

House Cleaning with EM



Powerful microscopic creatures keep your home and the environment clean

Do you know?

We humans are literally surrounded by a myriad of microorganisms.

They have the power to clean up polluted oceans and rivers.

They also break down dirt and odours in our everyday living.

Welcome Mother Nature's cleanup system into your home.

You can maintain and improve the cleanliness and health of your home with the help of these invisible microorganisms.

WHAT IS EM CLEANING?

EM (Effective Microorganisms) is a liquid blend of microorganisms such as lactic acid bacteria, yeast and photosynthetic bacteria that are beneficial to humans and the Earth. You can keep odours and dirt out of your home by using the multiple actions of these microorganisms, including the powers of organic acids produced by EM and the degradation and rectification powers of EM* itself.

*Rectification is an electrical engineering term referring to the conversion of alternating current to direct current. Here it refers to EM's ability to reorganise the flow of electrons.



Make your own Activated EM, an essential tool of EM cleaning

THE LONGER YOU USE, THE EASIER IT GETS!

As you continue to clean your home with EM, you will notice that the accumulation of dirt and dust and the recurrence of bad odours slow gradually. The longer you clean with EM, the easier cleaning gets. As EM is safe to use anywhere around your home, you can discover and create your own ways of using EM. As you EM-clean in and around your home more, your environment also benefits from EM's cleanup power.



Windows collect less dust and dirt when cleaned with EM.



Minimal cleaning tools for a tidier home.

GENTLE TO HANDS - ENJOY CLEANING WITH KIDS!

The greatest benefit of EM cleaning is the simplicity of cleaning tools. Most types of dirt can be dealt with a bottle of Activated EM solution and a bar of soap. There is no need for a mask, goggles or gloves for you don't need to use any harsh chemical products. You don't need to worry about your hands or children coming in contact with EM as it is gentle to human skin.

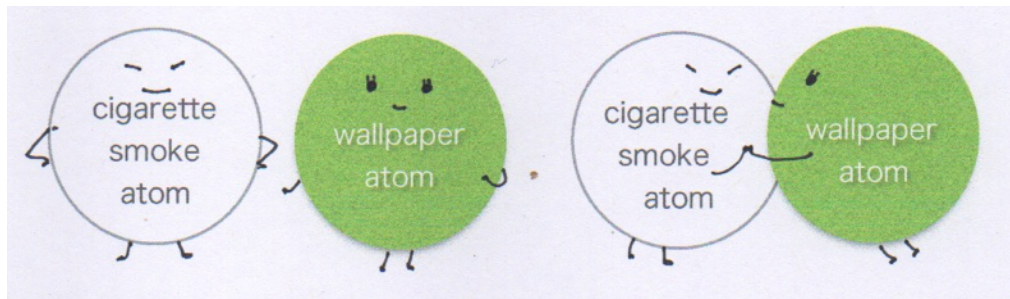
MECHANISMS OF DIRT ACCUMULATION AND EM CLEANING

EVERYTHING IS MADE OF ATOMS!

Everything in your home, including fabric, glass, timber, ceramic and metal objects, is made of atoms. Dirt and odours are also made of atoms.

The phenomenon of “getting dirty” can be explained as “atomic binding between things”.

For example, cigarette smoke atoms bind to wallpaper atoms.



When binding is strong, the smoke stain on the wall is hard to clean whereas it is easy to remove when binding is weak.

