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Review Article,

## Current Application Of Achillea Millefoilum L. Based In Uses Mentioned By Ibn Rushd. A Review.

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### Abstract:

**Background:** This is a specific review of *Achillea millefoilum* L. (Yarrow), known as Qaisum in Arabic, focusing in the current application.

**Purpose:** The purpose of the present study is to confirm the uses of *Achillea millefoilum* mentioned by Ibn Rushd with modern scientific and pharmacological research.

**Study Design:** *Achillea millefoilum* is listed among other medicinal plants in the ancient book “Al-Kulliyat Fi A-Tibb”, written by the famous Andulasi Philosopher Ibn Rushd. The focus of the study is to review only the uses mentioned in the book, review up to date literature (e.g. Google Scholar, PubMed, Scopus) and analyzing the current pharmacological properties in link to the active constituents of the plant.

**Results:** Ethnopharmacological research confirming the uses mention by Ibn Rusd, such as alopecia and its relation with castor oil and pumpkin, in addition to its application for the treatment of skin disorders.

**Conclusion:** The results give further insights into the pharmacological activity of *A. Millefolium* and confirm the different uses mentioned by Ibn Rusd.

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**Key words:** *Achillea*, millefoilum, Ibn Rushd, Chemistry, Pharmacology.

**Abbreviations:** AA, alopecia areata; AGA, androgenetic alopecia; AT, alopecia totalis; AU, alopecia universalis; BPH, benign prostatic hyperplasia; DHT, di hydro testosterone; HNE, human neutrophil elastase; IL-1 $\alpha$ , interleukin 1 alpha; KGF, keratinocyte growth factor; MMP, matrix metalloproteinases; SRD5 $\alpha$ 2, steroid-5 $\alpha$ -reductase type 2; TE, telogen effluvium; VEGF, vascular endothelial growth factor.

### Introduction:

The Andalusian philosopher Ibn Rushd (1128-1198 A.D.), known in west by the name of Averroes. Ibn rush was a faithful disciple of Aristotle and he stuck to the organization of the Aristotelian corpus implemented by Andronicus of Rhodes. He wrote many books in natural physics and philosophy in addition one book in medicine known as “Kulliyat Fi A-Tibb, known in its Latin

translation as Colliget (Tbakhi et al., 2008; Al-Jabiry, 1999). He mentioned plenty of plants used for treatment of verities of diseases in different dosage forms following Galen in their application (Al-Jabiry, 1999). In this paper I will focus on *Achillea millefoilum* L. (Asteraceae) commonly known as yarrow, uses mentioned by Ibn Rushd and their current application based on scientific researches. *Achillea* L. Genus comprises numerous species of wild plants, includes 110–114 species, 50 of which are European species. The largely typical species mainly of the Mediterranean area, also many species are native to Eurasia, with some native to North America and Africa. *Achillea millefolium* L., known as *Qaisum* in Arabic, is the most widespread and one of the most widely used medicinal plants in the world. *A. Millefolium* IA a perennial plant with height up to

100 cm (Shah et al., 2017; Csupor, 2105; Shamsizadeh et al., 2017). *Achillea santolina* L., also known as Qaisum, is the most widely distributed species thought Iraq and Jordan (Al-Snafi, 2017; AL-Eisawi, 2013). The word “*Achillea*” refers to the Greek hero Achilles, who is believed to have carried the plant to treat the wounds of the soldiers, while the word *millefolium* meaning thousand-leaf, refers to the multipinnate leaves (Shah et al., 2017; Csupor, 2105). The ancient name *Herba Militaris* refers to its use as a vulnerary drug on battle wounds (Csupor, 2105).

#### Uses mentioned by Ibn Rushd:

"A drug with a very bitterness taste. It has a strong effect to cut, dissolve and open the solid mass presented in the skin, it is stronger than Absinthe regarding this effect, but Absinthe has more astringent effect. It is used to treat Alopecia areata if painted with hot fat like castor fat. Its ash is more dried and hot than the ashes of dried Pumpkin and Dill root, because the mood of these two medicines is far from this medicine. Therefore it became the ashes of burned pumpkin and dill used for sores where hardness, such as sores in the incident foreskin, if it is not swollen" (Al-Jabiry, 1999).

#### Chemical composition of *A. Millefolium*:

*A. Millefolium* contains flavonoids (e.g. Apigenin, kaempferol, luteolin), the spasmolytic and anti-inflammatory properties of this herb have been attributed to its flavonoid content. And 0.5-1.5% volatile oil mainly monoterpenes (e.g, eugenol, 1,8-cineole, delta-cadinol, caryophyllene and linalool) are the most representative metabolites constituting 90% of the essential oils in relation to the sesquiterpenes, guaianolide-type sesquiterpene lactones (achillicin, achillin). Yarrow contains phenolic composition mainly 3,5-O-Dicaffeoylquinic acid and 5-O-caffeoylquinic acid. The antioxidant and antibacterial activity of yarrow are due to the presence of the flavonoids and phenolic acids and essential oils. 3-4% tannins (Shah et al., 2017; Csupor, 2105; Shamsizadeh et al., 2017; Al-Snafi).

