

“HEALTHY COOKWARE”

By

Dorota Baginski

The goal of this presentation is to provide general information about different type of cookware, materials it is made of and methods of food preparation to allow you to make informed decision what vessel to use in order to cook healthy meal.

TYPES OF COOKWARE



A Pyrex chicken roaster



Clay roaster



Dutch oven

Braising pans and roasting pans (also known as braisers and roasters) are large, wide and shallow, to provide space to cook a roast (chicken, beef, or pork).



Large and
small skillets



Cast iron pan

- **Frying pans, fry pans, skillets, or spiders** (obs. Southern United States) provide a large flat heating surface and shallow sides, and are best for pan frying. Fry pans with a gentle, rolling slope are sometimes called **omelet pans**.
- **Grill pans** are fry pans that are ribbed, to let fat drain away from the food being cooked.



Griddles are flat plates of metal used for frying, grilling, and making pan breads (such as pancakes, injera, tortillas, chapattis, and crepes). Traditional iron griddles are circular, with a semicircular hoop fixed to opposite edges of the plate and rising above it to form a central handle.



A copper saucepot (stainless lined, with cast iron handles)

Saucepans and soup pots (or just "pots") are vessels with vertical sides about the same height as their diameter, used for simmering or boiling; with one or two handles.

Sauté pans, used for sautéing, have a large surface area and low sides to permit steam to escape and allow the cook to toss the food. The word "sauté" comes from the French verb "sauter", meaning to jump. Sauté pans often have straight vertical sides, but may also have flared or rounded sides.



Stockpot by La Creuset-enamel on steel

Stockpots are large pots with sides at least as tall as their diameter. This allows stock to simmer for extended periods of time without reducing too much. Stockpots are typically measured in volume (6-36 L). Stock pots come in a large variety of sizes to meet any need from cooking for a family to preparing food for a banquet. A specific type of stockpot exists for lobsters, and an all-metal stockpot usually called a caldero is used in Hispanic cultures to make rice.



Commercial, hard anodized aluminum by Calphalon



Enameled cast iron by La Creuset

• **Woks** are wide, roughly bowl-shaped vessels with one or two handles at or near the rim. This shape allows a small pool of cooking oil in the center of the wok to be heated to a high heat using relatively little fuel, while the outer areas of the wok are used to keep food warm after it has been fried in the oil. In the Western world, woks are typically used only for stir-frying, but they can actually be used for anything from steaming to deep frying.

COOKWARE MATERIALS

Metal:

- Aluminum : cast and anodized
- Steel: stainless and carbon
- Cast iron

Coated and composite cookware:

- Enameled cast iron
- Enamel over steel
- Sandwiched and Clad aluminum, steel, copper
- Aluminum non-stick coated with ceramic-titanium

Non-Metallic Cookware:

- Ceramics
- Glass
- Glass-Ceramics
- Silicone
- Bamboo

How can I tell if I have stainless steel, hard anodized or nonstick cookware?

Stainless steel cookware is typically a shiny silver material, hard anodized cookware is a deep dark gray color, and cookware that is nonstick typically will have a smooth light gray, dark gray, or black interior that is clearly different than the exterior of the pan.

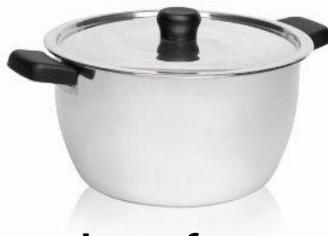


Anodized Aluminum cookware, is made by electrochemical process creating coated surface.

Pros: Inexpensive, lightweight, good thermal conductivity, doesn't rust, corrosion resistant.

Cons: Can be reactive, especially with acidic foods, changing the taste of the food; if scratched de-anodization occurs and aluminum is exposed.

Brands: Calphalon, Circulon, Kitchen Aid



Aluminum Cookware is made of cast or sheet aluminum.

Pros: Inexpensive, lightweight, good thermal conductivity, doesn't rust, corrosion resistant.

Cons: Can be reactive, especially with acidic foods, changing the taste of the food.

