

CIGARETTES WHAT'S IN CIGARETTES

The Ingredients

Cigarette smoke contains over 4000 different substances.¹ Many of these substances occur naturally in the tobacco plant and include gases, chemicals, metals and even radioactive compounds. Of all these substances, only tar, nicotine and carbon monoxide are regularly measured in Australian cigarettes. The tobacco companies have agreed with the Australian Government to keep the amount of these substances present in cigarettes within set limits. However there is no safe cigarette and no safe level of smoking.² Tobacco also has various things added to it. While it is growing, pesticides are used. When cigarettes are being made, the tobacco is treated with flavourings and other chemicals. The filter and cigarette paper wrapped around the tobacco also contain many chemicals. In fact, cigarettes are a lot like a toxic chemical factory. This TAP unit looks at what's in cigarettes.

Tar

Tar is the name given to the sticky yellow-brown substance that stains the smoker's fingers, teeth and lungs. If you look at a cigarette butt, you will see that the filter is stained brown as well. Tar is made up of many gases and chemicals, including substances known to cause cancer.¹ New regulations on tobacco labelling have limited the amount of tar in cigarettes to 16 milligrams.²

Nicotine

Nicotine is a powerful drug that occurs naturally in the tobacco plant. Like heroin and cocaine, nicotine is addictive.³ Nicotine affects the body in a number of ways. Depending how she/he feels at the time, smoking can stimulate or relax the smoker. This is because nicotine affects brain and muscle activity. Nicotine increases blood pressure, making the heart work harder, and tightens the blood vessels, slowing down blood supply to the skin and making skin temperature drop. Stomach secretions are also altered, and nicotine is thought to be involved in the development of ulcers. Nicotine is involved in the development of heart disease, fertility problems and cancer. Nicotine also affects appetite and the way the body uses energy.³

In large quantities, nicotine is very poisonous. Nicotine poisoning was once fairly common, as nicotine was used in insecticides during the 1920s and 1930s, but it is not seen often these days.⁴ However little children who accidentally eat cigarettes or butts can become very sick.⁵

Because nicotine is so dangerous, its manufacture, use, advertising and sale are controlled by state government regulations. For example nicotine gum, which some smokers find helpful in quitting smoking, can only be bought at a pharmacy. However nicotine when used in tobacco products does not have to comply with these rules, despite the fact that cigarettes deliver higher levels of nicotine than either gum or patches.^{6, 7, 8} Tobacco labelling regulations state that cigarettes will not contain more than 1.5 milligrams of nicotine per cigarette.²

Carbon Monoxide

Carbon monoxide is a gas found in cigarette smoke. You cannot see it, smell it or taste it, but in large amounts it kills quickly. Carbon monoxide is also found in car exhaust fumes. When carbon monoxide enters the blood, it takes the place of oxygen, cutting down oxygen supply to the body. Along with nicotine, it is involved in causing heart disease.⁹ Carbon monoxide can also affect your night vision, and slows down response time.^{10, 11} The maximum amount of carbon monoxide allowed in Australian cigarettes is 20 milligrams per cigarette.²

Hydrogen Cyanide, Ammonia and Formaldehyde

These gases are found in cigarette smoke and damage the tiny hairs (cilia) which act as brushes to clean the lungs. When the lungs' cleaning system stops working properly, poisons collect in the lungs and airways, which leads to infection and disease.¹² Other gases in cigarette smoke that damage the cilia are ammonia and formaldehyde.¹³ Ammonia is a strong chemical sometimes found in household cleaners, and a common use for formaldehyde is as a way of preserving the organs of dead people in morgues.

