Water Contamination And The Methods Of Water Treatment

Various regulations have been put for water quality and multiple indicators were used. Fecal contamination was and is the most widely looked for in water contaminants and Escherichia coli, a bacterial species found in all mammal feces, became the international indicator for fecal water contamination (Edberg et al. , 2000). Besides microbial contaminations, 50 % of chlorinated drinking water samples were shown to be contaminated with yeast (Brinkman, et al. , 2003). All the currently used methods for water treatment have drawbacks, and rarely examined the impact on yeast.

Therefore, it is vital to search for novel methods that could overcome all the drawbacks. Water treatment methods are wide and diverse. They include the use of ozone, ultra violet radiation, hydrogen peroxide and others. By far, the most commonly used and deemed safest is chlorine addition. Chlorinated water is not only used in swimming pools but rather in most chemically treated water around the globe. Disinfection of water can be achieved in two ways: the physical removal of the pathogens and the inactivation and/or death of the pathogens. The several approaches followed are: coagulation and sedimentation, filtration, rapid filtration, slow sand filtration, activated carbon filtration, chlorination, ozonation, UV disinfection, and solar disinfection. Each one of these technique has it disadvantages. Drinking water distribution systems may harbor various saprophytic heterotrophic microorganisms (such as bacteria, fungi and protozoa) that grow on biodegradable organic matter (Servais, et al. , 1992). Fungi are a diverse group of organisms belonging to the kingdom Eumycota, they are classified into filamentous fungi (molds) and yeasts. Certain fungi are adapted to aquatic habitats and are expected to be naturally present in water.

Historically, studying fungi in water have been mostly overlooked and so the knowledge of the occurrence of fungi in drinking water is still limited (Hageskal, et al. , 2009). Fungi can enter water distribution systems in various ways. It may grow in the pipework that have low circulation and form resistant biofilms (Virginia, et al. , 2011). Furthermore, the materials forming tanks of water can contribute to biofilms containing fungi through the slow release of organic material (Souza & Tundisi, 2003). Fungi contaminating water forms a global conflict affecting all citizens of the world; and it is more alarming at hospitals, where opportunistic fungal infections may be caused by contaminated water sources (Hageskal, et al. , 2009).

Genus Candida encompasses numerous species that inhabit a variety of hosts, either as commensal microbes and/or as pathogens. Candida species belong to the normal microbiota of an individual’s mucosal oral cavity, gastrointestinal tract and vagina (Sardi et al. , 2013). Species of Candida are a major cause of fungal infections, and to date there is no vaccine

against Candida or any other fungal pathogen (Whibley & Gaffen, 2015). Candida albicans is the predominant cause of invasive candidiasis in the majority of clinical settings, accounting for more than 90% of invasive candidiasis cases. Non-albicans Candida (NAC) species of clinical importance include C. glabrata, C. tropicalis, C. parapsilosis and C. krusei. Other less frequently reported species include C. guilliermondii, C. lusitaniae, C. kefyr, C. famata, C. inconspicua, C. rugosa, C. dubliniensis and C. norvegensis. (Sanguinetti, et al. , 2015). Although C. albicans is the most frequent species associated with disease, non-albicans Candida (NAC) species also cause disease and their prevalence is growing. It is becoming apparent that immunity to C. albicans varies in significant ways from non-albicans species, with important implications for treatment, therapy and predicting demographic susceptibility (Whibley & Gaffen, 2015). Oral colonization by Candida spp. has been reported to range between 17%-75% worldwide (Mushi, et al. , 2016). C. albicans occurs among 17. 7% in the healthy population and rises to 40. 6% among hospitalized patients (Jenkinson & Douglas, 2002). Oral candidiasis is established after colonization of the oral cavity and C. albicans is able to switch between different morphologies (yeast, hyphae, pseudohyphae, chlamydospores and newly identified yeast-like morphotype sited in Figure 1), which is thought to underlie much of the variation in virulence observed in different host tissues. However, novel yeast-like cell morphotypes, including opaque (a/?), grey and gastro intestinally induced transition (GUT) cell types, were reported (Noble, et al. , 2016).