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Analysis of Inorganic Compounds Cr, Cd, CN, Mn, and Pb in RAW Water and Water Filtration Results in Jakarta-Indonesia

Heruna Tanty, Margaretha Ohyver, Tati Herlina, and Nurlelasari

Abstract — This review is the result of analysis of inorganic compounds Chromium (Cr), Cadmium (Cd), Cyanide (CN), Manganese (Mn) and Lead (Pb) in the raw water, water filtration results of Granular Activated Charcoal(GAC) and water filtration results of Reverse Osmosis(RO). Samples from 30 drinking water refill depot(AMDIU) in five regions of the District Jakarta (DKI Jakarta) taken in May-June 2012. The results show that the raw water contains of CN, Pb, Mn, Cr and Cd respectively 0.0211 mg/l, 0.009 mg/l, 0.130 mg/l, 0.0116 mg/l and 0.0021 mg/l. The water filtration result of GAC contains CN, Pb, Mn, Cr and Cd respectively 0.0197 mg/l, 0.0085 mg/l, 0.116 mg/l, 0.0103 mg/l, and 0.002 mg/l and the result of RO contains CN, Pb, Mn, Cr and Cd respectively 0.0195 mg/l, 0.0078 mg/l, 0.099 mg/l, 0.099 mg/l and 0.0018 mg/l. There are significant differences at $\alpha=0.05$ for Cd, Cr and Mn in the raw water and RO filtration results, while for water, water filtration GAC results are not significantly different. It means the raw water filtration GAC results and RO results contain levels of CN, Pb, Mn, Cr and Cd less than the standards level of the Indonesian Ministry of Health. So the raw water, water filtration results of GAC and RO in DKI Jakarta were qualified health for consumption.

Index Terms— Inorganic Compounds, Raw water, Water filtration, MANOVA

I. INTRODUCTION

Water is a compound that is needed by the body. Water helps the metabolism process as well as a result transformation metabolism and oxygen to all parts of the body cells and regulates body temperature. Water is fundamental to our quality of life, so every day is recommended for human to drink eight glasses of water or at least two and a half liters, that your metabolism will be good.

In 2011 the population of Jakarta, approximately 10,187,595 peoples, they need clean water per day average of 2.38 million m³. The Government through the Regional Water Company (PDAM), until now only be able to distribute 1.53 million m³/day (approximately 39%) to the total water needs

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of residents in Capital Region (DKI) Jakarta⁽⁵⁾. Clean water crisis in Jakarta as sources of ground water in Jakarta had been contaminated by the bacteria E-coli and fecal coli bacteria, The results of Athens research in Jakarta, Bekasi and Tangerang showed 31.6% of ground water containing the bacteria E-coli and fecal coli bacteria⁽⁴⁾. So when referring to the Minister of Health Regulation No. 416/MENKES/PER/1990⁽¹⁰⁾ about clean water requirements, groundwater in Jakarta cannot be consumed.

Water needs of Jakarta residents provide opportunities for medium entrepreneurs to open depots drinking water refill (AMDIU). With prices ranging between USD 3000 - USD 3500 per gallon, lower middle economic people can buy drinking water needs. Within a few years, more than 2000 AMDIU spread in Jakarta, and about 65% AMDIU not listed on the Department of Health. This condition is of course difficult for the government to control the quality of AMDIU.

Drinking water refill (AMDIU) generally use a process filtration calls filters Granular Activated Charcoal (GAC), and today there are also free sold by the filtration process Reverse Osmosis (RO) which can be installed directly in the home.

Water is a universal solvent, so that the water soluble organic or inorganic substances. Water was containing inorganic chemicals 75.3% and 24.7% of organic chemicals. Organic chemicals are needed by the body, because it is cultivated in water treatment chemicals are not removed, while the inorganic chemicals are not needed by the body at all and even harmful to the body. Therefore, their presence in drinking water should be eliminated or reduced in number as small as possible.

The study contains an inorganic compound Cd, Cr, Mn, Pb and CN-ions have been studied by Heruna et al⁽²⁾, from 10 samples around AMDIU Bina Nusantara University Jakarta, it was only Mn a qualified health, four other inorganic compounds (Cd, Cr, Pb and CN) is still above the standards, and the water that has been processed by the RO filter it meets the appropriate standards prescribed by the Ministry of Health⁽¹¹⁾.

This study aimed to determine whether the content of inorganic chemicals compounds Cd, Cr, Pb, Mn and CN in raw water and drinking water refill in Jakarta according quality standards. It also whether there are differences in the raw water, water filtration GAC and RO result of inorganic chemical substances.