

# Cordyceps SAP

Science-based hot-water mushroom extract for optimal health and immune support\*

**Cordyceps SAP** is a hot water-extracted mushroom used in herbal medicine to support the immune system and as a source of antioxidants.\* *Cordyceps sinensis* has traditionally been used for a variety of concerns including treating patients with fatigue; in athletics; for liver, kidney, and respiratory protection; as well as for immune support.\* The majority of the research focuses on the active ingredients in *Cordyceps*, including polysaccharides, lipids, cordycepin, and 3-deoxyadenosine.\*<sup>[1]</sup>

## SUPPLEMENT FACTS

**Serving Size:** 1 Capsule

	Amount Per Serving	% Daily Value
Cordyceps ( <i>Paecilomyces hepiali</i> ) 8:1 extract, equivalent to 4 g of dried mushroom, 40% polysaccharides providing 20% $\beta$ -glucans	500 mg	**

\*\*Daily Value not established

**Note:** Polysaccharide and  $\beta$ -glucan content may vary from lot to lot.

**This product is non-GMO and vegan friendly.**

**Contains no:** Gluten, soy, wheat, eggs, dairy, yeast, citrus, preservatives, artificial flavor or color, starch, or sugar.

**Cordyceps SAP** contains 60 capsules per bottle.

## DIRECTIONS FOR USE

**Adults:** Take 1 capsule daily or as directed by your healthcare practitioner. To avoid digestive upset, take with food / a meal.

## INDICATIONS

**Cordyceps SAP:**

- Can be used to support immune function.\*
- Is a source of antioxidants to help protect against oxidative damage.\*
- Can be used to improve resistance to fatigue and stress.\*

## SAFETY AND SIDE EFFECTS

Consult a healthcare practitioner prior to use if you are pregnant or breast-feeding or if you have diabetes.

## PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Cordyceps SAP** lot numbers have been tested by a third-party laboratory for identity, potency, and purity.

\* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

Scientific Advisory Panel (SAP):  
adding nutraceutical research  
to achieve optimum health



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*Cordyceps sinensis* is unique in the world of medicinal mushrooms, as it grows on an insect host instead of a plant host.<sup>[1]</sup> The majority of commercially available cordyceps is grown on different mediums, but analysis of wild versus cultivated shows they are clinically interchangeable.<sup>[1, 2]</sup>

## CORDYCEPS AND IMMUNITY

One of the active ingredients within cordyceps, 3-deoxyadenosine, has a close similarity to adenosine and can be involved in reactions including RNA/DNA synthesis.<sup>[1]</sup> The ability to interrupt RNA/DNA synthesis has led to the use of cordyceps for treating a variety of chronic viral infections via its potential to inhibit viral replication.<sup>[1]</sup>

In a combination in vitro / in vivo study, researchers investigated the immunosuppressive effect of *Cordyceps militaris* on T cells.<sup>[3]</sup> Cordycepin showed immunosuppressive activity in vitro, which researchers attempted to confirm in vivo by inducing a T cell-mediated delayed-type hypersensitivity reaction in a 2,4-dinitro-1-fluorobenzene-induced mouse model. In vitro results demonstrated that cordycepin resulted in:

- a marked suppression of concanavalin A-induced splenocyte proliferation;
- increased  $T_H1$  and  $T_H2$  cytokine;
- increased ratio of CD4<sup>+</sup> to CD8<sup>+</sup> T cells.<sup>[3]</sup>

In vivo, cordycepin markedly suppressed the T cell-mediated delayed-type hypersensitivity reaction. Researchers concluded, based on current observations, that cordycepin has a potential role in downregulating the immune system, and could be useful as an immunosuppressive agent in treating undesired immune responses.<sup>[3]</sup>

In a study investigating the use of *Cordyceps sinensis* capsules on renal function and other bodily systems after renal transplantation, researchers examined clinical data comparing 80 transplant recipients who received cordyceps to 100 transplant recipients in the control group.<sup>[4]</sup> Researchers compared 1- and 5-year patient renal allograft survival rates, liver and kidney function, uric acid, 24-hour urine protein, as well as routine blood and urine tests between the 2 groups.<sup>[4]</sup> The cordyceps group was found to have significantly lower rates of infection, serum AST, ALT, and total bilirubin, and significantly higher peripheral red and white blood cell counts compared to control.<sup>[4]</sup> The 1- and 5-year survival rates in the cordyceps group were 98.7% and 98% compared to 95% and 93% in the control group.<sup>[4]</sup> Researchers concluded that cordyceps capsules are an ideal immunoregulator, effective in protecting liver and kidney functions, improving blood counts, reducing the rates of infection, and preventing allograft rejection.<sup>[4]</sup>

