

A NATURAL REMEDY WITH MULTIPLE FACES: DEER ANTLER VELVET

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ABSTRACT

Deer antler velvet is a biologically distinctive tissue harvested from the immature, fast-growing antlers of deer. Unlike most mammalian organs, antlers undergo complete annual regeneration, which makes velvet antler an exceptional model of natural tissue renewal. This regenerative capacity has contributed to its long-standing use in Traditional Chinese Medicine and related Asian healing practices, where it is valued for restoring vitality, supporting musculoskeletal strength, and improving reproductive function. Historically, deer antler velvet has been administered to address conditions such as weakness, joint disorders, sleep disturbances, anemia, cognitive decline, and impaired wound repair. Advances in biomedical research have helped clarify the basis of these traditional applications. Deer antler velvet contains a complex mixture of biologically active compounds, including peptides, amino

acids, collagenous proteins, glycosaminoglycans, minerals, lipids, and multiple growth-related factors. These constituents are responsible for its broad physiological activities. Experimental studies demonstrate that Deer antler velvet exhibits notable antioxidant and anti-inflammatory actions, which may help counteract cellular damage and persistent

inflammation associated with aging and chronic disease. In addition, its immunoregulating properties contribute to enhanced host defense and systemic balance. Growth-stimulating proteins present in Deer antler velvet promote cell division and tissue regeneration, supporting its reputation as an adaptogen and physical performance aid. Evidence suggests benefits in muscle recovery, endurance, and overall physical capacity. Further research indicates a role in regulating hormonal activity and improving reproductive health in both sexes. Emerging findings also point toward potential neuroprotective and anticancer effects. Collectively, these properties position deer antler velvet as a promising natural resource for future nutraceutical and pharmaceutical development.

KEYWORDS: Deer antler velvet, Elk velvet antler, Deer Antler Polypeptides, Traditional Chinese Medicine, Velvet antler.

INTRODUCTION

"Deer antlers during their phase of rapid growth" is the definition of velvet antler, and it receives the concept of "velvet" refers to the hair's velvety, silky covering. According to traditional Chinese medicine, velvet antler is one of the most efficacious animalbased treatments. The terms "velvet," "deer velvet," and "velvet antler" are used interchangeably when dealing with deer velvet antler.^{[2][5][11]}

Traditional Observation and Scientific Rationale

A common observation in my home served as the basis for this review piece. I saw an ancient barasingha (swamp deer) antler that had been preserved for a long time when exploring my ancestral home. I once saw my grandmother making a paste by rubbing the antler with water on a rough stone. She clarified that in the past, children with ordinary colds, coughs, asthma, and joint-related discomfort were treated with modest amounts of this concoction to ease rib pain.

I was inspired to learn more about its potential foundation of science by this custom.

According to research in the literature, deer antlers include a variety of bioactive components, comprising minerals, proteins, collagen, amino acids, and growth factors.

Numerous pharmacological characteristics, such as antioxidative activity, anti-inflammatory action, support for the health of bones and cartilage, neuroprotective benefits, and possible anti-cancer activity, are linked to these components.

Thus, the purpose of this review paper is to investigate conventional assertions and evaluate the available scientific data regarding the pharmacological characteristics and prospective therapeutic applications of materials composed of deer antlers.



Figure 1: Images of Deer Antler Velvet showing front (inner surface) and back (outer surface) views.

Regenerative nature of velvet antler: Velvet antler can be removed once a year using a procedure known as "velvet removal" since it fully regenerates every spring (7),(12). Deer velvet is a sustainable resource since antlers are replaced the next springtime by the same biological growth process, regardless of whether or not they are taken out or allowed to cast organically.^{[9][10]}

Extraction of DAPs

Because of the conformational arrangement of proteins that disguise hydrophobic and reactive groups deep within the protein structure, all of the intact proteins in the organism are in an inert state of activity. As a result, specific approaches must be used to extract bioactive peptides. Water extraction, enzymatic hydrolysis, chemical hydrolysis, organic solvent extraction, fermentation extraction, and Deer Antler Polypeptides ultrasonic-aided extraction are currently the techniques used to extract Deer Antler Polypeptides.^{[13],[14][15]} It is important to note that water extraction of deer antler was once widely used as a traditional medicine; as a result, many investigations on, have continued to use this method, however with improvements.^{[6][17][18]}