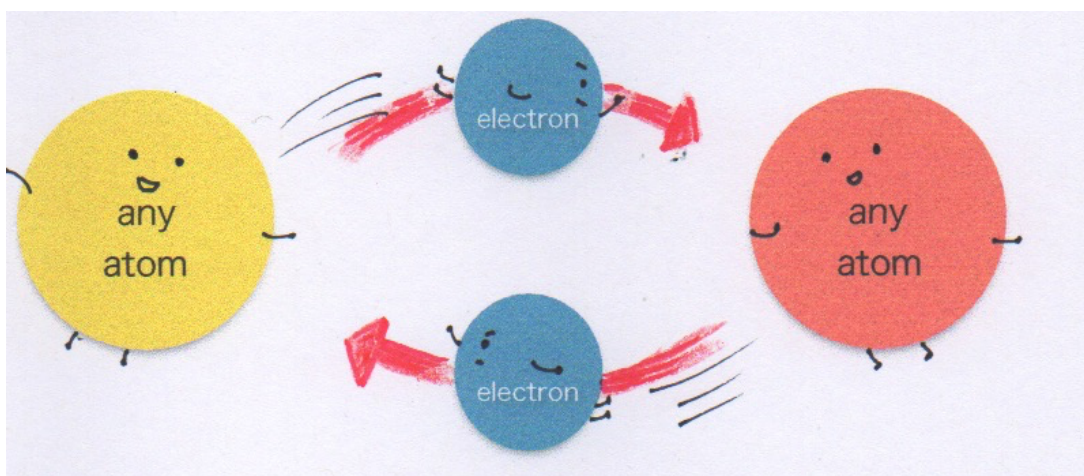
BINDING IS CAUSED BY THE ACTION OF ELECTRONS!

So what binds the atoms of different things?

It's the electron, one of the particles that make up every atom.

Electrons love moving about and attaching to and detaching from all sorts of things.

Atoms bind or separate when electrons enter, exit or travel between them.

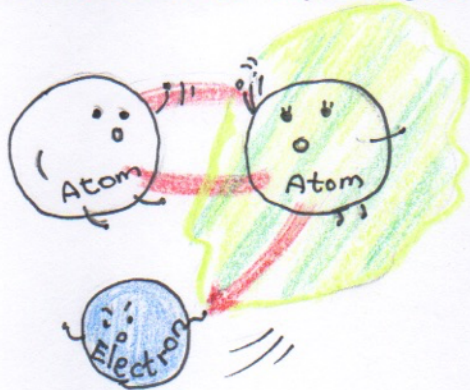


It results in one of two types of reaction. (1) Taking electrons from the other atom (oxidation). (2) Giving electrons to the other atom (anti-oxidation or reduction). A majority of dirt buildup is the result of the first type of reaction. EM combines multiple catalytic actions of living organisms and can respond to either type of reaction depending on the situation.

MECHANISMS OF DIRT ACCUMULATION AND EM CLEANING

MOVE ELECTRONS TO REMOVE DIRT!

“Dirt removal” means “separating bound atoms”.



So how we can move electrons?



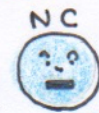
Use the power of electricity!



As electricity is either positively charged

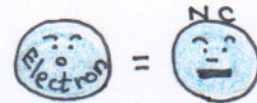


or negatively charged,

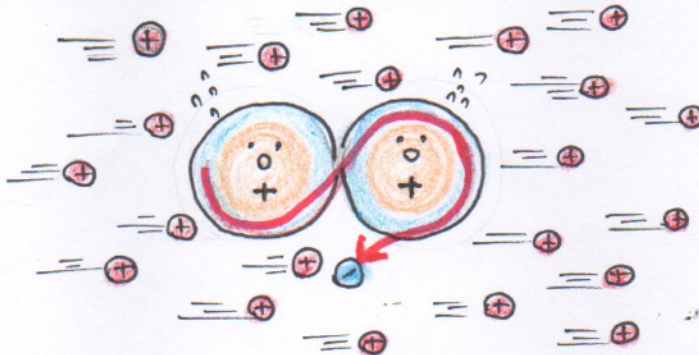


it creates a force to either attract or repel.

Let's say that the electron is negatively charged electricity.

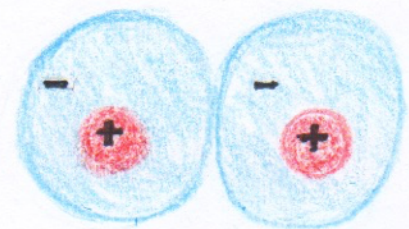


What happens if atoms are suddenly met by a strong surge of positively charged electricity?



The boundary between the negatively charged space of the atom and the surrounding positively charged surge fluctuates. As the negatively charged space is shaken and swayed, it becomes easily moveable. When “dirt” is disrupted by electrical fluctuation in the vicinity, it becomes more easily removable.

If we put on a special pair of glasses that can see the state of electricity...