#### The Pharmacology of *A. Millefolium* based on Ibn Rushd uses (Alopecia):

Water flowers extract of *A. Millefolium* showed decreased hair loss in subjects suffering from the (TE), and (AGA) using topical 5% minoxidil as a reference standard (Türkoğlu et al., 2017). Minoxidil suppressed (SRD5 $\alpha$ 2), (VEGF), and (KGF) expression and the *A. Millefolium* extract

suppressed (VEGF) and (KGF) in a similar way as minoxidil (Türkoğlu et al., 2017; Pekmezci et al., 2018). It did not show a significant effect on (SRD5 $\alpha$ 2) expression. Based on these results, clinically approved effects of *A. Millefolium* extract on the reduction of hair loss cannot be linked to the changes in (VEGF) and (KGF) gene expression since both of them was unexpectedly downregulated by *A. Millefolium* extract (Türkoğlu et al., 2017; Jain et al., 2016). There can be various mechanisms by which *A. Millefolium* extract perform their hair-loss-reducing action. Inhibition of 5 $\alpha$ - reductase II may be one of those mechanisms for minoxidil but not for *A. Millefolium* extract. Among the factors that we tested, IL-1 $\alpha$  was the only one which was affected by *A. Millefolium* extract. The *A. Millefolium* extract reduced IL-1 $\alpha$  gene expression to a one-fifth of the control similar to the reduction to a one-third of the control upon minoxidil treatment (Türkoğlu et al., 2017; Pekmezci et al., 2018; Jain et al., 2016). Since IL-1 $\alpha$  was shown to inhibit human hair follicle growth and the hair fiber production in whole-organ cultures, downregulation of this factor may explain the effect of *A. Millefolium* extract on hair loss (Türkoğlu et al., 2017; Pekmezci et al., 2018). Over 20,000 patients with the hair product contains *A. Millefolium* leaf extract, were treated from 1993 to 2014 for a variety of hair loss diagnoses including approximately 16% of the patients suffer from (AA), (AT) and (AU), The result showed 70% of the patients showed positive results (Jaffe et al., 2016).

#### Pharmacological effect of *A. Millefolium* and Pumpkin:

Pumpkin Seed (*Cucurbita pepo* L.) Seed extracts and oils are widely used to treat (BPH), either alone or in combination with saw palmetto or other plant extracts (Abdel-Rahman, 2006). In the prostate where is excess testosterone is changed into (DHT) by the chemical reaction with the enzyme 5- $\alpha$  reductase. The other thing which occurred that some (DHT), that is not used up in the prostate, it enters the bloodstream and end up in the root of the hair causing hair loss (Abdel-Rahman, 2006; Dhariwala et al., 2019; Pekmezci et al., 2018). Women tend to see air loss during changes in their hormones which occurring during childbirth or menopause result in decreasing of estrogen and thus increasing in testosterone. This increase follows increase of testosterone and converted to (DHT) which is associated with hair loss (Dhariwala et al., 2019; Pekmezci et al.,

2018). Pumpkin seeds are rich in phytosterols compounds which are responsible for the mechanism of action of the plant by inhibition the effect of 5- $\alpha$  reductase (Chandler et al., 2018). *A. Millefolium* rich in phytosterol (e, g, beta-sitosterol, alpha-amyrin, stigmasterol, campesterol, cholesterol taraxasterol, and pseudotaraxasterol) (Ali, 2017). This might be explained their combination mentioned by Ibn Rushd for the treatment of Alopecia.

#### **A. Millefolium and Castor oil:**

Castor oil is obtained from seeds of plant *Ricinus communis*; it is a ricinoleic, monounsaturated fatty acid which can act as humectant and moisturizer (Maduri et al., 2017). Castor oil is considered one of the most common oils used in hair oil is formulated to give the hair good shine, gloss and thick eyebrow. This is achieved by applying a thin continuous film of an oily material on the hair surface without causing stickiness. Hair oil has more preferred as they promote hair growth and prevent hair fall (Maduri et al., 2017; Shilpa et al., 2019). I can see that Ibn Rushd combination between castor oil and *A. Millefolium* extract is a great and advanced formula for treatment of alopecia and prevents hair loss.

#### **Anti inflammatory effect of A. Millefolium:**

Leaves and flowers of *A. Millefolium* have been used for centuries for their anti-inflammatory effect in wound healing, and skin inflammation, as also mentioned by Ibn Rushd (Al-Jabiry, 1999). *A. Millefolium* oil extract on artificially irritated skin were restored to basal values after 3 to 7 days of treatment. *A. Millefolium* showed an augmentation in cytokeratin-10, transglutaminase-1, and filaggrin expressions, a treatment of 2-month topical application of 2% *A. Millefolium* extract significantly improved the outlook of wrinkles and pores when compared with placebo (Pekmezci et al. 2018; Saeidnia et al., 2011). As various proteases, for instance human neutrophil elastase (HNE) and matrix metalloproteinases (MMP-2 and -9), are associated with the inflammatory process, the aim of this study was to test a crude plant extract in in vitro-protease inhibition assays for understanding the mechanisms of anti-inflammatory action. (Saeidnia et al., 2011). Three fractions of *A. Millefolium* were prepared, plant extract, enriched in flavonoids and the other enriched with dicaffeoylquinic acids, respectively, the three fractions were tested in order to evaluate their contribution to the antiphlogistic activity of the plant. The extract and the flavonoid fraction

inhibited human neutrophil elastase (HNE) showing IC (50) values of approximately 20 microg/ml, whereas the dicaffeoylquinic acids fraction was less active (IC (50) =72 microg/ml). The inhibitory activity on matrix metalloproteinases (MMP-2 and -9), was observed at IC(50) values from 600 to 800 microg/ml, whereas the dicaffeoylquinic acids fraction showed stronger effects than the flavonoid fraction and the extract (Pekmezci et al. 2018; Saeidnia et al., 2011; Benedek, 2007)

#### **Conclusion:**

The results give further insights into the pharmacological activity of *A. Millefolium* and confirm the different uses mentioned by Ibn Rusd.

#### **Conflict of Interest:**

The author has stated that there is no conflict of interest associated with the publication and no financial support, which could have influenced the outcome.

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