

# TOPICAL CANNABIS PREPARATIONS: SNAKE OIL OR HEALING OPTIONS?

by Cheryl K. Smith

As medical marijuana has become more widely accepted, methods for its use have gone beyond simply smoking it. Vaporizers are replacing pipes and “joints,” as physicians and other proponents strive to make it as safe as possible for patients. “Medibles”—foods that are medicated with cannabis butter or oil—have gone mainstream, with new gourmet products being added every day.

Entrepreneurs are also creating tinctures, ointments and lotions, with names like Apothecanna, Doc Green’s Therapeutic Healing Cream and Pain Eraser. Testimonials abound about the effectiveness of these topical medicines, with claims that they are effective not only on skin conditions, but for muscle, joint and other types of pain. *But do they really work?*

**Brief History.** The use of cannabis as a medicine dates back thousands of years. It was mainly used orally (as a tincture or component in medicine) and by smoking, although there is some documentation of external use. Cannabis is believed to have been used externally by the Egyptians, for its antiseptic properties. Reports from different parts of Africa indicate that it was used for a similar purpose.

In “Cannabis as a Medicament” (<http://tinyurl.com/249rcct>), the authors report that cannabis was used in European folk medicine as an antiseptic, as well. The narcotic effect apparently was not mentioned or noticed; instead it was believed to be effective for antibiotic and limited analgesic purposes. They mention the use of the dried leaves with butter for burn treatment and other external applications for inflamed feet, furuncles (skin infection involving a hair follicle) and erysipelas (bacterial skin infection) in various cultures. In the Victorian era, cannabis plasters and ointments were used to relieve local pain.

In more recent (1968) Arabic medicine, cannabis (or “hemp”) was used to treat pityriasis (a disorder causing flakiness or scaling of the skin) and lichen (an inflammatory skin condition) by washing with the juice from the leaves.(1)

**Effect of Cannabis on Skin Conditions.** Confirming that the historical uses of cannabis are in fact effective, recent studies have shown that cannabis has antibacterial, anti-inflammatory, anti-cancer and immune-modulating properties.(2) This means it may be effective on skin infections, burns, rashes and other skin problems. Most of the evidence that cannabis ointments and lotions work when applied topically is anecdotal, although studies have begun to be published.

Different parts of the cannabis plant have been suggested for topical use. The seeds of the plant are made up of essential fatty acids and protein, and are considered to have therapeutic effects. The fatty acid, gamma-linolenic acid, in particular, is recommended for relief from the skin diseases eczema and psoriasis. It is also believed to provide some relief for osteoporosis, rheumatoid arthritis and other inflammatory diseases. The buds, leaves, and trichomes (resin glands) are the parts of the plant most commonly used for creating topical preparations. Hashish made from these parts of the plant can also be used.

While early studies looked mainly at the effects of smoked marijuana, recent studies most often use oral cannabinoids (usually THC), or are performed on laboratory animals. These include studies looking at the effects using of fatty acids as a nutritional supplement rather than topically. Only rarely has a study looked at topical applications of cannabis, but at least one study found that nerve and mast cells in

human skin contain cannabinoid receptors. This would indicate that topical application of cannabis could have an effect on skin conditions.

In fact, at least one study showed that topical cannabinoids have a positive effect on severe itching. In that 2006 German study, researchers found that 14 of 22 patients had reduction in severe pruritis (itching) with application of the endocannabinoid N-palmitoyl ethanolamine (PEA).(3) The PEA was applied in an emollient cream to the skin. No patient experienced side effects.

A more recent study, in 2007, looked at how the cannabinoid receptors in mice become activated by administration of cannabinoids, significantly decreasing inflammation caused by contact skin allergy.(4) The study's authors suggest that cannabinoid compounds such as those produced by cannabis plant may provide an enhancement to therapeutic treatment for humans.

On the flip side of these beneficial effects is the possibility that cannabis may cause some of the very skin problems it is used to treat. A 1983 article in the *Western Journal of Medicine* noted that many people who have a sensitivity or an allergic reaction to airborne plant pollens, including some in other botanical families, may develop contact dermatitis or urticaria (hives) as a result of prolonged exposure to cannabis (such as trimming, or other work in the industry that requires handling).(5) Another potential, but less likely, risk may be anaphylactic reaction. A 1971 medical article noted such an effect from smoking cannabis.(6)

While the studies cited addressed the effect of cannabinoids on external skin conditions—something that can be readily observed and proven true or not true—the question remains as to whether cannabinoids can effectively permeate the skin barrier to affect internal conditions, or even joint pain.