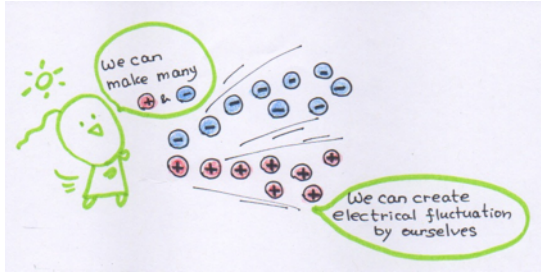


The atom looks like a positively charged space at the centre surrounded by a negatively charged space. The electron, the binder, is this negatively charged space itself.

How to produce electrical fluctuation?

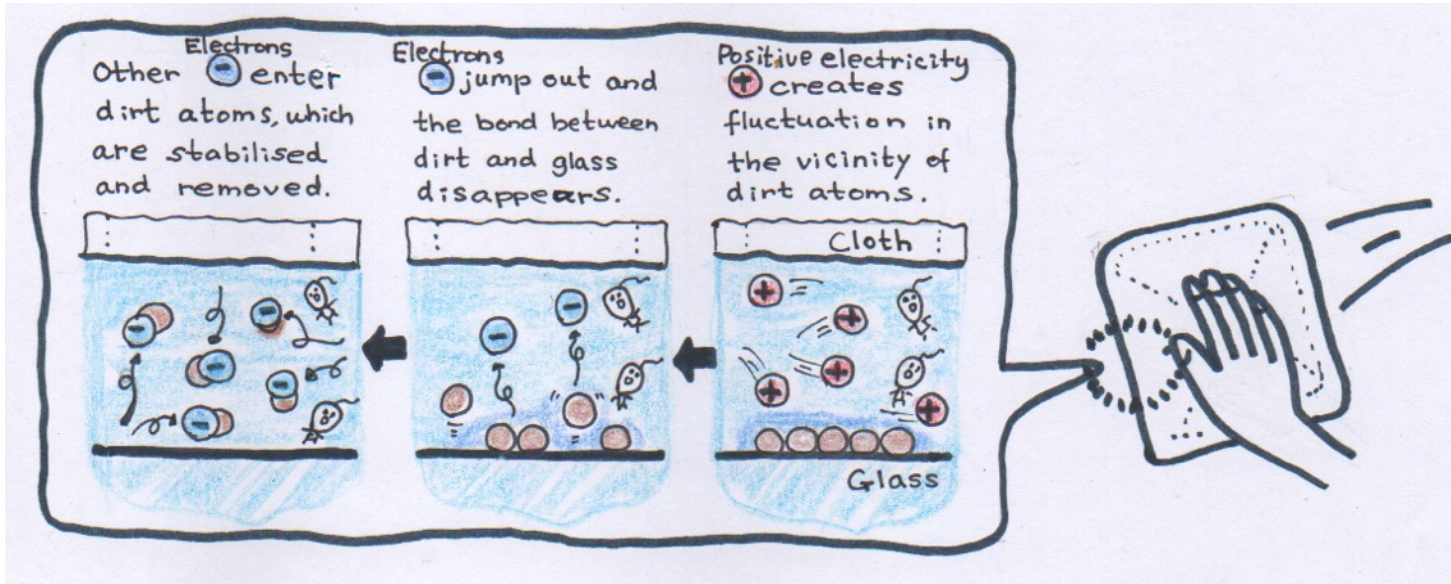
- (1) Use the power of acidity and alkalinity! - Used by most types of detergent.
- (2) Use the power of heat! - Dirt comes off more easily with hot water than cold water.
- (3) Use the power of microorganisms! - EM removes dirt without detergent.

EM CONTROLS POSITIVE AND NEGATIVE ELECTRICITY!



Photosynthetic bacteria in EM can extract positive and negative electricity from any usable material in the vicinity.

*Positive electricity means hydrogen ions.



There are two processes of dirt production - reduction and oxidation. The above describes an example of dirt produced by oxidation. The atoms of oxidative dirt lack negative electricity (electrons) and have excess positive electricity.

Positive electricity emitted by EM causes fluctuations in the vicinity of dirt atoms' boundaries and disperses dirt.

