

Product Testing Toilet Cleaners



The Association of Conscious Consumers has tested 30 eco and ordinary acidic toilet cleaning gels in a laboratory. What is the relationship between ingredients, acidity and cleaning efficiency? Can a toilet cleaner be efficient and environmentally friendly? We were looking for answers to these questions.

Toilet cleaning gels are supposed to remove limescale deposits from the toilet bowl and eliminate unpleasant odors – besides doing the general cleaning of the toilet. There are basically two types of toilet cleaners, acidic and alkaline. Both types have good hygiene and cleaning properties and are most often sold in a sloping neck bottle typical of toilet cleaners. But still...always read the label carefully. If you have any chlorine-based bleach or sodium hypochlorite component in the product, it is certainly the alkaline type. In our test, we examined acidic cleaners that are particularly suitable for dissolving scale and uric scale-like deposits. It is important **not to use alkaline and acidic toilet cleaners at the same time**, as these can cause a chemical reaction that produces very dangerous gases that are harmful to health.

What are the ingredients of acidic toilet cleaners, and can they be environmentally friendly?

So, if you want to remove limescale, you'll need some kind of acid, besides, toilet cleaners contain surfactants to tackle other surface contaminants. Anionic surfactants are particularly effective in cleaning oily contaminants. Nonionic surfactants are excellent degreasers and cationic surfactants are used for disinfection / sanitation. In addition, fragrances can be found in toilet cleaners, which have no cleaning effect, but at least add the illusion of purity to the

value of the product. In the table below, the ingredients listed on the plastic bottles of the tested products are classified into different categories. Colors refer to the **hazard classification** of substances, which can be found in the database of the European Chemicals Agency (ECHA). The red ones are harmful to the environment and / or health, the orange ones should be treated with caution, and the green ones have no known harmful effects.

Acid	Surface active agent	Fragrance
Sav	Felületaktív anyag	Illatanyag
sósav (hydrochloric acid)	PEG-2 oleamine	R-(p)-mentha-1,8-diene (limonén)
hangyasav (formic acid)	cetrimonium chloride	amyl cinnamal
citromsav (citric acid)	benzalkónium-klorid (C12-18)	citral
tejsav (lactic acid)		
ecetsav (acetic acid)		
szulfaminsav (sulphamidic acid)		
foszforsav (phosphoric acid)		
benzolszulfonsav (benzenesulfonic acid)		

A household cleaning agent can be claimed to be environmentally friendly if its ingredients do not harm the environment in the short or long term and if they do not accumulate but decompose in nature (in the case of toilet cleaners: when reaching wastewater).

Ecolabelled toilet cleaners (product qualified by an authentic third party) are available on the market, just like [hand dishwashing detergents](#), [washing powders](#), [liquid laundry detergents](#) and [all-purpose cleaning products](#) that we have tested so far. The reliability of the [EU Ecolabel](#) is guaranteed by criteria set by the European Commission and certification by **independent bodies**, which require products to have significantly lower environmental impacts than products with a similar purpose throughout their entire life cycle. The [EU Ecolabel criteria](#) set for hard surface cleaners, including acidic toilet cleaners, cover, inter alia, the toxicity to aquatic organisms and biodegradability of the components, the sourcing of palm oil and its derivatives from sustainable farming and the suitability for use of the products.

What did we examine?

In our test we used the [protocol](#) prescribed by the EU Ecolabel. In the laboratory study, we first focused on the most stubborn enemy of toilet ceramics, **limescale**. Tiny marble tiles - i.e. lime - were used for the test, they embody the limestone. First, the weight of the marble tiles was measured very accurately, then immersed in the toilet cleaning liquid for 10 seconds, and then allowed to stand for 10 minutes on a horizontal surface from which the liquid could drip freely. After the exposure, the marble tiles were rinsed off with water, dried and weighed again. Weight loss shows how much limescale the toilet cleaner has dissolved. (Lesson learnt: do not spray toilet cleaner on the marble floor...) The results of the limescale removal efficiency were given by the average of three measurements. The difference between the results is significant: the best products remove about eight times the amount of lime compared to the worst products in the same amount of time.



For the measurements we used gloss limestone tiles from Süttő, Gazdabánya, size 150x75x10mm.

In addition, we observed and recorded the color, odor, texture of the products, measured their density, pH, acidity, effect on porcelain surfaces, and thermal stability. The latter two were needed to see if the agents could damage the porcelain toilet bowl itself and to find out if it was dangerous to keep the plastic bottle in a stuffy bathroom on hot summer days, for example. The measured values can be found in the data sheet of each product.

