemphylium*, *Geotrichum*, *Mucor*, *Alternaria*, *Helminthosporium*, *Chaetomium*, *Penicillium*, *Curvularia* and *Aspergillus*. Bacteria (*Pseudomonas*, *Enterobacter*, *Citrobacter* and *Lactococcus*) are isolated from the apples of the apple snail *Pomacea canaliculata* has a high uricolytic activity. It re-uses nitrogen mixed with phosphorus in the snail. Uricol under non-enzymatic uric acid to form antioxidant or enzymatic uricolysis] to create allantoin and ammonia in the snail can buy amino acids, proteins and purine [13].

CONCLUSION

Current work has shown that gout is treated with a variety of methods used to prevent and prevent uric acid release. The original Moroccan strategy is based on the use of drugs that are associated with several adverse effects. However, the second method is much safer as it focuses on the use of plants and their components which play an important role in Moroccan phototherapy. In fact, this review identifies 23 species that have been used traditionally in Morocco to treat gout and show significant inhibition of xanthine oxidase: *Ailanthus altissima*, *Artemisia herba-alba*, *Capparis spinosa L.*, *Caryophyllus aromaticus L.*, *Citrullus colocynthis L.*, *Colchicum autumnale L.*, *Ginkgo biloba L.*, *Hyssopus L.*, *Pandandula angustifolia*, *Melissa officinalis L.*, *Mentha spicata L.*, *Rosmarinus officinalis L.*, *Smilax officinalis.*, *Smilax medica Schltdl.* and *Cham.*, *Smilax siphilitica*, *Smilax aristolochiifolia Mill.*, *Smilax febrifuga Kunth.*, *Smilax regelii Killip* and *C.V. Morton*, *Smilax aspera L.*, *Solidago virgaurea L.*, *Urtica dioica L.*, and *Zea mays L.* However, a few studies are needed to confirm these plants for use in management and maintaining gout.

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