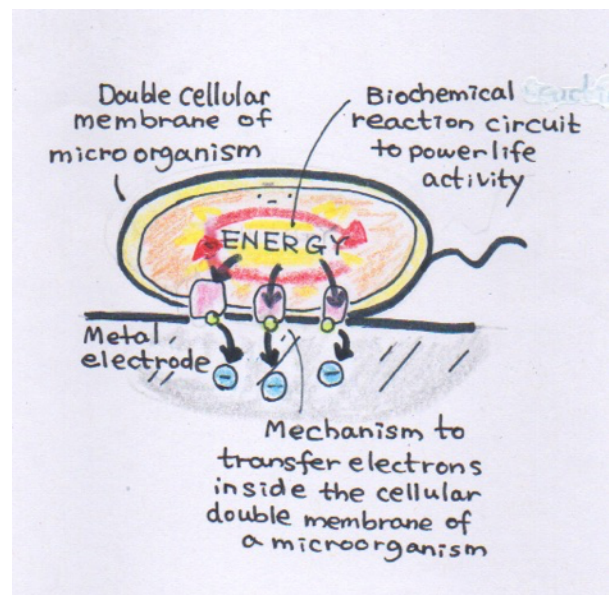
On the other hand, dirt atoms receive electrons generated by EM and become stable enough not to reattach themselves to another place (recontamination).

Live microorganisms transfer electrons out of their cells!

Living microorganisms are known to release electrons out of their bodies (cells). This phenomenon is called Extracellular Electron Transfer and research is under way on a microbial fuel cell technology to create electricity through electron transfer between microbes and an electrode.

The body of a microorganism has a biochemical reaction circuit to produce energy as the source of life activity. Researchers have found a mechanism for efficient transfer of released electrons from microorganisms to the electrode via proteins inside the double membranes of the cells.

Reference: <http://www.t.u-tokyo.ac.jp/epage/release/2013/2013040801.html>



LET'S BEGIN EM CLEANING!

DILUTE!

EM cleaning spray (1:100 dilution)



One cap full of EM in a 500 ml spray bottle of water makes an approximately 1:100 diluted solution.

Point 1: Use up diluted Activated EM on the day

A pH below 3.5 keeps EM free of bacterial contamination. A diluted solution is prone to mould growth. Use it up, then wash and dry the empty spray bottle.

Point 2: Keep the bottle top clean

After using the cap of an Activated EM bottle for measuring, always rinse and dry it before putting it back on. Residual EM on the cap is exposed to the air and prone to contamination.

EM CLEANING TIPS

1. EM is alive.

EM is not an inanimate material. Imagine that what's in the bottle is a team of minute creatures who have gathered to clean your home. Imagine them telling you, "I'll clean here", "I'll handle there". Treat them as living things. Living things change daily. Once diluted, EM must be used up on the day.

2. Go easy.

Don't think that you must stop using chemical products altogether because they are bad for health and the environment. Start small. Be curious and experiment on how you can apply EM to various kinds of dirt, grime, stain, odour etc. EM can be used with soap or baking soda and on all surfaces, including stainless steel, ceramics, timber and metals.

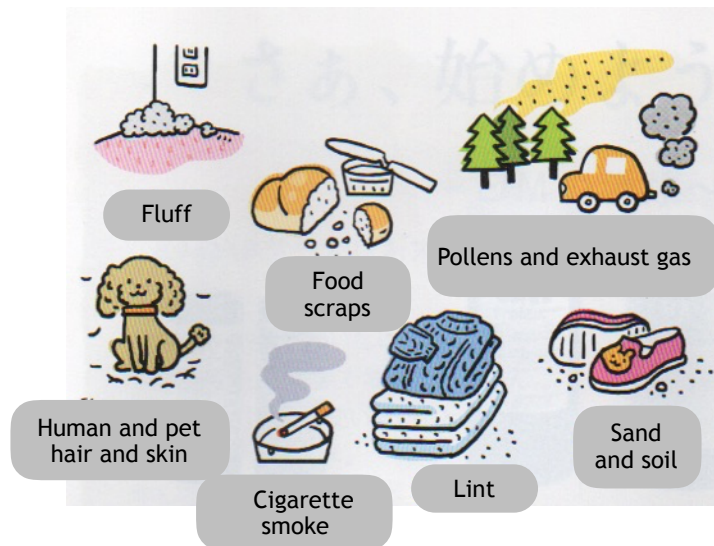
3. Enjoy.

