

The Study Of *Panglukatan* Water Quality at Tirtha Empul Temple's Springs Bali

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Abstract

This research discusses the study of water quality in the springs at Tirtha Empul Temple, in this study the water source in question is a clear water source that emerges from the ground called kalebutan water. Kalebutan water is usually used as a source of drinking water, melukat and for spiritual activities carried out by the people of Manukaya Village, Tampaksiring, Gianyar Regency in particular and the people of Bali and outside Bali in general. aims to determine the quality of panglukatan water in Pura Tirtha Empul's spring which is taken at different times, namely morning, noon and night, in terms of physical parameters (temperature, smell, taste, and color) and water chemistry parameters. (pH, presence of Cl⁻ ions, and presence of metals such as Fe, Mn, Pb, Na, Mg). The sampling technique used was purposive sampling. The instrument used to determine the quality of Panglukatan water at the spring at Tirtha Empul Temple is the standard of drinking water quality. The results showed that the Panglukatan water samples from the spring at Tirtha Empul Temple taken at different times (morning, noon, and night) were all of good quality in terms of physical parameters (temperature, smell, taste, and color) and chemical parameters. water (pH, presence of Cl⁻ ions, and presence of metals such as Fe, Mn, Pb, