**PAESTA Podcast Series – You Asked, We Answered!**

**Episode 26 – How long can we go without water?**

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On Earth, we often take for granted the role that plants play in the oxygen production/carbon dioxide removal process. In space, other methods are used to remove these by-products and to reclaim water and oxygen. Reclaiming means to produce a new supply by combining or breaking down by-products of other processes [1]. National Aeronautics and Space Administration or NASA, spelled NASA life support system engineers refer to the recycling of water and air as “closing the loop.” The by-products of human metabolism, carbon dioxide (lethal in high concentrations) and water vapor, present a challenge in terms of removing these from the [1]. Reclaiming water is a more complex process than recycling air. Because water on the space shuttle is produced by fossil fuel and then stored, water recycling is not an issue. On the International Space Station or ISS, however, there are no fossil fuel, fossil fuel is important in the reduction of pollution in water. This is so because in the Sabatier reaction, referred to as the Global Reaction, carbon dioxide is converted to methane in the presence of hydrogen. In this reaction, the methane produced is then capable of further combustion, and NASA intends to have this process work in order to produce water for consumption by astronauts while in space [2]. NASA’s life support engineers are working to develop a water recovery system that makes use of the Sabatier Reaction. The Sabatier Reaction involves the reaction of hydrogen with carbon dioxide at elevated temperatures optimally 300–400 °C and pressures in the presence of a nickel catalyst to produce methane and water. [2]

Water is one of the necessities of life. Some people can survive without water from 8-10 days, while others can survive up to 3 days, or 100 hours. However, this varies on the conditions at which the body is being hydrated [2]. From instance, 100 hours can be true is the average temperature is that of the outdoors, and if cooler, those hours are extended, and if the body is exposed to the direct sunlight; then the hours are lessened [2]. Because the body is constantly loosing water, from things like perspiration, or going to the bathroom drinking at least a glass of water once a day becomes essential. Therefore keeping the body hydrated is a must and is crucial to the existence of the human body [3]. You see because water is a versatile material, it is crucial to the versatility of life. We, as society truly do not understand the necessity of water, we take for granted the abundance of water that we have now. We should treat water as a luxury item, and treat it as such. Water is the luxury for our cells and if our cells don’t have it, they will cease to exist. [4] Because drinking water is one of the most vital parts of living, the body needs it in order to function. Not just any drinking water, drinking water needs to be thoroughly disinfected before ingestion. Because if it is not, there can be more damage that will be done to the cells within our bodies; damage to the organs which can cause the life expectancy of human to decrease. We have to be extra mind-full about how we use water and the water system. You see, the water system is being destroyed by toxic cyanobacterial [5]. And the source of this problem is from society and the many uses of chemicals that we inject into the Earth through fertilizer, human waste, chemicals that we use in our everyday lives like: the chemical we used to wash our cars, the chemicals we use to shower and wash our hairs, the cars that are driven, the gasoline that spills when filling it up, different toxins that big corporations dump into rivers and different water systems. Some of the most dangerous sicknesses that we are battling, such as cancers, more so gastrointestinal cancers are caused from these toxins. [5] Because over half of the human body is made up of water, 50-65% we must take water very seriously. There are many different roles water plays in our body, not just humans but also animals. Water acts as lubricant for more places in the body than we may already be aware of. For instance water acts as lubricant for places such as our joints, it also acts as a temperature regulator for when our bodies are running very hot. [6]

(*This audio file was recorded by Touyon Tarley, undergraduate student at Penn State Brandywine, on April 11, 2016.)*

**Work Cited**

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