

Plant and mud extracts use for health purposes

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ABSTRACT

Agents derived from plants include anti-inflammatory flavonoids, terpenes, quinones, catechins, alkaloids, etc., all of which are known to modulate the expression of pro-inflammatory signals. Aspirin, a cornerstone for the treatment of inflammation-associated diseases, was derived from the salicylic acid found in the bark of the willow tree (*Spiraea ulmaria*, *Salix* species). The plant kingdom has kept offering remedies for humans from time immemorial. Nearly a quarter of our current drug arsenal is from higher plants. Plants are still a major source for discovery of new lead compounds for the pharmaceutical industry. During the last two decades, nearly 50% of the newly introduced drugs are of plant origin or analogues thereof.

Key words: radiological scores, RA, narrowing, erosions.

As potency is a rare trait of phytochemicals, bioprospecting is gradually overridden by the more holistic and integral view of using plant mixtures, extracts or partially purified extracts. Researchers have started discovering traditional and ethnomedicine anew. By 2016, the global nutraceutical market will exceed 207 billion U.S. dollars.

We now know hundreds of genes that regulate inflammation in model organisms. This vast amount of information yields increased power for personalized and stratified medicine, for identifying new biomarkers and for drug development. Overall, it gives us a blueprint (albeit still imperfect) of how inflammation is controlled that we can use to potentially manipulate the inflammatory process, whatever its underlying molecular mechanisms may be.

The physical and chemical characterisation of plant extracts, whose biomedical properties are generated by combining various chemical elements with biological structural components, is a strong argument for interdisciplinarity. The study at systemic and at the cellular and molecular level aims the interdisciplinary interaction of biochemists and biologists

with mathematicians in the analysis and interpretation of experimentally obtained data. The clinical trial involves interdisciplinary and transdisciplinary interaction of doctors, biologists from clinical laboratories and mathematicians that will need to process the data obtained and together with the rest of the team to interpret these in a medical and biological manner to bring valid scientific arguments for the therapeutically useful hypothesis of the new anti-inflammatory products developed within the project.

Garlic (*Allium sativum*) play a role as antibiotic, anticancer, blood thinning, antiviral, antifungal and help in the fight against high blood pressure, high cholesterol, AIDS, arthritis, diabetes, influenza, leprosy and tuberculosis [4]. The health effects of garlic are attributed to the organosulfur compounds found in crushed cloves. Allicin is chemically unstable and degrades and rearranges over time to form a second generation allyl sulfides and polysulfides [5], which can be isolated by steam distillation or oil extraction. They have an inhibitory effect on the production of the pro-inflammatory mediators NO and PGE2 and also suppress iNOS and COX-2 expression in the macrophage cultures and

also, the levels of IL-1b, IL-6, and TNF- α mRNAs were attenuated in RAW 264.7 macrophages [6]. Thiacremonone was the isolated active compound from heated garlic juice treated at 130°C for 2 h [7]. In vivo studies showed that topical application of thiacremonone suppressed the 12-O-tetradecanoylphorbol-13-acetate-induced ear edema, the carrageenan and mycobacterium butyricum induced inflammatory and arthritic responses.

Capsaicin from chili pepper (*Capsicum annuum*) produces highly selective regional anesthesia by causing degeneration of capsaicin-sensitive nociceptive nerve endings which can produce significant and long-lasting increases in nociceptive thresholds. Capsaicin potently activates transient receptor potential vanilloid 1, which is a main receptor underlying nociception and it also inhibits NF- κ B, thus producing an anti-inflammatory effect [8]. There are topical capsaicin formulations now available to treat post-herpetic neuralgia. Other uses have been studied for peripheral neuropathies and chronic musculoskeletal pain [9]. Hydrogel, solution, ointment and cream, microemulsion, transfersome, noisome, liposome and cubosome preparations of capsaicin have been documented in the literature to treat pain-related disorders such as rheumatoid arthritis, osteoarthritis, diabetic neuropathy, and postoperative pain [10].

The patent No. RO126913A0/2011 (Stan Adrian Viorel) describes the composition of a body massage cream with 32% water and mud from Techirghiol lake, 0.5% glycolic extract of ginger, 0.5% glycolic extract of rosemary leaves and 0.5% based organic iodine complex, along with the usual ingredients and excipients. Advantages of mud from the lake Techirghiol association with vegetable extracts obtained from ginger and rosemary have the following effects: antirheumatic, antiastenic, with synergistic properties in artrosis and inflammatory diseases.

The mud is composed by humic substances, pectin, cellulose and lignin, waxes, resins and inorganic materials [11], also being identified alkanes, 4 phenyl valeric acid, 5 isopentyl picolinic acid, 3 hydroxylauric acid, (5 α , 3 β) 3-hydroxy-11-androstanon, 5 α -2-ene-11 androstenone, squalene, α terpineol, menthol derivatives, palmitic acid, oleic and eicosanoic acid and izoprenoid phytan [12].

Humic compounds play a role in redox reactions, absorption, complexation and transport of substances, supporting structure and formation of mud and control the carbon biogeochemistry in ecosystems [13]. Humic acids have an astringent effect, adrenaline and dopamine receptor agonist, anti-allergic, antibacterial, anticoagulant, anti-inflammatory, antiviral, estrogen, hemostatic, hyperemic, UVB-protective [14] and are heavy metal chelating agents [15, 16, 17].

Fulvic acids are oxidized substances with aromatic structures characterized by extensive lateral aliphatic chains having a lower nitrogen content compared to humic acids [18]. Fulvic acids have anti-allergic effect [19,20], antioxidant [21], antimicrobial [22], reduces cutaneous immune response [23], antitumoral [24] antiseptic [25], acting in acid medium by inhibiting mitochondrial respiration in *Candida utilis* [26], being used in the treatment of eczema [27], have antiulcerogenic properties [28] and precognitive so can be used to treat Alzheimer's disease [29].

Lipid fraction is 0.2 to 5% of the mud and include fatty acids, sterols, terpenes, hydrocarbons, chlorophyll, fats, waxes and resins [30]. Another fraction of mud consists in protein hydrolysates, amino acids, enzymes (amylase, arylsulfatase, b-glucosidase, cellulase, chitinase, dehydrogenase, phosphatase, protease, urease) and carbohydrates [31].

For cellulite treatment extracted mud is mixed to form a cream with plant extracts and bioactive substances [32]. In psoriasis, seborrheic and atopic dermatitis,

eczema and first degree burns is used a cream containing 1-6% suspension of mud as active ingredient [33]. Combining the best fractions of mud obtained will result in getting the mud extract that will be used to obtain the new anti-inflammatory product. The experimental results to be obtained will determine the future direction of the marketing of products developed in the project.

Conclusions

The study determined for the first time in Romania the IL1 β levels.

Radiological scores levels correlate directly proportional to the duration of the disease and clinical parameters, with scores DAS, HAQ and NAD, NAT respectively, laboratory parameters (rheumatoid factors, IgG, ESR, CRP); correlates inversely proportional with levels of immunological parameters (IL-1 β) and bone densitometry (T-score) - which is in full accordance with the data in the literature.

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