

# Myth, reality and absinthe

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Absinthe has always had an ambivalent history, praised on the one hand as 'The Green Muse' by its devotees, while condemned on the other by its detractors as a cause of madness and moral degeneracy. But is there any scientific or medical basis for either position?

Evidence for the mind-altering effects of absinthe is largely anecdotal and the frequently quoted first-hand descriptions have come from artists and poets who would perhaps be expected to be fanciful in their descriptions. After all, imbibers of alcohol have always described their favourite tipples in extravagant terms, whether it be Burns on whisky or Yeats on wine. The case for the harmful effect of absinthe is largely based on research on laboratory animals conducted at the behest of the prohibitionist lobby and assumptions drawn from examinations of mental patients in the late 19th century.

## Green history

The origins of absinthe can be traced back to the end of the 18th century, when Pierre Ordinaire, a French doctor, used wormwood (*Artemisia absinthium*) together with anise, fennel, hyssop and various other herbs distilled in an alcoholic base as a herbal remedy for his patients. Ordinaire's recipe eventually found its way into the hands of Henri-Louis Pernod who established the Pernod fils dynasty when he opened his first distillery in 1805, and very soon 'Extrait d'absinthe' stopped being a local curiosity and started on its route to becoming a national phenomenon. By the end of the 19th century absinthe had been embraced in France by the Bourgeoisie and demi-monde alike, with over 2 million litres being consumed annually.

## Evidence?

So what is the published scientific evidence for the harm or benefits of absinthe?

Wormwood has had a long history in folk medicine dating back as far as ancient Greece when it was variously prescribed for rheumatism, jaundice, menstrual pains and as an aid in child birth, but only attracted scientific attention in the mid-19th century. At this time there was a powerful prohibitionist lobby gaining public attention throughout France and it should be noted that research was rarely totally independent and was conducted to support a particular position, for or against the banning of alcohol. The first published evidence for absinthe's harmful effects in animals dates from the 1860s in papers by Magnan and Amory. These purported to show that wormwood oil and alcohol produce a synergistic effect which leads to epileptiform convulsions. Magnan extended his studies to acute alcoholics and concluded that absinthe produced symptoms in humans that were distinct from alcoholic delirium tremens and manifest themselves as epileptic convulsions.

However, it is now accepted that Magnan's interpretations were oversimplified and alarmist. He not only concluded that absinthe caused medical and psychological troubles not associated with the high consumption of alcohol, he argued

that absinthe's deleterious effects were hereditary. Magnan was preoccupied with the degeneration of the French race, which he blamed on alcohol and in particular, absinthe. There should be no surprise at the correlation of absinthe drinking amongst the destitute and alcoholics, as it was the cheapest way of buying strong alcohol. On the other hand, millions of French people enjoyed the occasional glass of absinthe after work without any ill effects.

## A potential cause?

Around the same time, it was becoming generally accepted that thujone, a terpene found in wormwood, was responsible for absinthe's secondary effects, detrimental or otherwise. It is often stated that the absinthe produced in the 19th century had much larger amounts of thujone present than are allowed in today's versions of the drink, which have to comply with EU limits of 10 mg/l. Values as high as 260 mg/l have been quoted by Arnold, but analytical techniques available in the 19th century were not capable of separating thujone from many of the related compounds present in the essential oils of the plants used to make absinthe and it is therefore

Sample	Thujone mg/l	Anethole mg/l
Swiss 'La Bleue'	25	956
Vintage Pernod fils circa 1900	6	1400
Emile Pernot 45%	8	1053
Un Emile 68%	10	792

**Table 1. GLC analysis of absinthe. Samples were analysed on a BP10 capillary column with FID. Programmed from 70°C (held for 10 min) to 12°C at 5°C/min and held isothermally for a further 10 min.**

likely that concentrations were grossly overestimated.

