

# 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.<sup>(1)</sup>

**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.<sup>(1)</sup> The essential oil of *Artemisia* showed antagonistic activity toward the growth of *E. coli*, *Pseudomonas aeruginosa*, *Staphylococcus 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.<sup>(2)</sup>

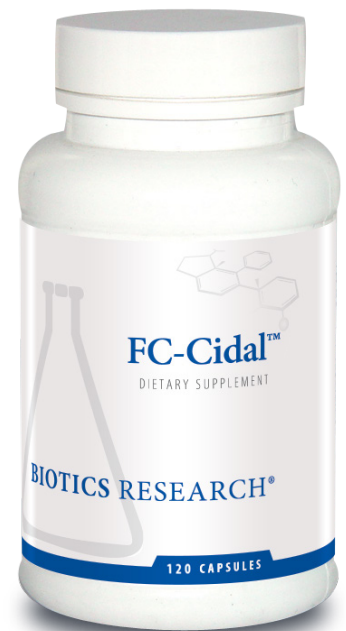
**Urtica dioica (Stinging Nettle Extract).** *Urtica dioica*, often called common nettle, stinging nettle or nettle leaf, is native to Europe, Asia, northern Africa, and western North America. *Urtica dioica* was studied on 16 skin and wound infections and was found to possess qualities to promote healing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

**Tinospora cordifolia (Guduchi).** This herb has also been used traditionally in India. It contains bitter substances, giloin (a glycoside), gilenin, gilosterol and tinosporine.<sup>(5)</sup> 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*.<sup>(6)</sup> 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.<sup>(7)</sup> 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.<sup>(8)</sup>

**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.<sup>(9)</sup> This herb also contains quercetin, and more unusual polyphenolics, such as genkwanin and progenkwanin glycosides. Horsetail also contains sterols, such as beta sitosterol and campesterol, as primary sterol constituents.<sup>(10)</sup> The antimicrobial activity of horsetail extracts has been reported<sup>(11)</sup> to stimulate flow through the ureters<sup>(9)</sup> 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.<sup>(12)</sup> 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.<sup>(13)</sup> Furthermore, olive phenolic compounds inhibited the growth of spore-forming bacteria<sup>(14)</sup> and *Staphylococcus aureus*.<sup>(15)</sup> 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.<sup>(16)</sup>



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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.<sup>(17)</sup>

***Thymus vulgaris* (Thyme).** An aromatic culinary herb, thyme has long been used as a seasoning and food preservative.<sup>(18)</sup> 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.<sup>(19)</sup> Thyme also contains several polyphenolic compounds, such as eriodictyol and polyphenolic biphenyls, that exhibit potent antioxidant activity.<sup>(20)</sup> 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.<sup>(21)</sup>

***Tabebuia 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  $\beta$ -lapachone functions as an activator of the DNA unwinding enzyme, topoisomerase I, which is required for DNA repair. Among the naphthoquinones,  $\beta$ -lapachone was found to be the most effective in fostering the growth of healthy bacteria.<sup>(22)</sup>  $\beta$ -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  $\beta$ -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.<sup>(23)</sup>

Product Adjuncts: **A.D.P.<sup>®</sup>, Lactozyme<sup>®</sup>, BioDophilus-FOS<sup>™</sup>**

#### References

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## Supplement Facts

Serving Size: 1 Capsule

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

To place your order for **FC-Cidal<sup>™</sup>** or for additional information please contact us below.



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