Composition and Bioactive components

About 34% ash, 12% moisture, and 54% organic material of which 10% is nitrogen and 3% fat make up dried velvet antler. The composition differs depending on the species, antler maturity, and antler study region (tip, upper, middle, and base).^{[1][14]}

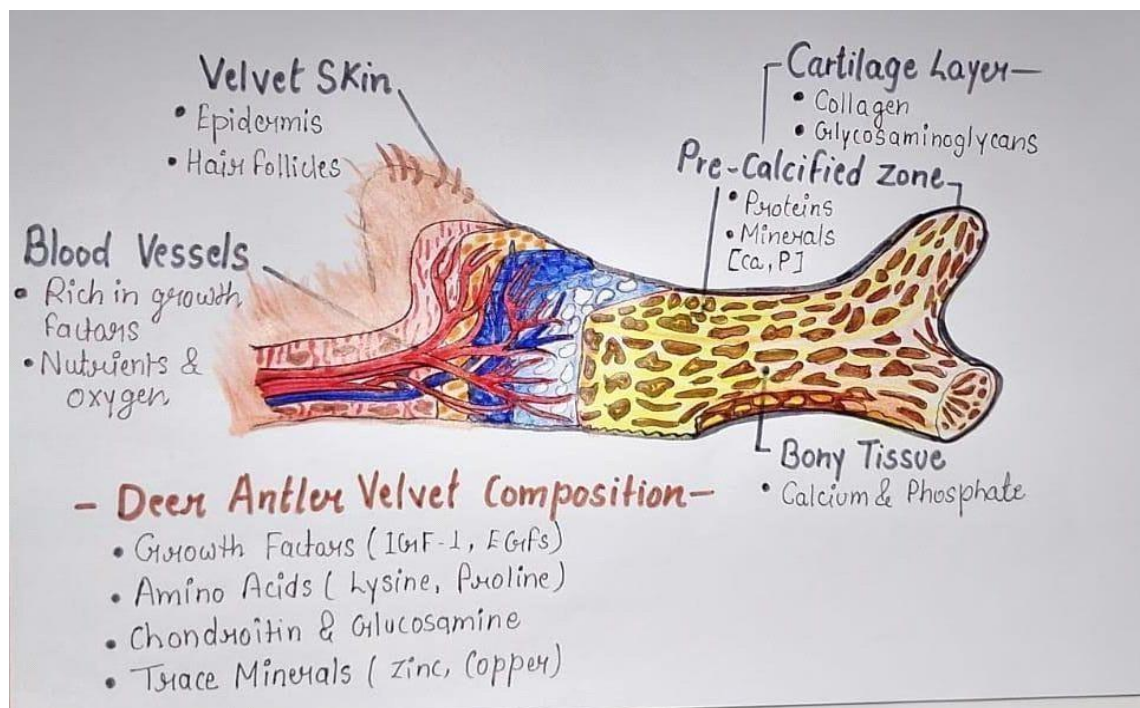


Figure 2: Image of Deer Antler Velvet showing its layers and composition.

Several fundamental cells, like fibroblasts, chondroblasts, chondrocytes, and osteocytes, are found in the developing antler. The cartilage tip section, also known as the wax piece, has higher quantities of lipid, the uranic acid, sulfated glycosaminoglycan, and sialic acid than other parts of the antler. The tips of the antlers start apart as undifferentiated mesenchymal cells that develop into cartilage. The primary form of collagen involved in the development of cartilaginous antler in velvet antlers is type II collagen. Glycosaminoglycan chains are found in antler cartilaginous tissue. The tip, upper, middle, and base of developing bugs were found to contain glycosaminoglycan's. Prostaglandins and growth hormone precursors are found in high concentrations in elk velvet antlers.^{[4],[23]}

Prostaglandins, which are constituents of velvet antler, may help the extract's ability to lessen swelling that is brought on by arthritis and injury as well as physiological reactions in lipid metabolism, as confirmed by velvet antler's ability to lower cholesterol in lab animals and its polysaccharides' capacity to lessen blood clotting.^[22] Cholinergic molecules have been linked

to hypotensive effects, and velvet antler polysaccharides have been linked to antiulcer effects. Glucosamine sulfate and chondroitin sulfate, two glycosaminoglycan's, have strong antiinflammatory properties and other degenerative diseases of the muscles, bones, and joints.^[24]

