



## RESEARCH ARTICLE

**Analytical study for Air-conditions drain water**

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**Abstract**

Urgently, needs to find new sources of water appropriate for human use, especially after the increase in pollution, as well as the increase in the number of inhabitants of the land. In this study, the water drain from the operation of household Air conditioners and Split unit was examined, the proportion of Turbidity, salts and Chloride was tested, in addition, biologically and radiation was examined, to ensure that it was free of any pathogenic. The radio activity was tested also; the results indicated the validity of water for drinking and other uses for human after comparing the results with international standard for drinking water.

**INTRODUCTION**

Human activities caused to increasing the pollution especially for water, and the numbers of humans was annually increasing lead to water consuming, therefore needs to look for new sources for sweet water to appropriate human demands. Water recycling is a critical element for managing our water resources. Through water conservation and recycling, we can meet environmental needs and still have Sustainable development and a viable economy.” USEPA.

The researchers studied this problem and started to recycling the waste water in many countries, Monterey, California recycled water from the Monterey and adjoining towns to irrigate 5000 ha of vegetable crops in the Lower Salinas Valley (Anderson, 2003). *Australia*. Recycled water from storm water and treated wastewater sources is used for toilet flushing in sporting venues, irrigation of open space areas, and to 2,000 residential houses for gardens and toilet flushing. Microfiltration and reverse osmosis treatment processes are used to achieve the required water quality. The scheme will reduce demands on Sydney’s freshwater supplies by about 850,000 m<sup>3</sup>/yr (Cooney, 2001). *Oil refining*. In Australia, a 14,000 m<sup>3</sup>/d dual membrane water reclamation plant has been installed at the Luggage Point sewage treatment plant in Brisbane to supply process water to the BP oil refinery (Don, 2001; Barr, 2002).

Singapore Public Utilities Board has been conducting the Singapore NEW Water project, a 10,000 m<sup>3</sup>/d demonstration project to demonstrate the suitability of recycled water, which has received advanced treatment to supply high purity water for high technology and semiconductor industries (Anderson, 2003). As discussed by Davison *et al.* (2001) wastewater treatment and storm water management for urban water cycle. The conduct of an integrated urban water planning study is often a less costly process than traditional separate water and sewerage strategy studies (Anderson and Iyadurai, 2003). Water recycling can make a substantial contribution to meeting the world’s water needs and to lessening mankind’s impact on the world’s water environment (Anderson, 2001a; Anderson, 2001b).

Radon gas can dissolve and accumulate in water from underground sources (called ground water), such as wells. When water that contains radon is used in the home for showering, washing dishes, and cooking, radon gas escapes from the water and goes into the air. It is similar to carbonated soda drinks where carbon dioxide is dissolved in the soda and is released when you open the bottle. Some radon also stays in the water. Radon is not a concern in water that comes from lakes, rivers, and reservoirs (called surface water), because the radon is released into the air before it ever arrives at your tap.

Only about 1-2 percent of radon in the air comes from drinking water. However breathing radon increases the risk of lung cancer over the course of your lifetime. Some radon stays in the water; drinking water containing radon also presents a risk of developing internal organ cancers, primarily stomach cancer. However this risk is smaller than the risk of developing lung cancer from radon released to air from tap water.

Based on a National Academy of Science report, EPA estimates that radon in drinking water causes about 168 cancer deaths per year: 89% from lung cancer caused by breathing radon released to the indoor air from water and 11% from stomach cancer caused by consuming water containing radon (EPA, 2014). In this study water drain from the operation of household air conditioners examined as a new water source for drinking and human activities.

## Material and method

### Sampling

10 samples were collected from different kinds of house hold air conditions, saved in poly ethylene bottles at 4° C.