Metals

Seventy-six different metals have been found in cigarettes, including arsenic, cadmium and nickel.¹⁴

Radioactive Compounds

Radioactive compounds have been known, for a long time, to cause cancer. Those found in highest concentration in cigarette smoke are polonium-210 and potassium-40.¹⁴

Other poisonous chemicals

Other chemicals found in tobacco smoke include acetone (used in nail polish remover), naphthalene (used in mothballs), phenol (used in disinfectant), acetic acid (found in vinegar), methanol (rocket fuel) and toluene (industrial solvent).¹⁵

Pesticides and additives

A wide range of chemicals, including herbicides, fungicides and insecticides is used in tobacco farming.¹⁶ Australian cigarettes have contained high levels of pesticide residues in the past. In 1981, tests showed that they contained 43 times more DDT and 30 times more dieldrin than British or American cigarettes.¹⁷ Although these pesticides are no longer in use on tobacco crops, the residues last for a long time, and are still found in the soil and water of some of the tobacco growing areas in Victoria.¹⁸

When cigarettes are being made many other chemicals are added, including chemicals that keep the cigarette burning, and different kinds of flavours.¹⁹

Some overseas countries have introduced laws about the amount and type of agricultural chemicals, flavourings and additives which can be present in cigarettes.^{20, 21} Australia has no laws about these, but has a voluntary agreement with the tobacco industry on the levels of tar, carbon monoxide and nicotine.

A report released by the organisation Action on Smoking and Health in the United Kingdom looks at what some of the additives in cigarettes are intended to do, using information from tobacco industry secret documents. To mask the harsh and bitter taste of nicotine, sugar is commonly added, as well as honey, liquorice, cocoa and chocolate liquor. These sweeteners lessen the harshness of the smoke, making it easier for the industry to recruit new smokers, most of whom are children.

But additives may serve a darker purpose than just flavouring. When sugar is burned, some of it turns into acetaldehyde, which acts to make nicotine more addictive. Nicotine levulinate and levulinic acid change the chemistry of smokers' brains to make them more receptive to nicotine. Chemicals in liquorice and cocoa act to open the airways, so that more nicotine and tar goes deeper into smokers' lungs.

Treatment with ammonia alters the form of some of the nicotine, making it more readily absorbed into the body, through cigarette smoke. In this way, smokers can get a higher level of nicotine from low tar or "light" cigarettes than they suspect. The nicotine level on the packet doesn't measure the level of this form of nicotine, and can't take into account the changes to smokers' bodies from other additives.

Recently, the tobacco companies operating in Australia, agreed to make public a list of the additives they add to their cigarettes. This list is available on a Commonwealth Government website at www.health.gov.au/internet/wcms/publishing.nsf/content/health-publth-strateg-drugs-tobacco-disclosure.htm. It would appear, to make these additives seem ordinary and harmless, the companies also listed in which foods these chemicals can be found. However this is misleading. Firstly the chemicals in cigarettes may change into different, and possibly toxic chemicals when they are burned: for example, liquorice, a cigarette additive, produces a cancer causing chemical when burnt. Secondly, whereas stomachs have powerful enzymes and can detoxify certain amounts of harmful substances, lungs are more delicate and do not have similar ways of reducing the harm of poisonous substances. This means that additives could be significantly more toxic when burned and inhaled, than when eaten.²²

There are a number of important issues surrounding cigarette additives:

1. They are used to make smoking easier and more appealing to children
2. They boost the amount of nicotine absorbed by smokers' bodies, without informing the smoker via labelling, and
3. They are added without consideration of the long term health consequences to smokers.

Some smokers become confused, believing that it is solely the additives that are harmful to their health, not the tobacco. But don't be fooled - it is smoking the tobacco itself that results in addiction and gives rise to tobacco-related diseases, suffering, disability and death.

What's in cigarettes - Activities

- 1 Conduct a survey to find out what people know about the substances found in cigarettes. Do smokers know more about what's in cigarettes than non-smokers?
- 2 Why do you think that tobacco products are not included in the state government poisons regulations? (You might find that *TAP 1: Tobacco* provides some further background.)
- 3 Create a 'product' which contains some of the substances found in cigarettes. Do you think people would like to buy it? Survey a range of people to see if they would buy such a product and if they think it should be readily available in a variety of shops.

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