

# Summary Report to Scientific Inhalations Regarding McFinn's Triple-Filtered Waterpipe With Pesticides

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## 1. Goal of the project

Scientific Inhalations has developed a unique inhalation device designed to provide an improved experience for its users over alternative devices. The device, named McFinn's Triple-Filtered Waterpipe, consists of a glass bubbler and has two chambers containing different filter materials. The first chamber is filled with activated virgin coconut carbon and connected between the bowl and the water trap. The second filter contains organic cotton and is connected between the inhalation device and the mouth piece.

The present study was motivated by the necessity to evaluate the risks of pesticide exposure to medical cannabis patients. The current medical cannabis supply lacks regulation on plant material preparation, treatment, and processing and the issue has been brought to attention as analysis of various samples from medical supply sources have shown positive results for the presence of pesticides [unpublished results]. Since medical cannabis products are currently grown and prepared by numerous entities subject to no regulatory oversight, there is a potential risk that toxic levels of pesticide residues may be unknowingly consumed by patients. Although not yet directly quantified, additional health complications in patients may be a contingency of pesticide exposure. The primary goal of this study was to analyze to what extent pesticide residues may transfer into the smoke stream produced from cannabis when inhaled through McFinn's Triple-Filtered Waterpipe and other comparable smoking devices commonly used by medical cannabis patients.

Previous studies conducted with tobacco cigarettes have positively identified the transfer of pesticides such as pyrethroid residues into the smoke stream around 2-16%. Being there is a significant lack of regulations set in place for the medical cannabis supply, it is important that the potential for pesticide exposure is evaluated under the conditions the common cannabis user may experience. In order to determine the existence of pesticide residues in the cannabis smoke stream, a number of pesticides, which are readily available to the public and have a potential to be used by cannabis growers, were selected for the study. The pesticides include various insecticides, miticides, and acaricides, which are listed in Table 1. The smoking devices, which include a standard small glass pipe, McFinn's Triple-Filtered Waterpipe without filters, and McFinn's Triple-Filtered Waterpipe with filters installed as recommended by the manufacturer, were chosen to represent a generalized data set for standard smoking conditions as well as to evaluate the effectiveness of the McFinn's Triple-Filtered Waterpipe in removing pesticide residues present in the smoke stream.

## 2. Material and methods

A laboratory setup was constructed in which the mouthpiece of the smoking device was fixed to tubing leading to a cold trap containing an organic solvent at low temperature. Inhalations were simulated using a vacuum pump and timed valve. The settings were made such as to represent the smoking behaviour of a typical adult person.



The material used for this study was a single batch of medical cannabis which was prepared for use by applying ~750µg of each pesticide, diluted in acetonitrile (all pesticides adjusted for purity) one at a time to 5 separate sample lots containing ~2.3g of cannabis in round bottomed flasks. Each addition of pesticide was then mixed and partially evaporated to ensure the samples were homogenized. Each batch contained 4-5 pesticides and once all were introduced into the material, the samples were evaporated for an additional 20 minutes to further homogenize and dry the samples. The smoking procedure was carried out by passing the flame of a standard lighter over the plant material for 2 seconds at 30 second intervals while a slight vacuum was applied to the selected inhalation device.

### 3. Results

The relative amounts of pesticide residue recovery from each of the smoking devices are presented below in Figure 1. Table 1 presents the relative percentages of pesticide recovery from the smoke stream with respect to the amount of plant material used in the experiment.

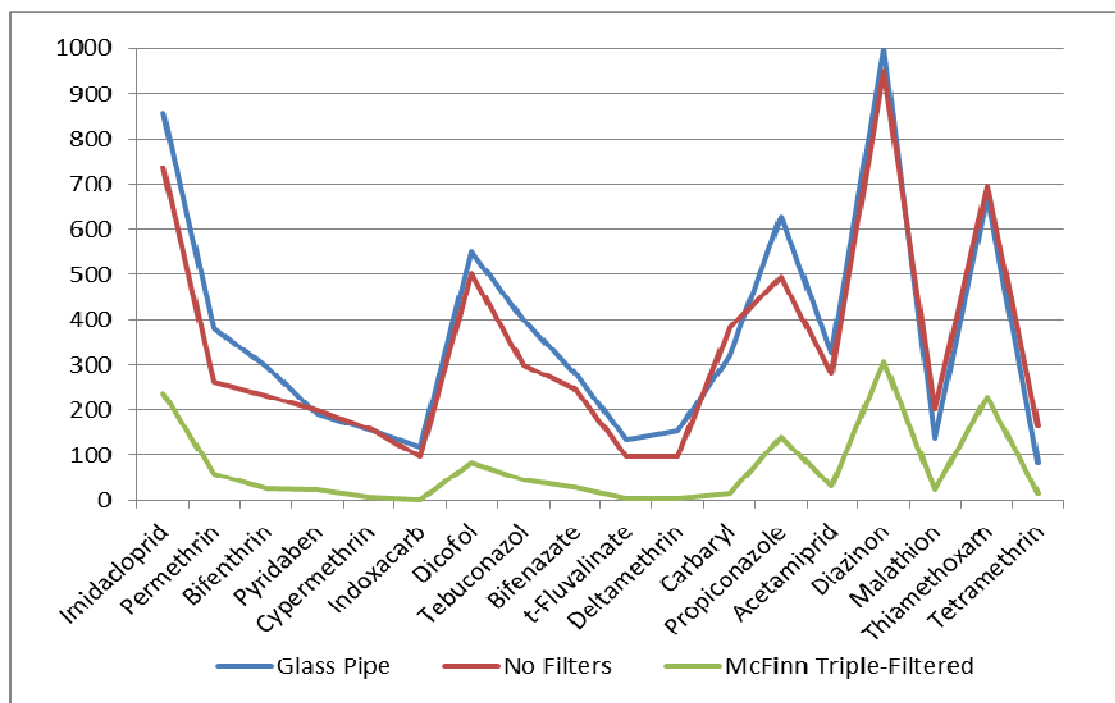


Figure 1: Comparative total recovery of pesticide residues from the “would be inhaled” smoke stream between the three devices.