EM cleaning leads to many surprises. You may feel light and cheerful, you may notice things you have never noticed before, your world opens up through many other EM using friends... Keep your mind open to surprises. An old proverb says that when you enjoy cleaning, you cleanse your mind, and you'll be blessed with good luck and happiness.

DUST THOSE WHO CONQUER DUST CONQUER DIRT

WHAT IS DUST?

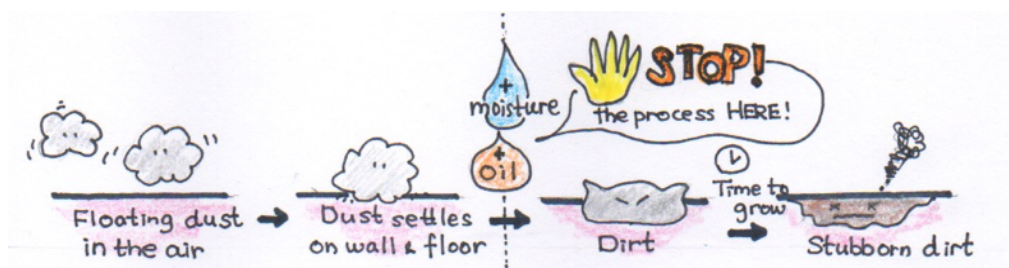
Dust is the common name for things like lint or fibres from bedding, curtains and carpets, pet hair, food waste, flower pollens, bacteria and cigarette smoke. Most of them are too small to see (less than 10 micrometres = one-hundredth of 1 mm) and floating in the air. Various substances constituting the dust are allergens.



HOW DOES DUST GROW?

Dust is easily attracted to static electricity. Dust tends to cling to the corners of walls and ceilings because of electrostatic activity. Dust particles that have just landed on the floor or the wall are easily removable with a vacuum cleaner, a broom or a mop. Once dust absorbs moisture or oil, however, it turns into grimy “dirt”, which sometimes becomes stubborn dirt (stains) if left alone. The best strategy is to clean it before it grows into stubborn dirt!

However, who has time to wipe down walls everyday? Instead, you can spray 1:100 Activated EM to the walls, curtains and all over the house daily. The non-ionising effect* of EM reduces static electricity in the walls and curtains and hence slows dust collection. Simply spray EM to stop dust from growing into greasy dirt. No elbow grease is needed.



WHEN TO CLEAN?

Visible dust (larger than 10 micrometres) takes about 30 minutes to settle on the floor if it does not cling to a wall earlier while invisible dust (1 – 10 micrometres) takes as long as 10 hours. The best time to clean the house is either before the dust floats up (shortly after you get out of bed) or as soon as you come home after a day's activity.

*What is non-ionising effect?

An ion is a particle that is either positively or negatively charged. Non-ionising means the neutralising (balancing between positive and negative) of an ion. EM's non-ionising action comes from the ability of photosynthetic bacteria in EM to release positive and negative particles in response to the prevailing condition (multiple organic catalytic actions).

*Water (H₂O) has the ability to attract both positive and negative ions to allow dissolution of any materials because of its polarity. EM's organic catalytic actions exert far stronger attraction than water.

PREPARATION



A microfibre cloth



1:10 Activated EM
in a bucket



EM cleaning spray
(1:100 Activated EM)

STEP 1

Immerse a well-worn cleaning cloth (or a lint-free microfiber is the best) in 1:10 Activated EM solution in a bucket, wring the cloth out tightly, open and leave it flat for 5 minutes until it is half-dry.



Half-drying prevents streaky finish.

STEP 2

Apply the EM cleaning spray (1:100 Activated EM solution) to walls, curtains and all over the rooms.



Shoot down dust particles floating in the air before wiping them off.

FLOORING



After vacuuming the floor, apply the EM cleaning spray to the floor and mop it up. EM adds lustre to any hard flooring materials.