Fact: Claims have been made linking aluminum to Alzheimer's disease and other health problems, but these claims have been unsubstantiated by scientific research. "In fact, according to the FDA, taking one antacid or aspirin tablet provides the body with far more aluminum than cooking and storing an entire day's meals in aluminum."

Tip: If you're set on aluminum cookware, only use it if it's in good condition, never use it for food storage, and avoid using it to cook foods that are acidic or salty (such as tomato sauce or salad dressing).



Stainless steel is made mostly of steel alloy, which contains small amounts of chromium and nickel, which make it corrosion resistant with antibacterial properties. This also influences its use in commercial kitchens and food processing plants, as it can be steam-cleaned, sterilized, and does not need painting or application of other surface finishes. Widely considered to be the best composition is 18/10 (18 parts chromium and 10 parts nickel).

All stainless steel contains iron, nickel, chromium, molybdenum, carbon, and various other metals such as aluminum or titanium. There are over 150 grades of stainless steel.

In a study conducted on heart patients receiving **stainless steel** stents, *restenosis*(a narrowing of blood vessel) occurred in 50% of patients. **Allergies to the nickel and molybdenum** in the stainless steel were suspected causal factors. NOTE: Stainless steel is 100% recyclable. For a typical 2,000-square-foot (200 m²) two-story house, a steel frame is equivalent to about six recycled cars, while a comparable wooden frame house may require as many as 40–50 trees.



Brand: All-Clad -Stainless with copper plating
on the bottom

Sandwiched Cookware it is various combinations of metals like steel, aluminum and copper; proves ideal for cookware applications and results in performance that greatly exceeds that of non-bonded cookware. The unique process uses heat and pressure to bond different metals into “sandwiched” sheets.

Plated or Clad Cookware Another example of how metals can be combined to improve conductivity is to plate or clad a good heat-conducting material onto the bottom of cookware. An example is copper clad onto the bottom of stainless steel cookware.



For example: Lifetime brand of Regal Ware uses **12 layers** of stainless, carbon steel, 3 different types of aluminum, solar bonding agent and silicon in its construction.

Other brands: Neova (5 layers), All-Clad, Emeril

Made of CLAD steel: *Gateway Arch in St. Luis and The Cloud Gate sculpture by Anish Kapoor, in Chicago*

Pros: Sturdy, easy to clean, conducts heat evenly

Cons: When scratched or worn, the chromium and/or nickel may leach into food, causing negative health effects.

Tips: Use only nonabrasive materials to clean stainless steel pots and pans. Abrasive cleaning can release small amounts of chromium and nickel. Never use scouring pads or harsh abrasives to clean stainless steel. Soaking the pan in a mixture of baking soda and warm water is a better alternative.



Copper Cookware has a coating (tin, nickel, stainless) to prevent copper from coming into contact with food.

Pro: Excellent thermal properties for even heating

Cons: The protective coating can be dissolved by foods (especially acidic ones) over time, allowing the copper itself to come into contact with food, which can lead to copper toxicity. To prevent this, use only nonabrasive cleaning materials and techniques and get rid of worn copper cookware.

Extra Care: Polish with a salt-and-lemon-juice paste to maintain shine. These pots aren't recommended if you have a ceramic cook top.



Teflon Cookware also known as Silverstone, Fluron, Supra, Excalibur, Greblon, Xylon, Duracote, Resistal, Autograph and T-Fal. *Teflon-coated aluminum* contains, **polytetrafluoroethylene (PTFE)**, a synthetic fluoropolymer, chemical used in production that creates a soap-like slipperiness and non-stick finish.

Pros: Nonstick, easy to clean, good for low-fat cooking because additional oil isn't necessary to prevent sticking

Cons: There have been reports that the non-stick Teflon coating is potentially harmful to people's health, especially when the Teflon is cracked or scratched. Teflon has already been implicated in increased instances of cancer in the pancreas, liver, testicles, and mammary glands, as well as miscarriages, thyroid problems, weakened immune systems, and low organ weights.

Fact: Actually, the one known danger of Teflon is **overheating**. While PTFE is stable and non-toxic it begins to breakdown at 500 °F (melting point 621°F), at which point it becomes unsafe to breathe, resulting in flu-like symptoms, like headache, fever, chills, and cough.

