Applying of Canadian water quality index for evaluation of some water treatment plants in Basrah province

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Abstract. In this study, ten water treatment plants were evaluated for water quality for drinking by using the Canadian Council of Ministers of the Environment Water Quality Index (CCME WQI).The ten main water treatment plants were Jubyla(1), Khor Al Zubair, Al-Shaibah, AlmahkalAljadeed, Hay Al-Hussain, Al Asmaei, Al Garma(1), Al Abass, Al Madena Al Riadia, and Mhaijran. These water treatment plants were in different places in Basrah province and supply most of the needed water for citizens in Basrah city.The samples were collected for the treated water monthly from January to December of 2019. 13 parameters of the treated water were tested, which were the Turbidity (Turb), Total hardness (TH), pH , Total dissolved solids (TDS), Total suspended solids (TSS), Chloride (Cl-), Magnesium (Mg^{+2}), Sodium (Na^+), Potassium (K^+), Calcium (Ca^{+2}), Alkalinity (Alk.), Sulfate (So_4) and Electrical Conductivity (EC) for all stations.The CCME WQI method classified the treated water of Mhaijran station as poor which means is not suitable for drinking purposes and this is because of several reasons, such as the dischargesof the pollutants into Shatt Al-Arab River from domestic,agricultural drainage, and industrial process pollutants.The water quality for the two water treatment plants, that are Al- Shaibah and Al Madena Al Riadia, were in good condition in the dry season.Whereas in the wet season, Al- Shaibah was marginal and Al Madena Al Riadia was fair.Al Abass was nearly fair in the dry and wet season whereas the others were ranged from marginal to poor condition.
Keywords: Water treatment plant, Canadian water quality index, Drinking water

1. Introduction

A very important issue related to human health is the accessibility to get clean water, which is necessary to ensure a healthy life [1].Water quality deals with the physical and chemical characteristics concerning all other hydrological properties [2]. Usually, the water quality from any water treatment plant (WTP) is determined by comparing the physicochemical properties of water samples from the inlet and outlet of the WTP with the water quality standards [3]. Drinking water quality guidelines have been introduced to ensure clean, healthy, and safe water for human consumption, thus protecting human health. These are usually based on scientifically evaluated acceptable levels of toxicity to either humans or aquatic organisms.There are several ways to analyze water quality data, which change according to informational aims, sample type, and size of the sampling area. Research in this area has been extensive, as evidenced by the number of methods proposed or developed for classification, modeling, and interpretations of monitoring data [4], and one of the most effective ways to communicate information about water quality trends is to use appropriate indicators [5].The indicators are based on the values of many physicochemical and biological