

# Phototherapy of Material Compound Urinary Stones

## Crystallisation in Present Extract Plant *In Vitro*

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### Abstract

Ten extracts of wild Algerian plants were, prepared daily just before handling by suspending a weighed amount of dry plant material in boiling tap water at room temperature. The artificial urine was prepared immediately before use by mixing in a T-type mixing chamber. Mixture agitation was maintained to prevent sedimentation; Percentage of inhibition of crystallisation (1%) was calculated as previously described. Extracts of plants used in this study was found to potentially inhibit the nucleation, growth and aggregation phases of calcium oxalate crystallization.

**Keywords:** Urolithiasis; Lithiasis; Urinary stones; Medicinal plants; Crystallization; Extract Plant *in Vitro*

**Abbreviations:** WHO: World Health Organization

### Introduction

Urolithiasis is defined as the result of abnormal precipitation within the urinary tract. This precipitation is most often from the normal constituents of the urine. This is a fairly common condition in the labor force. She is often recurrent and her etiopathogenesis is often unknown if not hypothetical. Urolithiasis causes temporary occupational disability. His knowledge goes back to ancient times, about 5000 years ago, described the first case in a Young Egyptian of 15 years after 9000

autopsies performed on mummies [1]. Some authors in America and others in Europe and South Africa, have noted the rarity of this condition in black individuals, even claiming the existence of immune factors in the latter [2]. This pathology continues to grow with a predominance of oxalic-calcium type stones. The formation of such concretion involves several physicochemical events such as nucleation, growth, aggregation and retention of crystalline particles in the urinary tract [3]. It is widely accepted that a large number of lithiasis patients become recurrent. Therefore, prevention of recurrence (up to 60%) is crucial.

Unfortunately, despite the considerable progress noted in the field of medical therapy, there is not a satisfactory drug for treating urolithiasis. Many lithiasis patients therefore resort to surgery or lithotripsy to eliminate urinary stones. However, these means are very expensive and are often associated with significant side effects. The use of plants in therapy is very old and is currently experiencing a renewed interest in the public. It is possible to use whole plants or the extraction products they provide [4]. According to the World Health Organization (WHO), traditional medicine is defined as the set of all practical knowledge that can or can not be explained to diagnose or eliminate a physical and mental imbalance based exclusively on lived experience and observation transmitted from generation to generation [5]. In addition, according to the O.M.S., nearly 6377 plant species are used in Africa, of which more than 400 are medicinal plants that make up 90% of traditional medicine. In 2004, nearly 75% of the African population used the plants around them for treatment and did not have access to so-called modern medicines [6]. Knowing that a plant can contain several thousand different substances, we can realize the natural wealth of the plant kingdom.

In the socio-economic context of developing countries, the study of plants can lead to the achievement of adequate and low-cost therapeutic responses, with proven scientific efficacy and optimal cultural acceptability. The scientific value of traditional medicine should lead to the development of herbal medicines. The key words in this area should be: security, efficiency and quality. Today, it is estimated that the active ingredients from plants represent 25% of the prescribed drugs, a total of 120 compounds of natural origin from 90 different plants [7].

In Algeria, as in many countries, a large number of patients use medicinal plants in the treatment of their diseases, including urolithiasis. Thus, the purpose of the present study is to evaluate the efficacy of aqueous extracts of medicinal plants, the most used in Algeria, in the treatment of oxalicytic and amono- magnesium urolithiasis in vitro. The study also focuses on the action of these extracts on the states of crystallization (nucleation, crystalline growth, crystalline aggregation) followed by polarized light microscopy photography. With this in mind, we devoted ourselves to studying the crystallization steps from aqueous and supersaturated oxalic-calcium and phospho-calcium solutions, maintained at 37°C to remain close to biological conditions, to stay close to biological conditions. In vitro crystallization studies have made it possible to specify the kinetic and thermodynamic conditions for the formation

and growth of crystalline species and the influence of various substances on these processes, as well as on crystalline aggregation. During this research, the objective is to reduce or eliminate the whewellite crystals, which represent the highest rate in the composition of the calculations in western Algeria. For this purpose, and since we can not test directly on human subjects, we have taken the in vitro model for the realization of our study. The goal is of course the reduction of calcium oxalate crystals.

## Discussion

It should be noted that the extract of *Erica multiflora* has, according to our results, the highest antilithic potential. This plant is often used in eastern Morocco as an alternative therapeutic tool to treat hyperlipidemia. It is also used in folk medicine as a diuretic and antiseptic. The phytochemical study shows that tannins, flavonoids and proanthocyanidins are the main compound of flower extracts [8]. On the other hand, the extract of *Ammodaucus leucotrichus* also shows a high inhibition of calcium oxalate crystallization unlike *Tetraclinis articulata*. *Ammodaucus leucotrichus* is used in North African countries as a condiment or spice. It is used in traditional medicine for the treatment of cold, fever, digestive disorders etc [9]. Note that the growth of crystals is the key step in the formation of stones. It should be noted that the driving force of crystallization is the reduction of the energy potential of the molecules bound together. It begins in a supersaturated liquid by the formation of clusters [10]. In addition, nucleation is the formation of a crystal phase in a solution. It is an essential step in the formation of kidney stones [11].

## Conclusion

Finally, the results of our work allow us to confirm the use of these plants, in the form of aqueous decoction, in the field of urolithiasis. These activities can be helpful in strengthening the body in depressed situations. In addition, an in-depth study of toxicity would be needed to determine doses. Plant extracts are generally used in the raw state. That's why we used high doses for our tests. To overcome this, it is preferable to isolate the active ingredients of the various plant extracts and present them in an acceptable dosage form.

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