FC-Cidal™

Herbs, spices and botanical preparations often exhibit antimicrobial properties due to a wide array of terpenoid and polyphenolic compounds. Indeed, culinary herbs have long been used to control pests and food-borne yeasts and molds in the context of food safety.[1]

FC-Cidal™ contains the herbal preparations French tarragon *(Artemisia dracunculus)*, Stinging Nettle extract *(Urtica dioica)*, Indian tinospora *(Tinospora cordifolia)*, Horsetail *(Equisetum arvense)*, Olive *(Olea europaea)*, Thyme *(Thymus vulgaris)* and Pau D' Arco *(Tabebuia impetiginosa)*.

***Artemisia dracunculus* (Tarragon).** A culinary herb yielding a characteristic aromatic oil, *Artemisia* yields a complex mixture of almost 50 different components. Its most potent constituents include anisaldehyde, paracymene, eugenol, liminene, linalool, menthol, cisocimene, alpha phellandrene, alpha pinene and beta pinene.[1] The essential oil of *Artemisia* showed antagonistic activity toward the growth of *E. coli, Pseudomonas aeruginosa, Staphyloccocus aureus, Streptococcus faecalis* and Yersinia *in vitro*. In addition, extracts of tarragon inhibited iron ascorbate-induced lipid peroxidation of microsomes prepared from human lymphoblastic cells indicating its antioxidant potential.[2]

***Urtica dioica* (Stinging Nettle Extract).** *Urtica dioica,* often called common nettle, stinging nettle or nettle leaf, is native to Europe, Asia, northern Africa, and western North America. *Urtica dioica* was studied on 16 skin and wound infections and was found to possess qualities to promote healing and bacterial homeostasis.[3] In another interesting study, the extract from *Urtica dioica* demonstrated antagonistic activity toward specific biofilm production (SBF) in *Escherichia coli* BW25113.[4]

***Tinaspora cordifolia* (Guduchi).** This herb has also been used traditionally in India. It contains bitter substances, giloin (a glycoside), gilenin, gilosterol and tinosporine.[5] Ethanol extracts of *T. cordifolia*, in combination with several other herbs, had a minimal inhibitory concentration (MIC) of 1 mg/ml when tested *in vitro* against *Entamoeba histolytica*.[6] Using an *in vitro* assay system with *Candida albicans* as the test organism, the activity of rat macrophages was increased by the administration of *T. cordifolia* at a level of 100 mg/kg.[7] It also induces production of interleukin (IL)-1, IL-6, IL-12, IL-18, interferon-gamma, tumor necrosis factor (TNF)-alpha and nonocyte chemoattractant protein (MCP)-1.[8]

***Equisetum arvense* (Horsetail).** In addition to a high percentage of silicates, horsetail contains a variety of polyphenols, such as agigenin and luteolin glycosides. These flavones are typical of American and Asian species, but not the European *Equisetum* species.[9] This herb also contains quercetin, and more unusual polyphenolics, such as genkwanin and progenkwanin glycosides. Horsetail also contains sterols, such as beta sitosterol and campestrol, as primary sterol constituents.[10] The antimicrobial activity of horsetail extracts has been reported[11] to stimulate flow through the ureters[9] and they have been used as a component of herbal teas and herbal mixtures.

***Olea europaea* (Olive leaf).** Various flavonoids and their glycosides have been isolated from olives and olive leaves, such as apigenin, luteolin, rutin and quercetin.[12] Oleuropein, a bitter principle of olives, is a glucoside and phenolic ester of elenolate, which is a multifunctional monoterpene. *In vitro* studies demonstrated that elenolate possesses antiviral properties.[13] Furthermore, olive phenolic compounds inhibited the growth of spore-forming bacteria[14] and *Staphylococcus aureus*.[15] Isolated flavonoids from olives, as well as olive extracts, inhibited the classical complement pathway assayed by the hemolysis of erythrocytes. Therefore, olive polyphenols may help balance inflammatory mechanisms.[16]

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In a laboratory test, olive leaf water (0.66% w/v) extract killed almost all bacteria tested within three hours, and scanning electron microscopic observations of *Escherichia coli* cells exposed to only 0.6% (w/v) olive leaf extract showed complete destruction.[17]

***Thymus vulgaris* (Thyme).** An aromatic culinary herb, thyme has long been used as a seasoning and food preservative.[18] Thyme contains 1-2.5% as an aromatic oil enriched in monoterpenes. Thymol content of thyme oil can be 30 to 70% and carvacrol content ranges between 3 and 15%. P-cymene, limonene and other terpenes are minor constituents. Thymol supports healthy microbial diversity. Volatile constituents of the aromatic oil of thyme influenced the growth of seven different Gram-positive and Gram-negative bacteria.[19] Thyme also contains several polyphenolic compounds, such as eriodictyol and polyphenolic biphenyls, that exhibit potent antioxidant activity.[20] Additional studies of lipid peroxidation in egg yolk, chicken liver, and muscle from mature chickens highlighted that the essential oil of thyme acted as a strong antioxidant in all of these systems.[21]

***Tabeuia avellandae* (Pau D'Arco, LaPacho).** This tropical tree is native to Brazil, where its inner bark has a long history of use among the indigenous peoples there. One of the active substances is lapachol, a naphthoquinone that typically accounts for 2-7% of the content.

The tricyclic derivative of lapachol and β-lapachone functions as an activator of the DNA unwinding enzyme, topoisomerase I, which is required for DNA repair. Among the naphthoquinones, β-lapachone was found to be the most effective in fostering the growth of healthy bacteria.[22] β-lapachone also inhibited the expression of iNOS, proinflammatory cytokines, and MMPs (MMP-3, MMP-8, MMP-9) at mRNA and protein levels in LPS-stimulated microglia, which suggests its support of inflammation pathways. The antioxidant effects of β-LAP appear to be related with the increase of HO-1 and NQO1 via the Nrf2/antioxidant response element (ARE) pathway and/or the PKA pathway.[23]

Product Adjuncts: **A.D.P.®, Lactozyme®, BioDophilus-FOS™**

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Supplement Facts

Serving Size: 1 Capsule

	Amount Per Serving
Proprietary Blend	500 mg
French Tarragon (Artemisia dracunculus) (leaf) *	
Indian Tinospora (Tinospora cordifolia) (stem & root) *	
Horsetail (Equisetum arvense) (whole herb) *	
Thyme (Thymus vulgaris) (leaf) *	
Pau D' Arco (Tabebuia impetiginosa) (inner bark) *	
Stinging Nettle Extract (Urtica dioica) (root) *	
Olive (Olea europaea) (leaf) *	

*** Daily Value not established**

Other ingredients: Capsule shell (gelatin and water), cellulose and magnesium stearate (vegetable source).

This product is gluten, dairy and GMO free.

RECOMMENDATION: One (1) capsule two (2) times each day as a dietary supplement or as otherwise directed by a healthcare professional.

CAUTION: Not recommended for pregnant or lactating women.

KEEP OUT OF REACH OF CHILDREN
Store in a cool, dry area.
Sealed with an imprinted safety seal for your protection.

Product # 6310 Rev. 09/18

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