The results show a relatively large difference in recovery of residues between the different pesticides. This is due primarily to the stability of each compound and to what extent degradation occurs under the heated conditions along the length of the device. Between the different devices used, it is clearly evident that McDFinn's Triple-Filtered Waterpipe with the cotton filters and activated virgin coconut carbon has a significantly lower recovery of pesticides residues remaining in the would-be inhaled smoke stream.



Table 1: Percent recovery of pesticide residues in would-be inhaled smoke stream

Pesticide	Smoking Device		
	Glass Pipe	No Filters	McFinn's Triple-Filtered Waterpipe
Imidacloprid	51.4%	47.6%	15.2%
Permethrin	52.3%	38.9%	8.5%
Bifenthrin	74.8%	60.3%	6.1%
Pyridaben	95.0%	51.6%	4.4%
Cypermethrin	54.0%	41.5%	1.1%
Indoxacarb	15.5%	25.0%	0.7%
t-Fluvalinate	15.5%	10.6%	0.3%
Deltamethrin	25.2%	15.1%	0.4%
Carbaryl	11.4%	14.3%	0.5%
Propiconazole	53.1%	43.4%	11.8%
Acetamiprid	45.6%	41.0%	4.4%
Dicofol	74.8%	64.4%	7.5%
Diazinon	37.7%	40.2%	12.1%
Malathion	38.6%	64.4%	7.2%
Thiamethoxam	57.2%	66.5%	20.4%
Tetramethrin	46.6%	71.9%	8.9%
Bifenazate	54.0%	44.7%	3.7%
Tebuconazol	95.0%	66.8%	7.0%

#### 4. Conclusions and Remarks

This study clearly shows that McFinn's Triple-Filtered Waterpipe inhalation device does filter out and reduce exposure to a number of pesticides that may be found in the stream of medical cannabis smoke vapor. McFinn's Triple-Filtered Waterpipe removed more pesticides in the smoke stream than a non-filtered waterpipe and a small hand-held glass pipe with similar levels of use.

Between the three devices used, the relative recovery of pesticide residues in the smoke stream ranged from 11.4% - 95.0% recovery from the glass pipe, 10.6% - 71.9% from the Waterpipe without filters, and 0.3% - 20.4% from McFinn's Triple-Filtered Waterpipe with filters. The recovery levels from the unfiltered devices were alarmingly high, demonstrating the resilience of pesticides to heat degradation.

When considering your medication and what it may be doing to your overall health, it is also important to consider exactly what you may, and may not, want to ingest. Utilization of filtered inhalation devices can offer reduction in the consumption of harmful contaminants that may be found on medical cannabis.





## Appendix 1. Instruction Manual for McFinn's Triple-Filtered Waterpipe

# Welcome to the New Standard in Smoking Filtration by Scientific Inhalations

McFinn's Triple-Filtered Water Pipe kit comes with an 18mm glass bubbler, two glass filter tubes (either Standard or Ultra), a mouth piece, a bowl, two pics, plus one container of Activated Virgin Coconut Carbon and one container of Organic Cotton.

## Instructions

1. Pour cold water into bubbler until you reach the "water line".
2. Fill one glass filter tube with Activated Virgin Coconut Carbon leaving approximately 1/4" of airspace between the bottom of the joint frost and the Activated Virgin Coconut Carbon.
3. Place glass filter tube with Activated Virgin Coconut Carbon into female joint at the top of the bubbler making sure it is securely connected.
4. Place the glass bowl into the female joint that is on the top of the glass filter tube with Activated Virgin Coconut Carbon making sure it is securely connected.
5. Take one Organic Cotton ball, break it into half if your water pipe came with Ultra glass filters, break it into thirds if your water pipe came with Standard glass filters. Unroll the Organic Cotton so as to loosen it to help get a good draw.
6. Take your pic and push the Organic Cotton into the second glass filter tube making sure that it is loose. (DO NOT PACK THE COTTON INTO THE TUBE.)
7. Place the glass filter tube with Organic Cotton into the female joint in the arm on the side of the bubbler making sure it is securely connected.
8. Place the mouth piece into the female joint on the top of the glass filter with Organic Cotton making sure it is securely connected.
9. Start off with very small inhalations and over time you will determine how much of a draw you can take.

Over time you will find what your personal needs are with regard to how often to change your carbon, cotton, and water but we suggest you change your Activated Virgin Coconut Carbon when you notice that the cresol/tar has covered the carbons (approximately 100 inhalations); and to change your Organic Cotton when you notice that the cotton is turning a brownish color.

We also suggest that you get into the habit of changing your water in the

water pipe at the same time that you replace your Organic Cotton as the filtration works so well that your water will continue to look clean even when there are impurities within.

As for washing your water pipe simply rinse it with rubbing alcohol and warm water or use a commercial cleaner found at your local smoke shop.

Most Importantly –

**Enjoy! Your Health is Your Wealth!**