Birds are extremely susceptible to the fumes, so if you're going to melt your Teflon frying pan on the stovetop, make sure your pet canary is a safe distance away.

Meat is usually fried between (200–230 °C) **392–446 °F**, and most oils will start to smoke before a temperature of 500°F (260 C°) is reached, but there are at least two cooking oils (Safflower oil and Avocado oil) which have a higher Smoke point than 500°F. **Empty cookware** can also exceed this temperature upon heating.

“A 1959 study (conducted before the U.S. Food and Drug Administration approved the material for use in food processing equipment) showed that the toxicity of fumes given off by the coated pan on dry heating was less than that of fumes given off by ordinary cooking oils.

A DuPont study on Teflon **PTFE (Fluoropolymer Resin)** did not detect any **PFOA** above their detection limit of 9 parts per billion, and DuPont says **no PFOA** is in Teflon cookware. “

While **PFOA Perfluorooctanoic acid** also known as **C8** has been detected in the low parts per billion range in the blood of people, exposure from non-stick cookware is considered insignificant by some sources. However, at temperatures well above those encountered in cooking, PTFE *pyrolysis* (transformation of a substance produced by the action of heat) can form minor amounts of PFOA.

Tips: Use with only plastic or wooden utensils, and nonabrasive cleaning tools and methods, to preserve the nonstick finish. Avoid overheating.

OR AVOID ALL-TOGETHER !



Cast Iron is classic cookware that lasts a lifetime; natural non-stick. Iron alloys with higher carbon content are known as cast iron because of their lower melting point and cast ability. Cast iron can also withstand very high temperatures, making cast iron pans ideal for searing. Being a reactive material, cast iron can have chemical reactions with high acid foods such as wine or tomatoes. In addition, some foods (such as spinach) cooked on bare cast iron will turn black. Cast iron is a porous material that rusts easily. As a result, it typically requires seasoning before use. **Seasoning creates a thin layer of fat and carbon over the iron that coats and protects the surface, and prevents sticking.** Place the cast iron pan, upside down, in the oven, with a sheet of aluminum foil on the bottom to catch any drips. Heat the pan for 30 to 60 minutes in a 300 to 500 degree oven. Once done, let the pan cool to room temperature. Repeating this process several times is recommended as it will help create a stronger "seasoning" bond.



Dutch Oven- enameled

Cast iron cookware could be enameled (description below “non-metallic cookware”)

Pros: Heats evenly, naturally nonstick, can go from oven to stovetop, “**can double the iron in your foods,**” “provides less than 20% of total daily iron intake”; inexpensive.

Cons: Requires special care including gentle cleaning and periodic reseasoning to maintain the stick-resistant surface, heavy.

Brands: Lodge, Kitchen Aid, La Creuset

Non-metallic cookware

Non-metallic cookware can be used in both conventional and microwave ovens.

Note: microwave oven cooking is generally considered as non-healthy method of cooking.

Non-metallic cookware typically can't be used on the stovetop, but some kinds of ceramic cookware, for example Corningware, are an exception.



Silicone Cookware and Bakeware is a man-made blend of oxygen, carbon, hydrogen and sand and sometimes other chemical elements. Some common forms include silicone oil, silicone grease, silicone rubber, and silicone resin.

Liquid silicone can be used as a dry cleaning solvent. Touted as an "environmentally friendly" alternative to the traditional perchloroethylene (or perc) solvent, the decamethylpentacyclosiloxane (D5) process has been patented by the company *Green Earth Cleaning*. Does not shrink cloths!

Silicone as a low taint, non-toxic material, can be used where contact with food is required. Silicone is becoming an important product in the cookware industry, particularly bakeware and kitchen utensils. Molds for chocolate, ice, cookies, muffins; Some novel designs are steamer, egg boiler, vegetables cooker, cooking lids, pot handle, kitchen mats, etc. etc.

It is used as an insulator in heat resistant potholders and similar. Silicone oven mitts are able to withstand temperatures up to 675 °F (357 °C), and allow reaching into boiling water.

Pros: Safe (if of good quality), non-reactive, non-stick, easy to clean.

Cons: Expensive, poor heat-conduction.