TV & COMPUTER



Wiping screens with a dry rag or tissue generates static electricity, which attracts dust particles in the air. Wipe your electrical goods with the semidry cloth prepared in STEP 1 to minimise static and dust collection. Large deposits of dust should be vacuum cleaned first.

DEODORISING

Smell the instant effect of EM!
Eliminate bad odours at the source!

Spraying EM throughout the house on a daily basis can eliminate a majority of unpleasant odours and make your living space pleasant. EM works on both odorous substances and odour-causing bacteria through its chemical and biological deodorising processes - two of the four odour elimination processes described on the next page.

TOILET



Spray diluted Activated EM all over the toilet cubicle and the inner surface of the toilet bowl. Pour undiluted Activated EM into the bowl and scrub with a toilet brush.

CUSHIONS



Cushions and sofas are hard to wash. Spray EM (and dry in a sunny place if possible) to eliminate musty or dusty smells.

KITCHEN WASTE



Spray EM on food waste, drain well, put in a garbage bag, and throw in a bin. If you are composting green waste, spray EM before draining.

CAR INTERIOR



You don't need air fresheners for your car if you spray EM on car seats and other surfaces regularly.

WHAT IS THE CAUSE OF BAD ODOURS?

Bacteria are involved in most of household odours. For example, proliferation of mould in the dark and moist shoe box, putrefactive bacteria in kitchen waste, or miscellaneous bacteria in damp clothes causes obnoxious odours.

Four major malodorous substances - ammonia, trimethylamine, hydrogen sulphide and methylmercaptan - are produced by a complex of bacteria and fungi in various facets of household living.

	SUBSTANCE	PH	ODOUR CHARACTERISTIC
4 MAJORS	Ammonia/ NH_3	Alkaline	Toilet, manure.
	Trimethylamine/ $(\text{CH}_3)_3\text{N}$	Strong alkaline	Rotten fish.
	Hydrogen sulphide/ H_2S	Mildly acidic	Rotten egg.
	Methylmercaptan/ CH_3SH	Mildly acidic	Rotten cabbage, onion.
OTHER	Isovaleric acid/ $(\text{CH}_3)_2\text{CHCH}_2\text{COOH}$	Mildly acidic	Sweaty socks.
	Formaldehyde/ HCHO	Neutral	Irritating, pungent.
	Butyric acid/ $\text{CH}_3(\text{CH}_2)_2\text{COOH}$	Mildly acidic	Sweat.

HOW TO ELIMINATE ODOURS?

PHYSICAL PROCESS

Charcoal and zeolite are microporous materials that can eliminate odours by trapping odorous substances in their microscopic pores. As they lose the deodorising effect when the pores are filled with odorous substances, they need to be replaced, washed or dried regularly.

SENSORY PROCESS

This involves suppressing a bad smell with a pleasant smell. Masking technique overpowers a bad smell by releasing another stronger smell. Pairing technique releases a counteractant that combines with the odorous molecules and turn them into non-odorous molecules. Either technique has the potential to cause a smell that is pleasant to yourself but not to others.

CHEMICAL PROCESS

Odorous substances are turned into non-odorous ones through a chemical reaction. For example, acidic substances can be neutralised through reaction with alkaline materials (e. g., baking soda) and alkaline substances with acidic materials (e. g., citric acid). This process does not work on neutral substances such as formaldehyde.

BIOLOGICAL PROCESS

Most of household odours can be stopped when odour-causing putrefactive bacteria are prevented from growing. Disinfectant can kill such bacteria while antibacterial finishing or treatment can create an environment in which bacterial growth is inhibited. However, disinfectant kills both good and bad bacteria and also carries the risk of promoting the emergence of resistant bacteria.

DEODORISING WITH EM

EM is an acidic solution (pH 3.5 undiluted, pH 5.5 in 1:100 dilution) which eliminates alkaline odours through neutralisation. It deodorises acidic and neutral smells through either the biological or chemical process. Be it alkaline or acidic, a majority of odorous substances increase harmful active oxygen. EM eradicates all types of active oxygen through its superior anti-oxidative and non-ionisation actions. And EM's anti-oxidative power will gradually make your home environment more resistant to bacterial proliferation.