### Water Quality Analysis

Water quality refers to the chemical, physical, biological, and radiological characteristics of [water](#) (Hanaor et al., 2014). It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose (Hanaor et al., 2011) It is most frequently used by reference to a set of standards against which compliance can be assessed. The most common standards used to assess water quality relate to health of [ecosystems](#), safety of human contact and water. The water quality was observed like (Smell, Color, Electrical conductivity E.C, pH), and tested chemically like Total Hardness, Ca, Mg, Na and Cl. (APAH, 2005)

In the same time Bacteriological water analysis is a method of analyzing water to estimate the numbers of [bacteria](#) present and, if needed, to find out what sort of bacteria they are.

The plate count method relies on bacteria growing a colony on a nutrient medium so that the colony becomes visible to the naked eye and the number of colonies on a plate can be counted. To be effective, the dilution of the original sample must be arranged so that on average between 30 and 300 colonies of the target bacterium is grown. Fewer than 30 colonies makes the interpretation statistically unsound whilst greater than 300 colonies often results in overlapping colonies and imprecision in the count. To ensure that an appropriate number of colonies will be generated several dilutions are normally cultured. This approach is widely utilized for the evaluation of the effectiveness of water treatment by the inactivation of representative microbial contaminants such as "E. coli" following ASTM D5465 (Hanaor et al., 2011; APAH, 2005).

The laboratory procedure involves making serial dilutions of the sample (1:10, 1:100, 1:1000, etc.) in sterile water and cultivating these on nutrient agar in a dish that is sealed and incubated. Typical media include plate count agar for a general count or MacConkey agar to count Gram-negative bacteria such as *E. coli*. Typically one set of plates is incubated at 22°C and for 24 hours and a second set at 37°C for 24 hours. The composition of the nutrient usually includes reagents that resist the growth of non-target organisms and make the target organism easily identified, often by a color change in the medium. Some recent methods include a fluorescent agent so that counting of the colonies can be automated. At the end of the incubation period the colonies are counted by eye, a procedure that takes a few moments and does not require a microscope as the colonies are typically a few millimeters across.

## Results and Dissections

Air conditions can drain 1 L/hr of water, while 1.5 L/ hr from Split unit. The water Quality was examined for Air conditions & Split unit drain Water the results was summarized in Table 1. We can recognize that all the factors within acceptable standard for drinking water due to this water was evaporated from the heater and compressors of

air conditions that's lead this kind of water is safety for drinking and human activity. This kind of water could be a good water resource in the future if it's truly used.

**Table 1** Air conditions drain Water values for Chemical, physical, and microbiological tests in compared with world standards.

Factors	Mean Value for samples		WHO (2004)	CCME (2007)	Iraq Quality for drinking water (2001)
	Air condition (2 Tons)	Split unit (2 Tons)			
Smell	None	None	None	None	None
Color	None	None	None	None	None
E.C	22	20	-	-	
pH	8	8	-	6.5-8.5	6.5-8.5
Total Hardness mg/L	75	68.6	-	0-75	500
Calcium mg/L	13	11.8	-	200	50
Magnesium mg/L	12	9.4	-	50	50
Chloride mg/L	ND	ND	0.7	-	250
Sodium mg/L	4	2	50	200	200
Most probable number	ND	ND	ND	ND	ND
Coliform	ND	ND	ND	ND	ND
Ecoli	ND	ND	ND	ND	ND

Bacteria test was clean from any bacteria growing in the media. The radon concentration in this study samples were found between (0.009 - 0.06) pCi/L, they were under the world standard for drinking water of 4,000 pCi/L on EPA, and 30 µg/l on WHO due to radon's gas evaporated quickly and the half-life of approximately 3.7 days ..

## Conclusion

Water reuse increases the available supply of water and enables greater human needs to be achieved with less fresh water, thus lessening mankind's impact on the world's water environment. Air conditions and Split unit drain water 1-1.5 L / hr after tested chemically, physically, and microbiological tests, the results conduct it was in rang with world standards. Other ways it's free from radon therefore the water can be used for drinking.

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