Red deer antler has been used to treat female infertility and male impotence in traditional Oriental medicine.^[25]

Due to a nutrient profile that is concentrated in particular areas of the antler, different sections of the antler are used historically for different ailments. The base is prepared for the elderly to increase calcium intake and lessen the likelihood that they will suffer from conditions triggered by calcium loss; the tip and middle regions are used as pediatric tonics; and the upper and middle sections are applied to degenerative inflammatory conditions, such as osteomyelitis.^{[19],[21]}

Antioxidative Characteristic

According to some recently published studies, the amino acid content of peptides might have an impact on their antioxidant activity because they work as hydrogen donors to transfer electrons for scavenging free radicals, the amino acid residues linked to antioxidant activity typically occur in hydrophobic and aromatic amino acids.^[27] Additionally, ferrous ions can be scavenged by amino acid residues with metal chelating capacity utilization to prevent oxidation processes.^[28] One excellent source of antioxidant peptides is deer antler, which is abundant in Glu, Pro, Asp, the amino acids Gly and arginine, and other compounds. In one instance, the highest percentages of the amino acids Gly, Ala, and Pro were found in Deer Antler Polypeptides generated by the hydrolysis of deer antler gelatin. Deer Antler Polypeptides are occasionally used in the food, pharmaceutical, and cosmetic industries because of their strong thermal and emulsion stability.^[44] For example, Deer Antler Polypeptides inhibit the caspase- 3 signaling pathway in order to reduce ROS-induced cell destruction and apoptosis. Human Umbilical Vein Endothelial Cells (HUVEC) damage caused by H₂O₂.^[36]

Deer Antler Polypeptides may interact with both enzymatic and non-enzymatic Experiments carried out in vivo and in cells showed that Deer Antler Polypeptides are resistant to oxidative damage.^[31]

In human hepatocellular carcinomas 2 (HepG2) and SMMC7721 cells along with mice liver tissue, Deer Antler Polypeptides administration decreased cell damage and downregulated the expression of phosphoinositide 3 kinase (PI3K).^[38]

Anti-inflammatory action

As an example, when rats with arthritis caused by streptococcal cell wall (SCW) were given treatment with Deer Antler Polypeptides, inflammation-induced leukocytosis was prevented and blood cell adhesion to the endothelium was reduced.^{[29],[39]} The result led to a decrease in the recruitment of inflammatory cells to the joints, which in subsequently modulated arthritis.^{[41][43]}

Bone and cartilage Health

Multiple studies have demonstrated that Deer Antler Polypeptides stimulate osteogenesis and prevent osteoporosis from developing.^[42] For instance, the research by Zhang et al. showed that osteoporosis manifestations disappeared and that levels of calcium ions, phosphorus, bone water concentration, bone mineral content (BMC), and bone mineral density (BMD) increased in rats treated with Deer Antler Polypeptides following the ablation of ovaries causing osteoporosis.^[45] The trabecular network was repaired, and the quantity and volume of trabeculae greatly increased, indicating an improvement in bone strength, according to paraffin sections.^[34]

TNF- α has the ability to prevent primary osteoblasts from transforming into osteoblasts.^[37] According to a serum proteomic investigation of rats in the osteoporosis model, Deer Antler Polypeptides upregulate 23 proteins which encourage bone formation, including B2m and IL16, and down regulate 10 proteins which could prevent bone formation from influencing the dynamic balance between osteoblasts and osteoclasts.^[49]

Neuroprotective Effects: Deer Antler Polypeptides have generated fascination for the treatment of neurodegeneration.^[32] When human brain tumor cells with H₂O₂-induced damage were treated with Deer Antler Polypeptides, apoptosis was significantly reduced.^[26] Tyrosine hydroxylase inactivation is a characteristic motor hallmark of Parkinson's disease and is intimately linked to degradation of the substantia nigra condition. In the Alzheimer's disease model, Deer Antler Polypeptides were extracted in three distinct ways.^[28] Deer Antler Polypeptides extracted using a combination of pepsin and trypsin hydrolysis were the most effective in improving motility and inhibiting β amyloid deposition in *C.elegans*.^[35]

Treatment with Deer Antler Polypeptides following the induction of depression in a mouse model can significantly reduce depression-like behaviors and lead to a significant reduction in damages to neurons.^[44]