GREASE BUILDUP

REGULAR CLEANING

Spray Activated EM in 1:50 to 1:100 dilution to loosen grease spots and wipe them off. Spray again lightly.

STUBBORN GREASE SPOTS

Cover grease spots with pieces of tissue or paper towel and spray undiluted Activated EM generously. Leave them soaked for over 1 hour. Use a toothbrush to scrub and wipe them away. Detachable components can be soaked in a mix of Activated EM and hot water in equal parts.

COOKING RANGE



EXTRACTOR FAN



MICROWAVE



WHAT REALLY IS A GREASE SPOT?

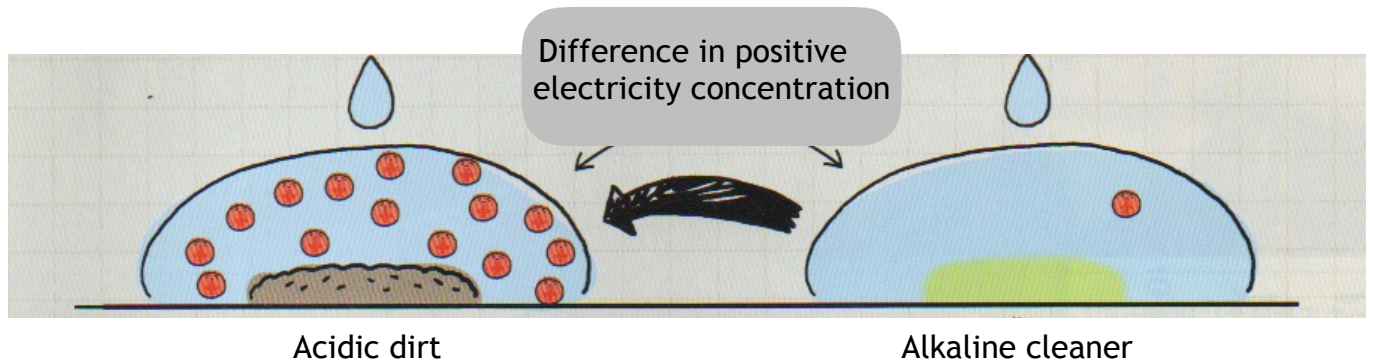
A grease spot can be caused by such things as cooking oil (fatty acid), greasy fingers (sebum), hair styling agents and facial creams. When fats are exposed to the air, they become oxidised and turn into yellowish or odorous peroxidation products. Chemically, greasy buildup is acidic.

This is why grease spots are commonly removed through neutralization by alkaline detergent. Natural alkaline detergent such as baking soda (sodium hydrogen carbonate) and sodium carbonate are widely used but as their alkalinity dissolves proteins in human skin, contact with them can damage skin as well as timber and aluminium products, flooring, tatami mats, or TV or computer screens.

Although EM is acidic and not alkaline, it is highly effective in removing greasy buildup. It does not damage your skin or other materials. It needs a certain period of soaking to loosen stubborn grease spots but its effectiveness is obvious as EM added to grease traps in commercial kitchens has been known to dissolve and clean large amounts of solidified fat.

WHAT ARE ACIDITY AND ALKALINITY?

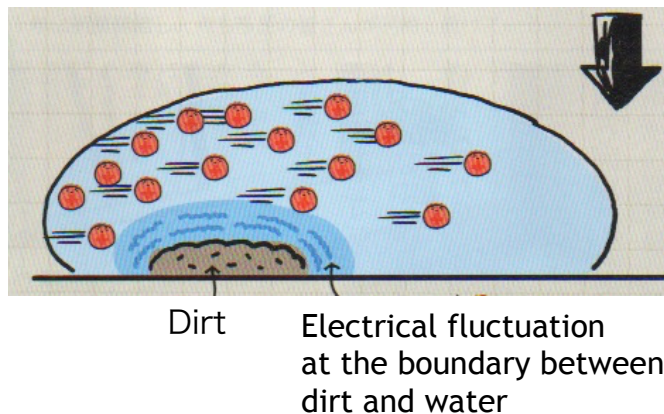
Acidity and alkalinity are different states of water when a substance is dissolved in water.