Indeed, Bedel gives the amount of dried wormwood used in a typical recipe as 2.5 kg in 100 l which, based on widely accepted yields, equates to 87.5 mg/l of oil, of which between 34 and 72% would comprise thujone, giving a final maximum concentration of thujone in the predistilled absinthe of 30 to 63 mg/l assuming 100% extraction. However not all of the thujone would have found its way into the distillate, and the final concentration in the finished absinthe would have been lower still.

This is indeed confirmed when GLC analysis is applied to samples of absinthes and the results do show much lower thujone levels than expected. Analyses were performed on a sample of vintage Pernod fils circa 1900, a sample of Swiss absinthe produced by one of the many illicit stills operating in the Val de Travers region of Switzerland (known locally as 'La Bleue') and two modern commercial absinthes produced by traditional methods in Pontarlier, France using 19th century protocols. Ironically, the vintage Pernod absinthe shows the lowest concentration of total thujone of any of the samples tested, while even the highest concentration, observed found in the Swiss sample, is lower than the EU limit of 35 mg/l for thujone in bitters.

According to Margaria, the convulsive ED<sub>50</sub> of thujone in rats is 35.5 mg/kg/day po, and the 'no effect' level is 12.5 mg/kg/day po.

No toxicity studies have been conducted in humans but the FDA accepts a safe level for food additives as a highly conservative 100-fold less than the no effect level in animals. Thus a safe (no effect) dose of thujone could be extrapolated as 8.75 mg/day for a 70 kg human and it can be seen that even at the highest concentrations found in any of the samples tested, the effects of the alcohol would far outweigh those of the thujone.

### The real reason

What was more likely to have caused harm to regular absinthe drinkers were the adul-

terants used in the cheaper varieties. Absinthe existed in a quality pyramid much as wine does today, and for each quality brand there were many more indifferent or even positively harmful versions sold cheaply to those who could not afford to buy a reputable brand. Common adulterants were cupric acetate (to provide the valued green colour) and antimony trichloride (which provided a cloudiness when

more adulterants. On the other hand, the base alcohol used in quality absinthe was rectified wine alcohol at 85% which was free from congeners, and although bottled at 68% (to preserve the natural green colour of the chlorophyll) the final strength when diluted was no more than a glass of wine.

Interest in absinthe naturally waned after it was banned in Switzerland and France, and scientific interest faded until a paper was published in 1975 by del Castillo *et al*, which suggested similarities between the reported effects of absinthe and those of marijuana (*Cannabis sativa*) and attempted to explain these by highlighting similarities in the molecular geometry of thujone and tetrahydrocannabinol. However, in 1999 Meschler and Howlett determined that thujone had no activity at the cannabinoid receptor, and current research by Höld *et al* points to it being a GABA<sub>A</sub> modulator. Thujone's GABA modulating activity explains its convulsant effects at high doses, and how smaller doses may produce stimulant action (there is anecdotal evidence that drinking absinthe produces a clarity of thought that is not usually associated with alcoholic drinks).

### The wormwood turns

So if the case for the harmful effects of absinthe is flimsy, does it have any beneficial ones? Ordinaire first prescribed it as a general tonic but it is doubtful

whether he performed any objective research into whether it was improving the condition of his patients, simply observing that as they kept coming back for more, it must be doing them good. The producers unashamedly sold absinthe on the basis of its health giving properties, especially in the years leading up to the ban. In 1844 absinthe was issued to French legionnaires fighting in Algeria as it was believed to prevent fever and kill bacteria in water. Although there were no studies to support this at the time, in 1975 Kaul *et al* found that dilute oil of wormwood did inhibit the growth of 4 out of 7 types of bacteria.