## CORDYCEPS AS AN ANTIOXIDANT

One of the active components of *Cordyceps militaris* is cordycepin, which has been widely used in oriental traditional medicine and possesses many pharmacological properties.<sup>[5]</sup> In a study exploring the use of cordycepin in prostate carcinoma cells, it was found that cordycepin significantly inhibited cell growth by inducing apoptosis in PC-3 cells.<sup>[5]</sup> The cordycepin-induced apoptosis was associated with the generation of intracellular reactive oxygen species (ROS). Interestingly, the quenching of ROS generation with N-acetyl-L-cysteine conferred protection against cordycepin-elicited ROS generation, disruption of the MMP, caspase-3 and  $\alpha$ -9 activation, and apoptosis.<sup>[5]</sup> This demonstrates that ROS generation plays a crucial role in the initiation of cordycepin-triggered apoptosis.<sup>[5]</sup> These findings show that cordycepin is a potent inducer of apoptosis of prostate cancer cells via the mitochondrial-mediated intrinsic pathway, suggesting it may be able to play a role in both the prevention and treatment of cancer.<sup>[5]</sup>

Studies supplementing cordyceps in healthy elderly subjects have demonstrated significant increases in aerobic capacity, oxygen uptake, as well as resistance to fatigue.<sup>[1]</sup> Other experiments looking at the effect of polysaccharide extracts from *Cordyceps sinensis* have demonstrated the ability to improve antioxidant enzyme activity, including superoxide dismutase, glutathione peroxidase, and catalase, resulting in beneficial effects on cardiovascular function, and therefore, a positive impact on elderly patients.<sup>[1, 6]</sup>

## FATIGUE AND STRESS

*Cordyceps sinensis* has traditionally been used for both athletic enhancement and health promotion.<sup>[7]</sup> The mechanisms for the improvement in physical fitness and fatigue were explored in a study on rats.<sup>[7]</sup> Cordyceps was orally dosed at a rate of 200 mg/kg<sub>bw</sub>/d to rats for 15 days, with a swimming and a nonswimming group.<sup>[7]</sup> Researchers found that both the cordyceps-supplemented group and the group with exercise improved in their exercise endurance compared to placebo rats.<sup>[7]</sup> Researchers tested a variety of metabolic regulators as well as endurance-promoting antioxidant genes. Results found that cordyceps supplementation significantly upregulated skeletal muscle metabolic regulators and angiogenesis, and improved glucose and lactate uptake in both exercised and sedentary rats.<sup>[7]</sup> It was also observed that there was an increased expression of oxidative stress responsive transcription factor NRF-2 and its downstream targets SOD1 and TRX by cordyceps supplementation.<sup>[7]</sup> Researchers concluded that cordyceps supplementation, with or without exercise, improves exercise endurance by activating the skeletal muscle metabolic regulators and a coordinated antioxidant response.<sup>[7]</sup>

In another study, researchers explored the antifatigue and antistress effect of the hot-water fraction of mycelia of *Cordyceps sinensis* in vivo using rats and mice.<sup>[8]</sup> For the antifatigue component, the swimming endurance capacity of mice was measured in a control group versus a group fed 150 mg/kg/d and 300 mg/kg/d of the hot-water fraction.<sup>[8]</sup> There was a statistically significant difference noted in endurance capacity, where both treatment groups prolonged swimming from an average of 75 minutes to 90 minutes, with a lessening of fatigue.<sup>[8]</sup> To test the physiological response to stress, rats were given 150 mg/kg/d hot-water fraction or placebo for 8 days, which included a 48-hour stress period.<sup>[8]</sup> Researchers then measured the weight changes of the adrenal gland, spleen, thymus, thyroid, and the biochemical markers alkaline phosphatase and total cholesterol.<sup>[8]</sup> The treatment group showed an inhibition of the increase in cholesterol and of the decrease in alkaline phosphatase which was experienced by the control group.<sup>[8]</sup> The treatment group also had showed suppression in the weight changes in the adrenal gland, thyroid, thymus, and spleen that were experienced by the control group.<sup>[8]</sup> Researchers concluded that the hot-water fraction of cordyceps had both antifatigue and antistress effects that were shown both physiologically and pharmaceutically, suggesting further research to determine the mechanisms of these effects.<sup>[8]</sup>

## REFERENCES

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