For example, water surrounding acidic dirt is full of positive electricity.

When an alkaline substance is dissolved in water, it produces very few positive electricity in the solution.

When they are combined



Combining two aqueous solutions in different electrical states gives rise to balancing effects toward equilibrium. Forces such as electrical concentration gradient (a force to equate concentration levels) and attraction between positive and negative electricity generate large waves and the resulting electrical fluctuations disperse dirt molecules.

The common notion that “Acidic dirt can be removed by alkaline cleaner and alkaline dirt can be removed by acidic cleaner” can be explained by these electrical fluctuations that occur in water.

EM (microorganisms) is so multifunctional that it can remove dirt SAFELY, EASILY and CONVENIENTLY. As it disperses dirt molecules by positive electricity and stabilise them by negative electricity, it does not cause recontamination at another place.

WHICH CLEANING AGENTS SHOULD I USE?

●: Effective for stubborn dirt ○: Effective for normal dirt X: Should not be used

It is hard to remember for which materials you can use acidic and alkaline cleaning agents. Remember you can use EM to clean any material.

Material	Alkaline baking soda	Acidic vinegar	Acidic EM
Steel	●	X	○
Plastic	○	○	○
Stainless steel	○	●	●
Wood	X	○ (painted X)	○
Plain wood	X	○	○
Coated plywood	○	○	○
Glass	○	●	○
Resin	●	●	○
Wooden chopping board	X	●	●
Bamboo/lacquer	X	○	○
Aluminium	X	○	○
Mirror	●	●	●
Flooring	X	○	○
Vinyl tile	○	○	○
Synthetic marble	○	X	○
Tile	●	●	○
Carpet	●	●	○
Vinyl-coated cloth	●	●	○
Fabric	●	○	○
TV/PC screen	X	X	○
Concrete	○	X	○
Flyscreen/aluminium window	○	●	●

WATER STAIN/SCALE



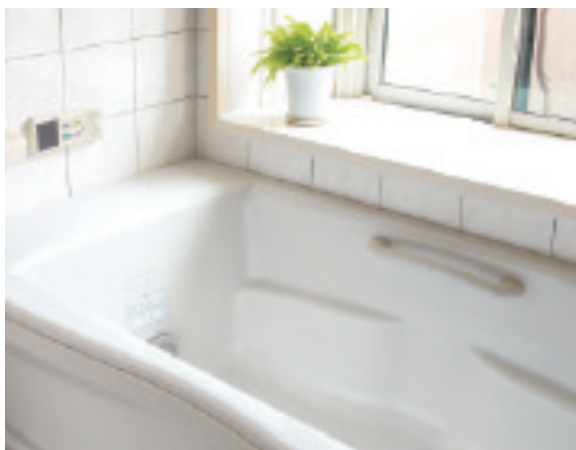
The main component of water stain/scale is calcium carbonate, an insoluble product of chemical reaction between Ca ions in tap water and the air. Keep a 1:100 Activated EM solution handy in your kitchen and spray after using the sink to prevent scale from forming. Soak stubborn water scale in Activated EM for a while and scrub clean.

BURNED POT



Burned food stuck to the bottom of a pot is acidic as it is a product of oxidated food. Adding Activated EM and hot water in equal parts into the pot can instantly eradicate the burned smell. Put the lid on and leave it for more than 24 hours to loosen the bond between the pot and the burned material, which can be easily removed by light scraping with a rubber spatula.

STAINING



Staining of bathtub is a combination of exfoliated skin (fat and protein), soap scum, water scale and microorganisms (moulds and fungi). These microbes sometimes secrete insoluble polysaccharides to form a biofilm. Adding Activated EM in your bath water on a routine basis will slow soap scum formation and make cleaning easier.

*The continued use of EM will create an anti-oxidation field and discourage the proliferation of odour-causing putrefactive bacteria.

The real benefit of EM cleaning is that you become healthier. The more you use EM in household cleaning, the stronger its rectification effect becomes. It fills your home with negative ions to promote human health, maintain the functionality of your electrical/electronic appliances, and create a pleasant living environment. Try and feel the benefits of EM cleaning.