

# VAPING OF ELECTRONIC CIGARETTES

Cigarette smoke contains thousands of chemical compounds many of which are very toxic and some even carcinogenic.

The harmful effects of smoking on humans are well-known and already for years there is has been growing pressure by the Health Ministries to persuade adults to stop smoking and convince youngsters not to start smoking.

In 2003, the Chinese pharmacist Hon Like has invented an alternative to the use of tobacco cigarettes by “evaporation” of a solution containing aromatic products and of which the smoke can be inhaled.

This invention was the start of the “**e-cigarette**” and of “**vaping**”, which now has a tremendous commercial success as an alternative to tobacco cigarettes.

According to the producers of electronic cigarettes, there are (contrary to the smoke of tobacco) “no harmful products” in the inhaled (and exhaled) smoke, and “vaping” is hence “not unhealthy”.

The e-cigarette industry has made vaping even more popular by adding attractive fruity aromas to the liquid which is vaporized.

**The result is that more and more youngsters are starting to vape, even as early as 12 years of age!**

## E-CIGARETTE SMOKE : HARMFUL OR NOT ?

The statement that the smoke of vaping is not harmful for health can be contested for several reasons.

First of all, the liquid of electronic cigarettes also contains “nicotine”, and it is well-known that nicotine is at the basis of the addiction to smoking.

The question is hence if “addiction” will not also be the ultimate consequence for those who are vaping daily...

Besides nicotine, the smoke of e-cigarettes also contains several other compounds such as propylene glycol, glycerols and aldehydes which can irritate or damage the respiratory tract.

The Superior Health Councils in many countries now warn more and more that vaping “is not without risk and even potentially harmful”.

## DETERMINATION OF THE EFFECTS OF THE SMOKE OF E-CIGARETTES

The “direct” determination of the possible effects of the smoke of electronic cigarettes is (as this is also the case for the smoke of tobacco cigarettes) very difficult.

In the USA in 1990, this incited the research team of Professor Drewes to develop an experiment on “a living organism” to determine the effects of chemical compounds.

The selected test species is the small worm *Lumbriculus variegatus*, with a length of 5-6 cm, and very slim (a width of 1-1.5 mm), well-known under the common name “blackworm”.

The interest of the American research group for blackworms is that these organisms show a remarkable behavior pattern when they are “touched”.



Touching of the head or the anterior segments with the tip of a needle immediately elicits a contraction. When the posterior segments are touched, the worms escape “in a flash” in a “zigzag” movement.

The team of Prof. Drewes also performed in this regard experiments with “nicotine” (the cause of addiction to smokers of tobacco cigarettes), with exposure of blackworms to pure nicotine dissolved in water.

It was found that in the solutions of nicotine the worms only react slowly (or not at all) to stimulation of the head or the tail.

**Nicotine** is not only an important component of the smoke of tobacco cigarettes, but it is actually also “**the major component**” of the smoke of electronic cigarettes!

No research has been thus far performed on the effects of the smoke of vaping on blackworms (and neither on other organisms), so it was hence decided to examine “their behavior” when exposed to vaping smoke.

The interesting findings of these investigations subsequently triggered the development of an “ANTI-VAPING” kit, for performance of simple tests in schools.

## **DEVELOPMENT OF AN ANTI-SMOKING EDUKIT3 – SMOKE OF E-CIGARETTES**

The concept of the ANTI-VAPING kit is similar to that of the ANTI-SMOKING EDUKIT1 – *CIGARETTE SMOKE* (which shows the effects of the smoke of tobacco cigarettes on the cilia of a ciliated protozoan), namely by blowing vape smoke in a tube filled with tap water.

The chemical compounds in the vape smoke dissolve in water, and a small volume of the vape water is then transferred with a pipette in a small transparent container in which one worm had first been introduced.

### **OBSERVATIONS**

After a short time of exposure (5 minutes), the head and the tail of the blackworm are stimulated with the tip of a needle, and the “behavior” of the organism in the container with vape water is analysed and compared to the behavior of a worm in a control container in tap water.

The worm probing will show that in the control container the blackworm will react immediately and escape, whereas in the container with vape water the worm is virtually “paralysed” and reacts very slowly (or not at all) to the stimulation.

Additional experiments can be performed on the “blood pulsation” of the blackworms, by analysis under the microscope on a glass slide.

The investigation will show that exposure to vape smoke substantially decreases blood pulsation (by paralysis of nerve and muscular activity).

The concentration of nicotine is indicated on all commercial packages, and one can therefore also perform in parallel an additional experiment with an electronic cigarette from a package with “0 nicotine”.

The experiment with “0 nicotine” in the electronic cigarette will show that, contrary to tests with vape water from e-cigarettes containing nicotine, the blackworms are “not immobilized” (= not paralysed).

This test is a clear proof that **the nicotine in the vape is inducing the paralytic effect to the blackworms.**

## CONCLUSIONS

The findings of the ANTI-VAPING test are an explicit proof that **vaping** has harmful effects on the health of “a living organism”, and by extrapolation also **on humans**.

The message of the  
ANTI-SMOKING EDUKIT3 – *SMOKE OF E-CIGARETTES*

is unquestionably:

**VAPING**

**is harmful for health!**