To measure the effect on the porcelain surface, drops of approximately 1 g were placed on a porcelain plate, which were wiped off after 24 hours and the surface of the plate was examined. No change was observed in any of the products, the color and lustre of the porcelain did not change.



A “Beatrice” white porcelain plate (from Alföld, the Great Plain in Hungary) was used to study the surface effect.

Thermal stability was tested at 40°C, and after 14 days no precipitation or change in texture was observed. Safety information, warnings and instructions for use can be found on the labels of all products, although in four cases they were not provided in Hungarian: Sodasan, Tierra Verde, Bio-D, Almawin. Our table also shows the availability of refills, which is fortunately available for more and more products and helps reduce the amount of plastic waste.

How did we score?

The result obtained for efficacy was converted to a scale of one hundred, so that the most effective agent was given 100 points, while the rest of the agents were given their initial scores based on the highest score. This value is **weighted by the number associated with the hazard label**: a multiplier of 0.4 for "corrosive" and 0.8 for "irritant". Thus, we “penalized” the use of substances that are harmful to the environment and health, and we obtained the final scores, based on which the order of the agents in our table was formed.



You see the hazard label for irritant effect on the left and corrosive effect on the right.

Summary of test results

In our view, the best is to consider in each individual case whether it is at all necessary to use a chemical for a particular task and, if you decide that it is necessary, the best is to choose the lightest possible agent that still performs the task.

Below, we'll give you useful tips on how to reduce the amount of detergent you need while keeping your toilet clean and hygienic.

So let's see what the Association of Conscious Consumers recommend you to keep your toilet clean! According to the European Chemicals Agency, there is only one type of acid among all toilet cleaning ingredients that does not pose any risk, and that is **citric acid**. According to their safety data sheet, the active ingredient of the following products is citric acid – and nothing else! **Domestos Professional Eco, Seventh Generation, Denkmit nature, L'Arbre Vert, Sodasan Citrus, Go for Expert (Tesco), Tierra Verde, Ecover, Green emotion.**

There are no negative environmental effects associated with two more active ingredients: **acetic acid** and **lactic acid**. But they do pose a risk to your health, so be very careful when using them! According to their safety data sheets, they can be found in the following toilet cleaners: **Blink Naturelle, Zöldlomb, Winni's Naturel, Cycle, Frosch, Ajax, Bio-D, Bref ProNature, Almawin, Glanc.**

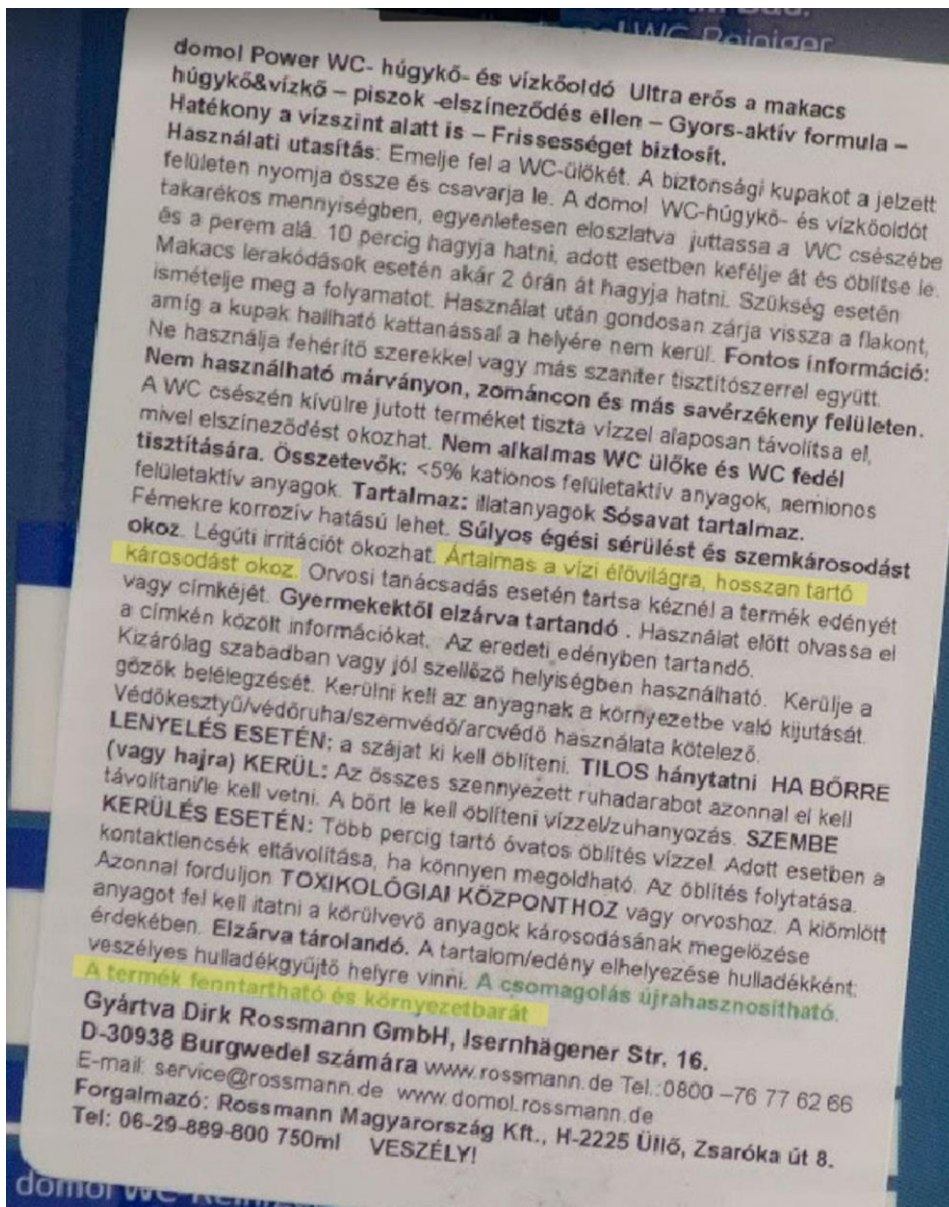
Efficacy studies have shown that hydrochloric acid is the most effective at removing limescale, but its use is not recommended due to its harsh environmental and health effects. Yes, you could say that chlorine is also used to disinfect drinking water and wastewater, and you have it in your stomach too, so it surely is not harmful and, eventually, it will form salt anyway...We have heard these arguments so many times!

