

## EVALUATING THE CERTAIN PHYSICAL VARIABLES OF BOTH COLD AND BOILED WATERS IN FIVE DIFFERENT COOKING PANS TREATED WITH SALINE, ACIDIC AND SALINE ACIDIC SOLUTIONS

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**ABSTRACT :** Various cooking pans are manufactured from different materials and qualification standards. Such cooking wares may have several health problems due to the probable contamination of food made in these pans. This work was designed to examine certain variables such as pH, electric conductivity and total dissolved solids in cold and boiled tap, saline, acidic and acidic saline waters using five different pans. It was found that these examined variables were varied significantly in terms of the treatment and the type of cooking pans. It seems very obvious that mean values of E.C. and T.D.S. in boiled waters were significantly higher than those of cold waters in all examined pans while mean pH values were clearly fluctuated in both cold and boiled waters of different examined pans where pH mean values were in general higher in boiled tap water of Teflon and Aluminum pans but lower in Ceramic pans while there was no clear difference found between cold and boiled water in Pyrex and Stainless Steel pans. However, E.C. mean values were varied from  $890.0 \pm 68.8 \mu\text{s/cm}$  in cold tap water placed in Teflon (PTFE) pan to  $3670.0 \pm 286.4 \mu\text{s/cm}$  in boiled acidic water in Pyrex pan. T.D.S. mean values were found to vary from  $440.0 \pm 39.7 \text{ mg/l}$  of tap water of Teflon pan to  $1890.0 \pm 164.2 \text{ mg/l}$  of boiled water of Pyrex pan.

**Key words :** Cooking wares, pH, E.C., TSS, cold tap water, boiled tap water.

### INTRODUCTION

The industry of cooking wares has shown considerable development worldwide in terms of materials used, market needs and food culture. Currently, there are several cooking vessels made from copper, aluminum, stainless steel, Teflon, ceramic, iron cast, pottery, wood and Pyrex (Pennel *et al*, 1998; Kramer *et al*, 2009; Louis *et al*, 2007; Christopher *et al*, 2007; Emmanuel *et al*, 2013). The systematic use of various types of cooking wares has resulted in leaching various contaminants in prepared food stuffs such as several heavy metal ions (Jeffrey *et al*, 2016; Ogidi *et al*, 2017; Carmen *et al*, 2011; Mohammed *et al*, 2011), PFOA released from PTFE-coated cookware (Bradley *et al*, 2007; Sajid *et al*, 2017) and potential hazard (Bassioni *et al*, 2015). However, during last decades much attentions have focused on cooking vessels using where the obtained results showed that many contaminants particularly various heavy metal ions released from these utensils such as stainless steel (Emmanuel *et al*, 2013; Bassioni *et al*, 2015; Kuligowski *et al*, 1992), Aluminum (Jeffrey

*et al*, 2016; Ogidi *et al*, 2017; Odularu Article, 2013), iron (Pooja *et al*, 2018), ceramic (Lych *et al*, 2008) copper (Verissimo *et al*, 2005), Pyrex (William *et al*, 2006), Teflon (Richmond *et al*, 1995) and granite (Buffard United States Patent, 2008). On the other hand, various studies have reported measurable concentrations of different heavy metal ions leached from the cooking pans into foods and beverages (Bassioni *et al*, 2015; Odularu Article, 2013; Kandavel *et al*, 2015). However, significant public concerns were raised as such cook wares may cause severe health impacts such as allergic contact dermatitis (Bassioni *et al*, 2015; Kamerud *et al*, 2013), cancer (Biegel *et al*, 2001; Wendee *et al*, 2013) and other health problems (Yu *et al*, 2011; Jeffrey *et al*, 2017; AL-Juhaiman *et al*, 2010).

This study was designed to examine certain physical variables such as pH, electric conductivity (EC) and total dissolved solids (TDS) of cold and boiled tap, saline, acidic and saline acidic waters placed in five cooking pans such as Teflon (PTFE), Aluminum, Ceramic, Pyrex and stainless steel kitchen cooking utensils.