

From the start let me say that this dialogue is not intended as a scientific report but more of a discussion piece. There is however plenty of detailed analyses of paper and foam cups and their respective environmental impact to be found with a web search or should I say today a "Google"

This discussion piece is based on the 40 years of experience and knowledge of the writer working in many areas of the food packaging industry in Australia. It may not contain hard environmental audits of these products but none the less my experience working day to day with these products over many years will be of use to the reader even if it only promotes discussion.

Generally the first reaction of anyone asked the question "Which product do you think is more environmentally desirable, paper or foam cups" will produce the answer "paper" I hope it will come as no surprise if I tell you this answer is wrong

Any environmental audit of these products produces the same result, foam cups are far less stressful on the environment than paper cups. I'm sure you are now saying "OK prove it" Without going into the detailed analysis in broad terms the production process used to make foam cups called "steam chest molding" is very low on power and water use. The production process to make paper cups is very high on power and water use. The raw material for foam cups is expanded polystyrene produced as a bi-product of the oil industry. Beads of polystyrene are placed into a mold and expanded using steam. Because of the large expansion that takes place it only takes a few beads and little energy to make the final product. The material content in foam cups is very low, most of the cup, as much as 95%, is air. It is the air that gives foam cups their remarkable insulation properties. Pour boiling water into a foam cup and you can still pick it up without any discomfort. Paper is not as good an insulator and cups often have two or three layers to make them bearable to the touch when full of hot product.

The raw material for paper cups is obvious and the paper manufacturing process is notoriously energy and water hungry and this is before the cup is made. Paper production for bleached paper from which most cups are made also produces dioxins which are highly toxic. I will say in defence of the paper production industry it is moving away from older bleaching processes to non toxic alternatives. However most paper cups in Australia are sourced out of south east Asia where environmental standards could be better.

The process used to make paper cups uses glue and very often dyes and inks as well. I'm sure you have noticed how many paper cups are printed. Foam cups are often printed as well.

The burning question always posed today is about recycling and biodegradability. The position for both of these products is not ideal but better for foam. Foam can be fully recycled and there are a growing number of sites to do this. As is often the case cups are not recycled and end up in land fill. In which case although foam is not readily biodegradable it is stable in landfill.

Paper cups are difficult to recycle mainly due to the plastic liner that is bonded to the paper to make the cup watertight. There is also glue to be dealt with in the recycling process. The liner has to be stripped from the paper before the paper can be reused, a difficult and expensive process. Paper cups cannot go through the normal paper recycling stream but have to be treated like milk cartons.

Paper at first consideration should be biodegradable in land fill but that is under ideal conditions. In a landfill the cups are buried under many tons or even thousands of tons of other waste and landfill topping. This cuts off all the air and moisture, the two elements that are necessary for the rotting process. Without water and air the microbes that facilitate the rotting process cannot survive. In fact modern landfill sites are sealed to prevent leaching of chemicals into the surrounding water table further restricting the degrading of organic matter. There are recorded instances of newspapers from old landfill sites being still readable from the 1920's. Compressed paper does not rot and is difficult to burn. When conditions are ideal and this is almost never, paper cups will rot but the downside is being organic they also give off methane in the process and any residue chemicals from the manufacturing process can leach into the water table. If the methane is not captured and it can be burnt to produce power, it flows to the atmosphere where it acts as a greenhouse gas.

Next time you are buying a coffee in a take away cup you may now want to take another look at the cup.