But please note that the following serious precautionary statements apply to **hydrochloric acid** and products containing hydrochloric acid. This agent causes severe skin burns and eye damage, it is toxic by inhalation, it may damage fertility or cause harm to the fetus, may cause serious eye damage, may cause damage to organs through prolonged or repeated exposure, may be corrosive to metals and cause respiratory irritation, it is harmful to aquatic life with long lasting effects. We must avoid releasing this agent to the environment. So many, horrible types of possible damage! This is one of the reasons why agents containing hydrochloric acid should be avoided. The other reason is the accumulation and aggregation of the various (negative) effects. If everyone uses only a little and only a little bit of everything, think about how much of that many little things will be in nature or in the human body at the end. We do have reservations about **formic acid** (H_2CO_2) too, the second most effective limescale remover of our test, which is one of the active ingredients in the test-winning product, **Denkmit Multi-Power Toilet Cleaner**. Formic acid is chlorine-free and contains only hydrogen, oxygen, and carbon atoms. It may seem harmless at first glance, yet it contains the following safety warnings: toxic by inhalation, damages organs, it is flammable liquid and vapor, harmful if swallowed, and causes serious eye damage. And what worries us is that the European Chemicals Agency is **currently investigating** the suspicion that formic acid damages the hormonal system (endocrine disruptor, EDC). The hormonal system, also known as the endocrine system, regulates many of our physiological functions, including

reproduction, metabolism, sleep, growth, the response to stress, and the immune system. Before we get the results of the European Chemicals Agency test, we cannot recommend you the test-winner product in good conscience. So if you want to make a conscious decision when shopping, we recommend the second and third place products, which also perform well and contain citric acid.

Sustainable and causing long-term environmental damage?

The obligation to issue safety warnings is regulated by law, while there is no similar requirement for green claims. We would like to highlight the discrepancy found on the label of Domol Power Toilet Cleaner. On the Hungarian label, the warning phrases state that it is "Harmful to aquatic life with long lasting damaging effects." Then, highlighted in green at the bottom of the label is: "The product is sustainable and environmentally friendly." Under no circumstances should we choose a product with such harsh effects and contradictory information!



Tips for Conscious Consumers

The pH of **10% household vinegar** is 2.3, 20% vinegar is not far from that, and you can prepare your own **citric acid solution** at home (dissolve 1-2 teaspoons of citric acid in 100 ml of water), whose pH is also in this range. In addition, we had proved in our previous article that in terms of disinfection vinegar is just as strong as the commercial agents are. I think, by now, you have figured out what we are suggesting to you...

If, however, you insist on in-store products, we would recommend **environmentally friendly products** that perform reliably. The test results of the green goods are summarized in the table below.

