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## Expert System To Diagnose The Feasibility Of Drinking Water For Consumption Using Certainty Factor Method In Pdam Tirta Sari Kota Binjai

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### Abstract

*Drinking water is water that has been processed or without processing that meets health requirements and can be drunk directly. Meanwhile, to find out the water is fit for consumption or not. It is difficult to distinguish what causes errors that lead to problems that occur such as health problems. Such as metal content must be safe for consumption. It takes a system that can be used as an information provider to determine the quality of drinking water suitable for consumption which is managed by PDAM Tirta Sari, Binjai City. An expert system using the certainty factor method in diagnosing the feasibility of drinking water for consumption. Drinking water in determining whether or not water is feasible and helps provide valid information about the feasibility of drinking water for consumption to customers.*

**Keywords:** *Drinking Water, Feasibility, Certainty Factor Method, PDAM Tirta Sari Binjai City*

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## INTRODUCTION

Humans meet the needs of body fluids by drinking water. However, not all drinking water is suitable for consumption. To ensure safety for consumption, water must be clean and meet the requirements of healthy water quality. Clean water is defined as water used in households for daily purposes, such as bathing, washing clothes, drinking, cooking and others. Especially for drinking water, its quality must meet the requirements as stipulated in the Law of the Republic of Indonesia Number 17 of 2019 concerning Drinking Water Resources (Permenkes, 2010). Meanwhile, to find out the water is fit for consumption or not. It is difficult to distinguish what causes errors that lead to problems that occur such as health problems. Such as metal content must be safe for consumption. So, we need a system that can be used as an information provider to determine the quality of drinking water suitable for consumption, which is managed by PDAM Tirta Sari, Binjai City.

## RESEARCH METHODS

### Expert system

An expert system is a computer system intended to emulate all aspects (emulates) of an expert's decision making ability. Expert systems make maximum use of specialized knowledge like an expert to solve problems (Rika, 2012).

An expert system, a branch of Artificial Intelligent (AI) is an AI program with a knowledge base obtained from the experience or knowledge of experts or experts in solving problems in certain fields and is supported by an Interference Engine/Inference Engine that performs reasoning or tracking of something or facts and rules that exist in the knowledge base after a search. so that a conclusion is reached (Siswanto, 2010).

The term expert system comes from the term knowledge-based expert system. This term arises because to solve problems, expert systems use the knowledge of an expert that is entered into a computer. Someone who is not an expert uses an expert system to improve problem solving skills, while an expert uses an expert system for knowledge assistants.



- b. Careful study of the facts about a thing to find its essential characteristics or faults and so on
- c. Decisions reached after a careful study of the symptoms or facts about a (Abin, 2012).

From the three definitions above, we can see that in the concept of diagnosis, the concept of prognosis has been implicitly concluded. Thus, in diagnostic work, it is not only identifying the type and characteristics and the background of a particular weakness, but also implies an attempt to predict or predict the possibility of suggesting a solution.

Diagnosis is an analysis of the abnormality or misadjustment of the pattern of symptoms. Similar to medical terms, diagnosis is an activity to determine the type of disease by examining its symptoms. Based on this, diagnosis is the process of examining things that are considered wrong or problematic (Suryanih, 2011).

### **Definition of Feasibility Study**

A project feasibility study is a research on whether or not an investment is feasible. Feasibility results are estimates of a business generating a decent profit when it has been operated. Estimates of success may be interpreted differently according to the party carrying out the business objectives. The feasibility of a project can be analyzed with several aspects so that conclusions emerge whether or not a project is feasible (Hussein, 2003).

Feasibility is a series of in-depth studies to determine whether the proposed project will provide greater benefits than the costs incurred. While business is all activities that aim to seek profit and companies that produce goods and services needed by an economic system. Some businesses produce goods such as cars, computer chips, cereal for breakfast. Others produce services such as insurance, hotels, salons, lodging, music concerts.

To determine the feasibility of a project can be seen from various aspects. Every aspect to be said to be feasible must have a certain standard of value, but the assessment decision is not only made on one aspect. Assessment to determine eligibility must be based on all aspects that will be assessed later. The size of the feasibility of each type of business is different, but the aspects used to state whether a project is feasible or not remain the same.

### **Definition of drinking water**

Based on (Permenkes RI No. 492/Menkes/Per/IV/2010) what is meant by drinking water is water that goes through a processing process or without a processing process that meets health requirements and can be drunk directly. cheaper, can be a third of branded bottled drinking water products. It is not surprising that many consumers have switched to refill drinking water services, causing drinking water depots in various cities in Indonesia (Bambang, 2014).

### **Method Definition Certainty Factor**

Shortliffe Buchanan introduced the Certainty Factor in the creation of MYCIN in 1975 to address the expert's thinking of uncertainty. Certainty Factor (CF) is one of the techniques used to overcome uncertainty in decision making. Certainty Factor can occur under various conditions (Rika, 2012).

In the concept of Certainty Factor, it is also often known as believe and disbelief. Believe is belief, while disbelief is disbelief. Certainty Factor is defined as the following equation:

$$CF(h, e) = MB(h, e) - MD(h, e) \dots \dots \dots (1)$$

Information:

CF [h,e] : Certainty Factor in hypothesis h which is influenced by facts e.

MB [h,e]: Measure of Believe, is the incremental value of the trust hypothesis h influenced by facts e.

MD[h,e]: Measure of Disbelieve, is an increase in the value of distrust hypothesis h is influenced by facts e.

H : hypothesis

E : evidence

## RESULTS AND DISCUSSION

From the calculation results of several existing criteria, it shows that the percentage of the highest confidence level is in the water pH criteria, which is 92.40%.

Criteria	pH	Clarity	Smell	Metal Content	Organism Content
Score	92.40%	61.59%	48.47%	39.72%	38.31%

## CONCLUSION

After the implementation and discussion of the program, the following conclusions can be drawn: the pH value of the water is higher and from the cases that have been calculated using the CF method, it is obtained from 50 cases there are 23 cases of water that are suitable for consumption and the remaining 27 cases of unfit water then more attention can be paid to the quality of drinking water.

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