

## Methicillin-resistant *Staphylococcus aureus* (MRSA)

Many bacterial infections possess multi-drug resistance. Among the most significant of these bacteria is methicillin-resistant *Staphylococcus aureus*, more commonly known as MRSA or “the superbug.” This bacterium is resistant to standard antibiotics, including penicillin. According to the *Journal of the American Medical Association*, MRSA is responsible for nearly 20,000 hospital-stay-related deaths annually in the United States.<sup>1</sup>

Cannabinoids are acknowledged to possess antibacterial and antifungal properties,<sup>2</sup> and topical preparations of the plant were initially investigated for these purposes nearly a century ago.<sup>3</sup> In 2008, investigators at Italy’s Università del Piemonte Orientale and Britain’s University of London, School of Pharmacy, assessed the germ-fighting properties of five separate cannabinoids against various strains of multidrug-resistant bacteria, including MRSA. They reported that all of the compounds tested showed “potent antibacterial activity” and that cannabinoids were “exceptional” at halting the spread of MRSA.<sup>4</sup>

Other studies have reported that non-cannabinoid constituents in the plant, such as terpenoids, also possess antibacterial properties against MRSA and malaria.<sup>5-7</sup>

Ethanol-based tinctures containing crushed cannabis leaves have also been documented to inhibit MRSA growth.<sup>8</sup>

Recent studies have also demonstrated that cannabinoids are effective in reducing the colony count of dental bacteria,<sup>9</sup> leading investigators to opine in favor of “the potential of cannabinoids in developing efficient and safer mouthwash products and next generation oral care products.”<sup>10</sup>

Clinical trials regarding the use of cannabinoids as antibacterial and antimicrobial agents have been recommended, but are yet to be conducted. Experts opine, “*Cannabis sativa* ... represents an interesting source of antibacterial agents to address the problem of multidrug resistance in MRSA and other pathogenic bacteria.”<sup>11</sup>

### REFERENCES

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<sup>2</sup> Radwan et al. 2009. Biologically active cannabinoids from high-potency *Cannabis sativa*. *Journal of Natural Products* 72: 906-911.

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<sup>4</sup> Appendino et al. 2008. Antibacterial cannabinoids from *Cannabis sativa*: a structure study. *Journal of Natural Products* 71: 1427-1430.

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<sup>6</sup> Ahmed et al. 2015. Minor oxygenated cannabinoids from high potency *Cannabis sativa* L. *Phytochemistry* 117: 194-199.

<sup>7</sup> Ethan Russo. 2011. Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects. *British Journal of Pharmacology* 163: 1344-1364.

<sup>8</sup> Chakraborty et al. 2018. Antimicrobial activity of *Cannabis sativa*, *Thuja orientalis*, and *Psidium guajava* leaf extracts against methicillin-resistant *Staphylococcus aureus*. *Journal of Integrative Medicine* 5: 350-357.

<sup>9</sup> Stahl and Vasudevan. 2020. Comparison of Efficacy of Cannabinoids versus Commercial Oral Care Products in



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<sup>10</sup> Vasudevan and Stahl. 2020. Cannabinoids infused mouthwash products are as effective as chlorhexidine on inhibition of total-culturable bacterial content in dental plaque samples. *Journal of Cannabis Research* 23 [open access journal].

<sup>11</sup> Appendino et al. 2008. op. cit.