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 tipple 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 Bourgeoise 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 manifested themselves as epileptic convulsions. However, it is now accepted that Magnan’s interpretations were oversimplified and alarming. 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

<table>
<thead>
<tr>
<th>Sample</th>
<th>Thujone mg/l</th>
<th>Anethole mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swiss ‘La Bleue’</td>
<td>25</td>
<td>956</td>
</tr>
<tr>
<td>Vintage Pernod fils</td>
<td>6</td>
<td>1400</td>
</tr>
<tr>
<td>Emile Pernod 45%</td>
<td>8</td>
<td>1053</td>
</tr>
<tr>
<td>Un Emile 68%</td>
<td>10</td>
<td>792</td>
</tr>
</tbody>
</table>

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%
extration. However not all of the
thujone would have found its way
into the distillate, and the final con-
centration 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 per-
formed 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 com-
mercial absintes produced by tradi-
tional methods in Pontarlier, France
using 19th century protocols.

Ironically, the vintage Pernod
absinthe shows the lowest concen-
tration 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 con-
vasive 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 concen-
trations found in any of the samples tested,
the effects of the alcohol would far out-
weigh those of the thujone.

The real reason
What was more likely to have caused harm
to regular absinthe drinkers were the adul-
ters 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 indis-
ferent or even positively harmful versions
sold cheaply to those who could not afford
to buy a reputable brand. Common adul-
ters were cupric acetate (to provide the
valued green colour) and antimony tricho-
rside (which provided a cloudiness when
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 rectifi-
cation 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’ com-
pared 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
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 tetrahy-
drocannabinol. However, in 1999
Meschler and Howlett determined
that thujone had no activity at the
 cannabinoid receptor, and current
research by Hölzl et al points to it
being a GABA<sub>A</sub> modulator.
Thujone’s GABA modulating activ-
ity explains its convulsant effects
at high doses, and how smaller
doses may produce stimulant
action (there is anecdotal evi-
dence that drinking absinthe pro-
duces a clarity of thought that is
not usually associated with alco-
holic drinks).

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

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.
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 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**