	Toilet cleaner	Test results	Descaling effect (g)	Acid active ingredient	Packaging (ml)	Price (HUF)	Ecolabel
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	WC tisztító	Teszt-eredmény	Vízköoldó hatás (g)	Sav hatóanyag	Kiszereles (ml)	Ár (Ft)	Ökocímke
	Domestos Professional Eco	55	0,43	citromsav	750	925	Ecolabel
	Seventh Generation Pine&Sage	50	0,49	citromsav	500	899	Ecolabel
	Zöldlomb Ecetes Öko	50	0,39	ecetsav, citromsav-monohidrát	750	499	Ecolabel
	Cycle	43	0,34	citromsav, ecetsav	500	990	Ecolabel
	Denkmit nature	40	0,31	citromsav	750	499	Ecolabel
	Frosch málnaecettel	40	0,31	ecetsav	1000	849	Ecolabel
	L'Arbre Vert	39	0,30	citromsav	750	1050	Ecolabel
	Bref ProNature grapefruit	31	0,24	ecetsav	750	699	Ecolabel
	Go for Expert Eco Friendly	29	0,29	citromsav-monohidrát	500	599	Ecolabel
	W5 Eco lemon	28	0,22	citromsav	700	549	Ecolabel
	Ecover óceán	21	0,17	citromsav	700	1109	Nordic Ecolabel
	Green emotion eukaliptusz	14	0,11	citromsav	750	885	Ecolabel



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Consumer Guide

By following these helpful tips, you can achieve maximum cleanliness with minimal use of chemicals in every part of your toilet bowl.



- **Use the toilet brush.** It is best to remove dirt immediately with the toilet brush: nothing dries and odors disappear.
- **Apply it under the rim too.** Best is to choose a brush that has a small special side brush, the bristles of which fit under the rim of the toilet bowl. Such a tool, called a toilet brush with rim cleaner/bristles, can be obtained in several places for as little as HUF 500-1000.
- **Hygienically clean.** In advertising, some manufacturers take advantage of our fear of bacteria. Just ignore those ads! Disinfectant cleaning agents are not recommended for keeping your household clean on a daily basis. Especially not in the toilet bowl, with which the skin rarely comes in contact. A general cleaning

with a toilet brush and detergents without disinfectant additives can perfectly do the job.

- **Clean properly.** The toilet seat and external surfaces should be cleaned with general cleaning agents and rinsed off with a warm water cloth. Also clean the toilet brush handle this way.
- **Clean with few chemicals.** Those who use the toilet brush frequently need less chemical help to clean. Some manufacturers recommend that you use a toilet cleaner two to three times a week. This will certainly benefit the company's revenue, but not necessarily your wallet. Experiment with how often you need to use a cleanser. Depending on water hardness and how often you use the toilet, chemical cleansing may be enough weekly, sometimes even monthly – it is not our favorite pastime anyway.
- **Cleanliness should not be expensive.** Since most manufacturers do not give accurate dosing instructions, we need to estimate the optimal amount ourselves. General rule is that economical dosing protects both your wallet and the environment. You can save even more for yourself and your environment by using plain household vinegar or citric acid to clean your toilet.
- **Intensive cleaning with a long duration of action.** A heavy dose of limescale and urinary stones containing limescale do not necessarily require a larger dose of toilet cleaner! The solution often lies in a longer duration of action. Allow the acidic solution to act overnight and then scrub to remove the dirt.
- **It lasts longer on the vertical surface.** How can I prevent the toilet cleaner from dripping off the vertical walls too quickly? Pour the liquid onto the area most in need of treatment, then quickly put a piece of toilet paper on it. The concentrated cleaning solution then "sticks" and acts for a longer time. Then rinse and scrub the area.
- **Prevention with toilet flush.** Don't be too harsh on yourself when saving water. An adequate amount of rinsing water plays an important role in cleaning.
- **Be careful with chlorine.** Avoid toilet and sanitary cleaners containing hypochlorite. This way you can minimize the risk of these agents coming into contact with acid gels and producing toxic chlorine gas.
- **Accident prevention.** Always follow the warnings and safety instructions that you see on the packaging. Above all, protect your eyes from splashes – for example, with glasses or safety goggles.
- **Keep out of the reach of children.** Each toilet cleaner has a childproof lock. But don't underestimate the ingenuity of your offspring, with a little try, dexterity, and "luck," these curious little people are eventually able to open the bottles. All products that are labeled as "corrosive" and "irritant" must be kept out of the reach of children, so it is best to store them in a closed, high place, possibly in a cupboard.