**Absorption of Cannabis Through the Skin.** According to *The Healing Magic of Cannabis*, cannabis in a compress, salve or tincture is absorbed locally when applied directly to the skin, but noted that there is debate about whether it can reach the central nervous system (CNS).(7) This is why topical applications have no psychoactive effect (despite the claims by some that they do).

A 1987 study from Israel investigated the skin permeation behavior of a tetrahydrocannabinol (THC) in both rat and human skin in vitro.(8) The researchers found rat skin much more permeable than human skin. They also found that “24 hours after application the drug was concentrated in the stratum corneum, in the upper epidermis, and around the hair follicles....” In other words, it doesn't penetrate very deep. However, using a permeation enhancer (oleic acid) on the rat skin only, they found a sustained concentration in the blood for about 24 hours. This study still leaves open the question of whether topically applying THC to human skin can deliver it to the bloodstream.

Cannabinoids are similar to opioids in that they inhibit pain by interacting with specific receptors within the pain pathways.(9) At least two patent applications have been filed for transdermal delivery systems (10) and various other methods have been suggested. Some people claim that using ethyl alcohol (such as vodka) as a medium for cannabis more effectively delivers cannabinoids to the body through the skin. While it is true that ethyl alcohol can be absorbed through the skin, no comparative studies have been done comparing the effectiveness of cannabis-infused alcohol with cannabis-infused oils in delivering cannabinoids through the skin.

A skin patch, similar to those used for delivering certain opiates and hormones, would have to be large enough and contain a large enough dose to overcome the low absorption rate of human skin. The scalp (which has the fatty sebaceous glands and hair follicles) may provide the best possibility for absorption of cannabinoids into the human body. In addition, DMSO (11) or oleic acid (12) could be used to enhance the penetration into the skin. However, many of the properties of DMSO are the same as those of cannabis (13), which could potentially confound a study on the effectiveness of cannabis.

At the Third National Clinical Conference on Cannabis Therapeutics, held in 2004, University of Kentucky professor Audra Stinchcomb, PhD, spoke on transdermal and intranasal delivery of cannabinoids (14). The study was funded in part by the American Cancer Society.

Dr. Stinchcomb noted that transdermal patches are a superior method for treating various conditions, because they decrease side effects, maintain steady drug levels, and provide controlled release of cannabinoids. The study also found that the addition of certain proteins can add to permeability and that cannabidiol and cannabidiol are more permeable to the skin than THC. Finally, they found that in this study, which used hairless guinea pigs for research subjects, there was difficulty in obtaining a high enough plasma level to be effective—an indicator that simply applying lotion or oil topically won't relieve joint pain or other internal pains.

**Factors in Perceived Effectiveness.** Studies to date have pretty clearly established that cannabis is effective for topical and possibly muscle problems. However, the fact that cannabis doesn't get you "high" when topically applied is good evidence that it does not reach the CNS or blood stream. However, there's no lack of testimonials (on Internet boards and heard personally by the author) to the effect that commercial or homemade cannabis-infused ointments and lotions are an effective alternative for treating a variety of medical conditions beyond superficial skin disorders.

Without good studies proving that topical cannabis preparations are effective for more than skin conditions, e.g., for joint pain or headache, it's hard to know whether those that are homemade or are on the market are really doing what people claim they are doing. Several factors may be at play. These include:

- Placebo effect
- Using another method at the same time
- Other ingredients are causing pain relief
- They do work, but the right studies haven't been done

*Placebo effect.* According to the *Skeptic's Dictionary*, "The placebo effect is the measurable, observable, or felt improvement in health or behavior not attributable to a medication or invasive treatment that has been administered." (15) There is disagreement as to whether this effect is psychological, physical, or has some other cause. An example of what may be the placebo effect is the claim of some individuals that they have gotten high simply from trimming bud or otherwise handling cannabis plant material. The placebo effect may be at play when topical cannabis preparations are used to treat some medical conditions.

*Using another method at the same time.* If a person is smoking cannabis, for example, while also applying a cannabis-infused oil to an affected area, determining which method cause the therapeutic effect is impossible. (This obviously isn't always the case, as many medical cannabis users have no desire to get

high.) The only true test is to stop all other methods and try only the topical application for a period of time.

*Other ingredients are causing pain relief.* Some topical preparations rely not only on carrier oils to get cannabis into the skin, but also contain other essential oils such as eucalyptus, peppermint, menthol, or camphor. These are some of the ingredients in Tiger Balm, a non-cannabis product that is sold for muscle pain relief and works. The principals behind these ingredients is the same as applying heat to joint pain. So is it the cannabis or the other oils? (Or both?)