Enameled bakeware and cookware is made of pottery, cast iron and aluminum and steel (speckled) that is coated with layered fused glass.

Pros: Non-reactive, safe and can go from stovetop to oven to refrigerator to freezer.

Con: Expensive and should be hand washed.

Tip: Buy only quality enameled pieces, and they will last a lifetime

Brands: Le Creuset, Lodge, Paula Deen



Glass cookware and bakeware can be clear or tinted; bio-friendly; It is made of *silica and boron oxide called Borosilicate glass* - used by European Pyrex; the U.S. manufacturer of Pyrex kitchenware uses tempered soda-lime glass.

While more resistant to thermal shock than other types of glass, borosilicate glass can still crack or shatter when subject to rapid or uneven temperature variations; tends to crack into large pieces rather than shattering .

The chemical resistance of glass can allow it to remain in a corrosive environment for many thousands and even millions of years.

Pros: Extremely safe, inexpensive and easy to clean; Corningware tinted glass can be use on stovetop.

Cons: Uneven heat conduction; can break easily.

World Kitchen owns/licenses such brands as: Pyrex , Corningware , Corelle, Revere, EKCO, Baker's Secret, Magnalite; Chicago Cutlery, OLFA



Bamboo steamers and cooking utensils are made of renewable bamboo.

Pros: Nonreactive, dishwasher safe, and earth friendly, inexpensive

Cons: Limited selection of items



Ceramic Cookware

Glazed ceramics, such as porcelain, provides a nonstick cooking surface.

Some unglazed ceramics, such as terra cotta, have a porous surface that can hold water or other liquids during the cooking process, adding moisture in the form of steam to the food.

Historically some glazes used on ceramic articles have contained high levels of lead, which can possess health risks.

- Pots, baking dishes, pans, and kettles made of lightweight ceramic 100% inorganic materials containing clay -- this innovative non-reactive material is the key element in cookware longevity;

Pros: the cooking surface can't be scratched -- even when cooking with metal utensils and cleaning with industrial steel wool;

Cookware can withstand very high temperatures (2700° F) -- steel melts at 2200°F

Cookware surface will never flake off into your food;

Easy cleanup; dishwasher safe; **Is non-reactive** -- no chemicals, toxins, or gases get produced while cooking; **Resists carry-over tastes and odors** -- even highly acidic foods (like tomatoes) will not stain cookware surface or be absorbed into other foods

Produces a far-infrared heating process -- a penetrating heat process that cooks food from both the inside and outside at the same time and enhances food flavor; **Contains no lead, cadmium, aluminum, copper, nickel, chromium, iron, or any other heavy metals; no trace metals or chemicals leaching from the cooking surface**

Cons: Expensive, breakable

Brand name: Ceramcor, Mercola, Royal Worcester (Porcelain)



Glass- ceramic is used to make products such as Corningware, which have many of the best properties of both glass and ceramic cookware.

Pros: can be taken directly from deep freeze to baking oven. Their near-zero coefficient of thermal expansion makes them almost entirely immune to thermal shock.

Cons: no pans available; NO stovetop for certain brands, NO pilot light, heat vent, broiler/griller, microwave browning element or toaster oven use. - DO NOT ADD liquid to a hot dish, place hot dish on a wet or cool surface, or handle with a wet or cold cloth; Breakable

Other Materials and Cooking Techniques



Sous-vide (pronounced /su vid/), French for "under vacuum", is a method of cooking that is intended to maintain the integrity of ingredients by heating them for an extended period at relatively low temperatures. Food is cooked for a long time, sometimes well over 24 hours. Unlike cooking in a slow cooker, sous-vide cooking uses airtight plastic bags placed in hot water well below boiling point, usually around (60 C)140 F.

Simplified method of **Sous-vide** is **Ziploc omelet**. To make the Omelet you are required to place the Ziploc bag in boiling water. Through the years there have been many accusations against S.C. Johnson & Son saying that when the bags are boiled, the toxic substance, **Bisphenol-A**, which is used in the manufacturing of some polycarbonate plastics, is released into the contents of the bag.

S.C. Johnson & Son denied that Ziploc brand bags contain any of the Bisphenol-A substance.

