Factsheet 27

vaporisers

ncpic
national cannabis prevention and information centre

what is a vaporiser?

A vaporiser is a device used to produce a vapour from heated cannabis which users then inhale. Unlike a joint or bong, vaporisers heat cannabis to below its combustion temperature, which means that smoke is not produced.

There are a number of vaporiser designs on the market, many of which are sold online. Many vaporisers use a hotplate to heat cannabis while other varieties use a hot air gun and may also filter the vapour through water before releasing it to be inhaled. Some vaporisers blow hot air through a disk containing cannabis while other home-made varieties are even fashioned from light bulbs. One style of vaporiser that has frequently been used in studies on the devices and the vapour they produce is the *Volcano Vaporiser*. This device contains a heater or hotplate, a ventilator, a filling chamber, a valve, a balloon and a mouth piece. Once the cannabis is heated, the vapour is funnelled through a valve by an air pump and fed into an inflatable, plastic, balloon-type bag (other vaporisers utilise a glass jar to hold the vapour). When the balloon is filled, it can be removed from the device and the vapour inhaled.

what is the history of the vaporiser?

The first 'vaporiser' to be mentioned in the literature was the *Tilt*, commercially marketed in the United States in the early 1980s before anti-paraphernalia laws were passed. However, according to a number of websites, the first electric vaporiser prototype, the *BC Vaporiser*, was not produced until 1994 in Canada. It was this vaporiser that was used by the California NORML (National Organization for the Reform of Marijuana Laws) and Multidisciplinary Association for Psychedelic Studies (MAPS) in a study of seven different smoking devices in 1996.

Since that time there have been a variety of changes made to the vaporiser with patents being filed for additions such as a removable valve balloon in 1998, and a heating block as a heat exchanger for "hot air extraction inhalers" in 2000.

why do some cannabis users prefer vaporisers over joints or bongs?

Many cannabis users who prefer to use vaporisers believe that they are safer than bongs or joints. They believe that because the cannabis is not combusted, they are protecting themselves from the harmful and carcinogenic chemicals produced by smoke. In the words of one cannabis user, "What's good about a vaporizer is that you don't inhale smoke - you inhale vapour making it much healthier. Another good thing is that you only need a small amount of herb [cannabis]. The only downside I see is that it's kinda pricey." One company selling vaporisers online claims that using the device "reduces the development of harmful substances and odours to a minimum" and that non-smokers in the room will not be adversely affected due to the absence of smoke and odour. These claims are primarily marketing tools and may not be indicative of the actual effect on the user or others.

what is the difference between cannabis smoke and vapour?

Cannabis smoke is the result of heating cannabis until it burns, at its combustion temperature of approximately 230°C. Vapour, however, is produced by heating, but not burning the drug. This is usually achieved at temperatures between 170°C and 200°C, although higher temperatures are possible.

Cannabis smoke contains gaseous and particulate matter including noxious tars, carbon monoxide, toluene, benzene, naphthalene, acetaldehyde, phenol and hydrogen cyanide, many of which are at similar levels to those that have been identified in tobacco smoke. These chemicals are all capable of causing significant respiratory symptoms.

Studies have indicated however, that cannabis vapour does not contain many of these chemicals, including the cancer-causing polycyclic aromatic hydrocarbons (PAHs) that are found in cannabis smoke. Lower levels of tar and carbon monoxide were also found in cannabis vapour compared to cannabis smoke. There have also been claims that using a vaporiser produces fewer toxic by-products and extracts THC more efficiently than smoking the drug in a bong or joint. Other studies have found that compared to bongs and joints, vaporisers lead to fewer respiratory symptoms and can achieve "reductions in tar relative to THC". Finally, there have also been suggestions that vaporisers allow THC to be absorbed more quickly into the body than joints or bongs.

A limitation of a number of these studies is that they have not tested for the presence of tar or "toxic gases with a low molecular weight, such as ammonia" or hydrogen cyanide. One study that did test both cannabis smoke and vapour for the presence of ammonia, found toxic levels of ammonia in vapour but far lower levels in smoke. Another downside of using vaporisers is that toxic chemicals that would otherwise be lost in the side-stream smoke of a joint (and thus not inhaled by the user) are not lost when using a vaporiser. Studies on the effect of inhaling ammonia have found that it can cause "irritation and central nervous system effects with no evidence of adaptation over the exposure period... [and] neurobehavioural impairment". Exposure to ammonia has also been linked to asthma and bronchial spasms.

A further reason to exercise caution when interpreting the results from studies that analyse cannabis smoke and vapour, are the large number of variables, or differences, in these studies. These may include the type of vaporiser used, temperature variations, cannabis potency, density of the plant matter used, how long the vapour is stored in the balloon and the parts of the cannabis plant used. In fact, even a company selling vaporisers online warns that not all studies on cannabis vapour have been conducted with the required scientific rigor and that results from such tests vary significantly. For example, one study which sampled over 6000 people in an online survey found that those who used vaporisers reported fewer respiratory symptoms than those who used bongs or joints. The researchers however, raised "several important limitations" of the study including internet reporting, as well as that in order to find regular cannabis users, they had to target people with a "potential interest in changing cannabis policy" which may inject bias into the results. In addition, the researchers speculated that vaporiser users often spend a lot of money on the devices in an effort to minimise respiratory harms from their cannabis use and are therefore more likely to "minimize reports of their respiratory symptoms, consciously or inadvertently, in an effort to justify their actions."

is using a vaporiser a 'safe' way to smoke cannabis?

Despite results from some studies appearing to show lower levels of by-products, carcinogenic chemicals and noxious waste by-products such as PAHs in cannabis vapour as opposed to smoke, there is no 'safe' way of inhaling cannabis. Any inhalation of cannabis vapour will cause bronchial irritation to some degree and will expose the user to chemicals and by-products associated with heating cannabis. As stated earlier, toxic levels of ammonia were found in cannabis vapour, and at far higher concentrations than in cannabis smoke. Eating cannabis in food or capsules or drinking it as a tea or in tinctures, are the only methods that completely remove the respiratory harms associated with inhaling cannabis smoke or vapour. These methods, however, can be risky also, as ingested cannabis can take over an hour to be absorbed and the user may take more than intended, which may give rise to unintended effects such as anxiety or panic reactions and an unpredictable period of intoxication.

No matter what method a person uses, they are still subject to risks associated with cannabis use, such as mental health problems, dependence, legal issues and diminished driving skills. Further research needs to be conducted in order to gain a clearer picture of the relative harms of vaporisers in comparison to other methods of administration.