By the early 20th century, absinthe producers were selling their brands on the basis of health benefits.

water was added in imitation of the milky appearance of diluted absinthe). The purity of the base alcohol used for lesser brands would also have been questionable, and toxic levels of methanol from poor rectification would have been a real possibility. An additional aggravating factor was that as the cheaper brands were lower in alcohol than the quality brands - around 45% abv for 'absinthe demi-fine' compared to 68 or 72% for 'absinthe superior' - someone drinking the cheaper version and seeking to obtain the same effect from the alcohol would have needed to consume more of the absinthe and hence

Wormwood is also hepatoprotective. Gilani and Janbaz found that an extract of *Artemisia absinthium* protected against acetaminophen- and carbon tetrachloride-induced hepatotoxicity in mice. Gilani also suggests that the presence of antioxidants and calcium channel blockers in wormwood probably contributes to its hepatoprotective effects. Recent studies by Wake *et al* have additionally demonstrated that extracts of wormwood (and other plants used in absinthe) have CNS cholinergic receptor binding activity and therefore contrary to accepted wisdom, absinthe may actually improve cognitive function.

### A matter of taste

In conclusion, there is no evidence that absinthe ever contained the high concentrations of thujone that would have led to detrimental effects or that it has hallucinogenic or mind-altering properties. The health problems experienced by chronic users were likely to have been caused by adulterants in inferior brands and by the high levels of alcohol present.

Claims for beneficial effects must also be treated with some skepticism as again, the detrimental effects of the alcohol would



Was wormwood a scapegoat for the prohibitionists?

presumably outweigh any benefits. It seems likely that the phenomenal success of absinthe during the 19th century was due to one factor, the French love of aniseed drinks.

The modern equivalent of absinthe, pastis, is by far the most popular distilled spirit in France with 125 million litres being consumed annually. Perhaps the reason that so much absinthe was consumed, and absintheurs waxed so lyrically about it was simply because it tasted good.

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## FURTHER READING

Magnan V (1869) **Epilepsie alcoolique; action spéciale de l'absinthe: épilepsie absinthique.** *Comptus Rendu des Seances et Memoires de la Société de Biologie (Paris)*5(4th series):156-161

Amory R (1868) **Experiments and observations on absinthe and absinthism.** *Boston Medical and Surgical Journal* 7(8):68-71, 83-5.

Arnold WN (1989) **Absinthe.** *Scientific American* 260(6):112-117.

del Castillo J, Anderson M, Rubottom GM (1975) **Marijuana, absinthe and the central nervous system.** *Nature* 253:365-366.

Margaria R (1963) **Acute and sub-acute toxicity study on thujone.** *Unpublished report of Istituto di Fisiologia, Università di Milano.*

Meschler JP, Howlett AC (1999) **Thujone exhibits low affinity for cannabinoid receptors but fails to evoke cannabimimetic responses.** *Pharmacology Biochemistry and Behavior* 62(3):473-480.

Höld KM, Sirisoma NS, Ikeda T, Narahashi T, Casida JE (2000)  **$\alpha$ -Thujone (the active component of absinthe):  $\gamma$ -Aminobutyric acid type A receptor modulation and metabolic detoxification.** *Proceedings of the National Academy of Sciences USA* 97(8):3826-3831.

Kaul VK, Nigam SS, Dhar KL (1976) **Antimicrobial activities of the essential oils of *Artemisia absinthium* linn, *Artemisia vestita* wall' and *Artemisia vulgaris* Linn.** *Indian Journal of Pharmacy* 38(1):21-22.

Gilani AH, Janbaz KH (1995) **Preventative and curative effects of *Artemisia absinthium* on acetaminophen and CCl<sub>4</sub>-induced hepatotoxicity.** *Gen Pharmacol* 26(2):309-315 and Gilani AH (1994) **Search for new calcium channel blocking drugs from indigenous plants.** *International Congress on Natural Product Research* August 1-5, Halifax 0:29.

Wake G, Court J, Pickering A, Lewis R, Wilkins R, Perry E (2000) **CNS acetylcholine receptor activity in European medicinal plants traditionally used to improve failing memory.** *Journal of Ethnopharmacology* 69(2):105-114.