There are still warnings out saying that the steam that is created in the bag could allow a number of other chemicals used in the bag's manufacturing to release into the food.

Ziploc has not commented on this aspect of the argument.

**Parchment Paper,
Paper Bag,
Aluminum Foil
and Leaves**



The paper is used as a folded pouch or parcel to hold food and protect from metal which is lay on, for example fish and poultry. The parcel holds in moisture to steam the food.

This method of cooking is called ***En Papillote*** (French: "in parchment")

Often instead of parchment - paper bag or **aluminum foil** is used.

Throughout the world all sorts of **leaves** are used to wrap, hold and cook food such banana, xanthosoma, cassava , cabbage, vine, corn husks or plantain.

CHARACTERISTICS OF QUALITY COOKWARE

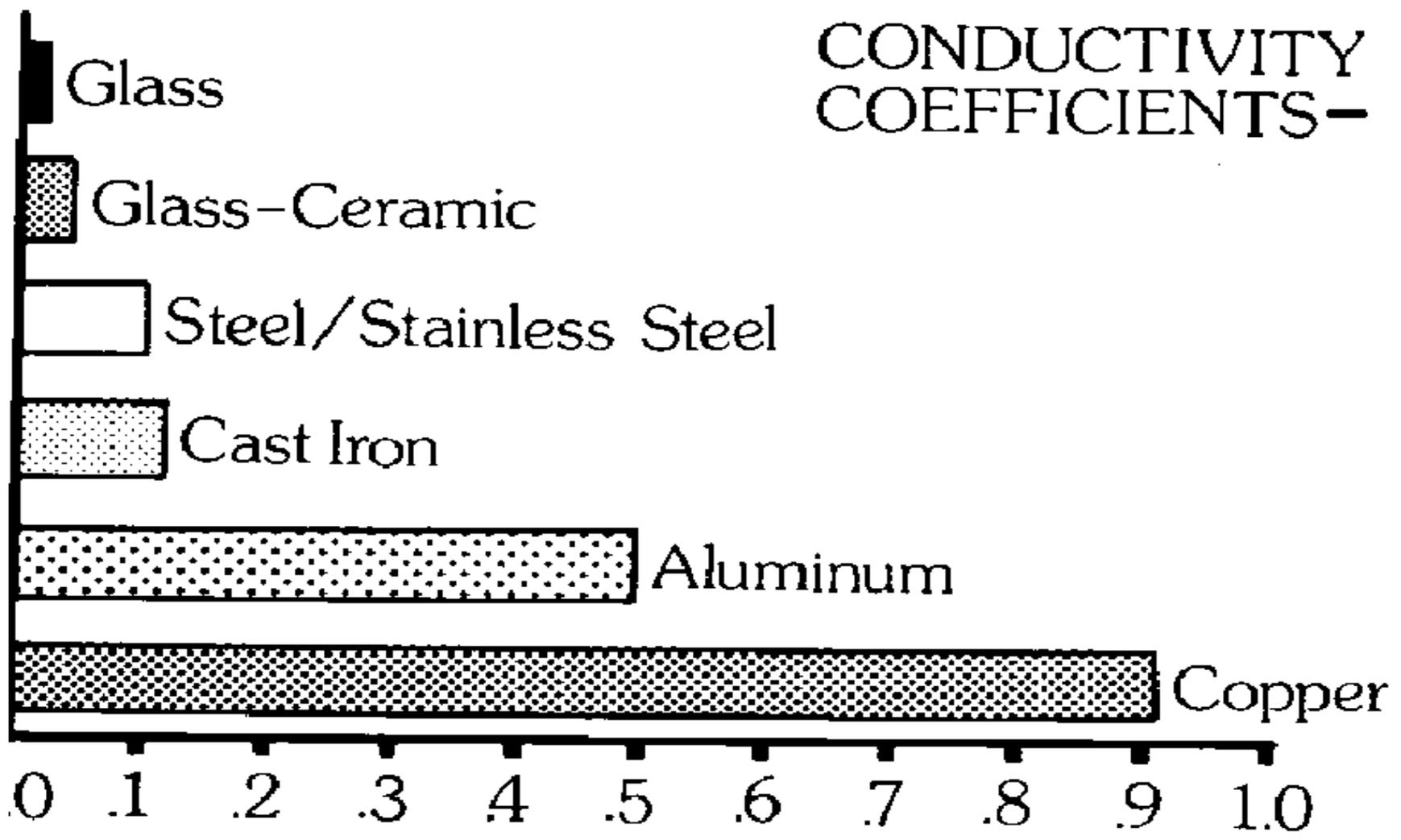
- **Best Conductivity**
- **Gauge** - thick bottom gives better heating performance
- **Sandwiched or Plated Metals** – resolve in better cooking; more layers of heat conducting material the better;
- **Smooth, Flat Bottoms**-the flatter the cookware's bottom surface when heated the better process;
- **Correct Size** - For good cooking performance, the diameter of the cookware should closely match the size of the heating area, cookware should not extend more than 1 inch beyond the heating area;