This is an area that is ripe for study. It may be that cannabis combined with other ingredients adds to the beneficial effect. An example would be camphor, glucosamine, and chondroitin sulfate in a topical preparation, which were found in a study to relieve osteoarthritis pain.(16)

*They do work, but the right studies haven't been done.* Clearly, more studies need to be done. When I started this article, I didn't believe that cannabis ointments and lotions had a therapeutic effect on anything other than skin conditions. I had tried such a salve years ago and found that it did nothing for my muscle pain.

Because I work in the medical marijuana industry, I continued to hear claims that topical applications are effective in treating all sorts of pain, including as muscle and joint pain. Then one day, a man came into our clinic with some olive oil that contained 1% hash (or honey) oil. When I scoffed at him, he handed me an eight ounce bottle with the demand that I try it. I was shocked several days later when I applied it to my shoulders and neck for severe muscle pain and found relief within 15 minutes.

**Conclusion.** Cannabis salves, lotions and ointments can be effective treatments for certain skin conditions such as burns, infections and rashes. Some preparations are also effective in treating muscle pains. Use of these products is fairly harmless and doesn't cause psychoactive side effects, which makes it a good method for such problems.

Other better methods, such as vaporization or oral ingestion, exist for treating medical conditions not affecting the skin or muscles. There is no evidence that topical preparations have an effect on headaches or internal problems. If topical cannabis preparations are even effective on joint pain, they would likely be more useful on joints that are close to the skin, such as the fingers or knees.

Despite their shortcomings, topical preparations are a good addition to the medical arsenal that this amazing herb can provide. In the future we can expect to see more studies of their effectiveness, as well as more sophisticated delivery methods and combinations of herbs or other substances.

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11. Dimethyl sulfoxide (DMSO), which has been used as a commercial solvent since 1953, is a by-product of the wood industry. Its potential medical uses were first noticed by Dr. Stanley Jacob, MD, a physician at Oregon Health Sciences University, in 1961. In the midst of studies to determine its effectiveness, FDA closed down clinical trials and, other than approving its use for interstitial cystitis, has generally continued to refuse to approve any new trials. DMSO easily crosses membranes and has the added attribute of carrying other drugs across these membranes.
12. Oleic acid is a monounsaturated omega-9 fatty acid found in various animal and vegetable fats. It makes up a large part of olive oil, which is often used as a carrier oil in topical cannabis products.
13. DMSO is very effective as a topical analgesic, causing immediate relief from the pain of burns, sprains and strains. Like cannabis, it also has been found to have potential in fighting cancer, bacteria and other disease processes.
14. <http://video.google.com/videoplay?docid=310494628955328203#>
15. [www.skepdic.com/placebo.html](http://www.skepdic.com/placebo.html).
16. [www.prohealth.com/library/showarticle.cfm?libid=1980](http://www.prohealth.com/library/showarticle.cfm?libid=1980).

## Claims for Commercial Cannabis Lotions, Ointments and Creams:

- **Apothecanna Pain Cream** is claimed to be effective on fatigued and sore muscles, arthritis, carpal tunnel, joint pain, fibromyalgia, headaches and migraines. It contains not only cannabis, but arnica, juniper, peppermint, clove, wintergreen, lavender and ravenara. Many of these other essential oils can provide relief for some of these conditions, so it isn't clear that the cannabis is responsible for the therapeutic effect, particularly in the case of headaches.
- Doc Green's Therapeutic Healing Cream is claimed to "get your muscles and aches 'stoned' while keeping your head clear." It is said not to show up on a drug test, but to provide local relief. This cream is in a shea butter base and sells for \$6.00 per ounce. Medical studies referenced to show its effectiveness are misleading, as they dealt with mice or with localized pain or itching, rather than joint or muscle pain.
- **Elsie's Ointments**, carried by Northern Lights Rx in Colorado, are claimed to help with "nerve, joint, headache and other pain." Like Apothecanna Pain Cream, all but the ointment meant for skin disorders contain other essential oils. The site also implies that topical application of this ointment can cure cancer, with a link to a news story in which a man claims that this ointment cured malignant tumors in his neck. This is a dangerous claim, particularly if it prevents patients from considering life-saving options such as surgery for a lethal cancer like melanoma.
- **Cannabee Pain Eraser**, a lotion that is marketed in California, only advertises that it is for pain and inflammation of muscle and soft tissue. It contains some essential oils (not noted) which may also have an effect on local pain relief.