

The agents showing the greatest efficacy or potential are **Cryptolepis sanguinolenta** and its compound **cryptolepine**, as well as **Diminazene** (a synthetic compound, not an herb).

Your provided list of agents focuses on activity against the Lyme co-infection agent, **Babesia duncani** (babesiosis), which is a common and often severe co-infection.

Based on *in vitro* (test tube) studies, here is a breakdown of the observed efficacy:

Herbal Agents Against *Babesia duncani*

The five herbal extracts you listed—**Cryptolepis sanguinolenta**, **Artemisia annua**, **Scutellaria baicalensis**, **Alchornea cordifolia**, and **Polygonum cuspidatum**—all demonstrated good *in vitro* inhibitory activity against *B. duncani*.¹

- **Cryptolepis sanguinolenta (Ghanaian quinine):** This herb and its primary active alkaloid, **cryptolepine**, showed the **most potent** activity among the tested botanicals against *B. duncani*.
 - The half-maximal inhibitory concentration (**IC₅₀**) of cryptolepine ($3.4^{2}\mu\text{M}$) was found to be more favorable than that of the standard prescription drugs **quinine** ($10^{3}\mu\text{M}$) and **clindamycin** ($37^{4}\mu\text{M}$).⁵
 - **High Potential for Eradication:** The 90% ethanol extract of *C. sanguinolenta* also showed **no regrowth** of the parasite in subculture after 6 days of treatment, suggesting potential for complete parasite clearance in the lab setting.⁶
- **Artemisia annua (Sweet wormwood):** The primary active compound, **artemisinin** (and its derivatives like artesunate and artemether), also showed potent activity against *B. duncani*. The **IC₅₀** values for these compounds were comparable to or better than quinine and clindamycin.⁷
- **Scutellaria baicalensis (Chinese skullcap):** The active compound, **baicalein**, had an **IC₅₀** value ($12^{9}\mu\text{M}$) comparable to quinine.¹⁰



Natural Alkaloid Against *Babesia duncani*

- **Diminazene:** Identified as a promising natural alkaloid, **Diminazene aceturate** is a well-established veterinary drug for treating babesiosis and trypanosomiasis in animals.¹¹ While its use in humans for babesiosis is not standard and is generally limited, its historical and established efficacy in other species supports its **promising**

anti-babesiosis activity mentioned in your source.

✨ Additional Context: Activity Against *Borrelia burgdorferi* (Lyme Bacterium)

It is important to note that Lyme disease involves the primary agent ***Borrelia burgdorferi*** (a spirochete) in addition to co-infections like *Babesia*. Some of the herbs mentioned have also shown significant promise against *B. burgdorferi*, especially the persistent, non-growing forms that are difficult to treat with standard antibiotics.¹²

- **Cryptolepis sanguinolenta** and **Polygonum cuspidatum** (Japanese knotweed) extracts showed strong activity against both growing and stationary-phase *B. burgdorferi* in *in vitro* studies.
 - In subculture studies, **Cryptolepis sanguinolenta** was the only one tested that caused complete eradication of *B. burgdorferi* stationary phase cells.

In summary, **Cryptolepis sanguinolenta** (and its compound cryptolepine) appears to demonstrate the **highest and most broad-spectrum efficacy** *in vitro* against both the ***Babesia*** co-infection and the ***Borrelia*** primary infection among the tested botanicals.

I can search for more recent clinical trial data on the efficacy of ***Cryptolepis sanguinolenta*** in human patients with babesiosis or Lyme disease, if you're interested.