• **Finish** - The color and texture of the finish also have some influence on cooking performance and speed. Dark-colored, rough textured cookware absorbs more radiant heat than highly polished cookware; however, the color of the cookware is more important in the oven than on top of the range.

• **Tight-Fitting Lids** - lids should fit firmly and snugly; tight-fitting lids hold in steam, thus less water and energy are used during cooking.,

• **Durable Handles** – flame guard, tight-fit, securely fastened, the handle weight should not cause an empty cookware to tip toward the handle.

CONDUCTIVITY COEFFICIENTS-



	Aluminum	Cobalt	Chrome	Iron	Nickel	Leaching?
Aluminum Tea Kettle	6.70	*	*	*	*	Yes
Stainless Steel Tea Kettle	*	*	*	1.27	*	Yes
Speckled Metal Bakeware	35.40	2.67	.23	1.48	19.30	Yes**
Seasoned Cast Iron Skillet	*	*	2.08	2,817.00	*	Yes
Non-Stick Anodized Aluminum 5.5 qt	7.10	*	*	*	*	Yes
Anodized Aluminum 1qt	*	*	*	*	3.28	Yes
Ceramic Non-Stick Aluminum Skillet	1.40	*	*	.95	*	Yes
Non-Stick Glass Bakeware	*	*	*	4.31	*	Yes
Mercola Healthy Chef 10" Ceramic Skillet	< .01	.056	< .05	0	< .05	No



All values are mg/L.

* Indicates value not tested for in given material.

** Speckled metal bakeware leaching values for cobalt and lithium are not available.

Analyses performed in accordance with STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 18th EDITION APHA-AWWA-WPCF.

4% Glacial Acetic Acid is poured into the vessels and let to sit for 24hrs. Once the 24 hr leach is over, the acetic acid is analyzed via AA Spectroscopy for the individual metal content and then recorded.

Cookware Material	Potential Hazards
Teflon	PFOA induced potential health hazards -- from your immune system to birthing activities
Aluminum	Is a reactive metal and suspected casual factor in Alzheimer's disease
Stainless steel	Potential likelihood of metal leaching into your food and allergen issues
Copper	Due to the possibility of copper caused discomfort, recommended to never have direct contact with your food

Foods Vary in their Reactivity

Do keep in mind that temperature affects reactivity. When hot, a food reacts more quickly than when it is cold. Thus, refrigeration deters uptake of metal or plastic ions.

Additionally, some foods are more reactive than others. Fat, acidic ingredients and water are more efficient absorbers than are protein and carbohydrates. Thus chicken fat more quickly sops up plastic polymers than does chicken flesh. While raw rice is a slow absorber, when cooked with water, oil, tomatoes and/or vinegar it more speedily uptakes foreign ions. This explains why quality oils, vinegar and wine are sold exclusively in non-reactive glass.

SUMMARY

- **Read carefully product information regarding materials, use and care**
- **Be aware of different names of this same process**
- **There is specific cookware for gas or electric stove top and ceramic flat cook top; **MATCHING COOKWARE WITH COOKTOPS** is important**
Certain type of cookware has only one, but perfect application; choice should be made based on function and need of food process, for example how fast dish should be cooked.
- **There is constant technological improvement**
- **Every manufacturer claims its product the best**

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