Anti-cancer Potential: According to a recent study, antlers were able to express several tumor suppressor genes to reduce danger of cancer, as well as an elevated level of growth due to the production of proto-oncogenes.^[50]

Specifically, by interrupting the cell cycle and reducing telomerase activity, peptides taken from hard antler plates prevent the growth of malignant breast cancer cells.^[38] Additionally, Deer Antler Polypeptides prevent breast and prostate cancer cells from invading. In a different *in vivo* investigation, Deer Antler Polypeptides given via gavage prevent breast cancer in mice.^{[40],[45]}

Traditional & Ethnomedical Uses

Promoting "wellness" has long been among the primary goals of Traditional Chinese Medicine. velvet antler is used traditionally in both Chinese and Korean traditions as a "tonic" that encourages health. In a similar vein, velvet is considered an "adaptogen" in Russia, a natural substance that is said to strengthen the body's defenses against stress, trauma, anxiety, and fatigue.^[46]

Although velvet antler has many different traditional uses, they generally fall into several different categories: the formation of blood cells, the immunological system, cardiovascular health and function, and body strength.^[33]

"Velvet antler" refers to the antler as a whole, not only the skin. The entire antler is used to make velvet products, involving all of the original deer velvet's bone, cartilage, blood, nerves, and connective tissues.^[40]

Product Synopsis: Traditionally, velvet antler is processed into slices that are no thicker above 1 mm by soaking it in alcohol. This type is most frequently used in traditional remedies that contain velvet.^[48]

Velvet antler that has either been traditionally treated or freeze-dried before being pulverized into a powder is commonly referred to as dried velvet powder.^[47]

Additional Functions of Physiological Regulation

Treatment with Deer Antler Polypeptides considerably reduces hepatic collagen deposition in mice and causes liver fibrosis. Abnormal accumulation of extracellular matrix components, particularly collagen, is a major cause of cardiac and gastrointestinal fibrosis.^[46]

Processing, Dosage and Safety

The recommended daily dose in Traditional Chinese Medicine is either 3,000– 4,500 mg/day boiled in water, soup, or Chinese wine, or 900–1,200 mg/day given as a powder by mouth. In Western countries, there are no recommendations from medical professionals regarding deer velvet powder.^[33]

The vast majority of deer velvet capsule manufacturers advise taking one to four dry powdered capsules daily.

Velvet antler must be preserved for consumption by humans after being taken from the deer and frozen on the farm. In the traditional Chinese method, the velvet is repeatedly dipped in almost boiling water to cook individual sticks.^[30] This is followed by oven frying and cool air drying. Velvet can also be preserved via freeze-drying, which does not require heat.^[35]

NOTES: Different persons may be influenced significantly by deer velvet, regardless of the fact that it may offer several advantages for customers. There is a small likelihood that some people who use deer velvet may have negative side effects, some of which could be rather severe.^[45]

It is advised that users speak with a medical professional before using any type of deer velvet. As with any dietary supplements, customers should speak with a health expert if they are under the age of 18 years, on prescribed medications, receiving other medical treatment, or pregnant or lactating.^[40]

The adverse effect may be _

*Could result in bleeding noses.

- Could raise body temperature temporarily. By way of example, it might not be recommended for customers to take deer velvet if they have a high body temperature.

*Headaches might result.

- Diarrhea may result.

Consumption of deer velvet should be decreased or discontinued if a customer encounters any of these issues, and if issues continue, medical assistance should be sought.^{[40],[50]}

Current Market Products of Deer Antler Velvet



Figure 3: Image showing different market forms of Deer Antler Velvet (capsules/tablets, powder/extract, and liquid/spray).

CONCLUSIONS

Velvet antler has been produced in many other countries for use in traditional oriental medicine.^[47]

The usage of purportedly tonic and regenerating medications is currently experiencing a rise in demand in worldwide markets. Velvet antler has been used to treat a wide range of conditions, including pain, topical wounds, forgetfulness, sleeplessness, anemia, and arthritis.^{[29][43]}

A deer velvet antler

- Enhances the immune system's performance;
- Improves strength and athletic performance;
- Enhances post-exercise muscle recovery;
- minimizes the harmful effects of stress;
- Improves both male and female sexual functions;
- recommends quick recovery from sickness;
- Has anti-inflammatory and anti-cancer qualities.^{[38][41]}

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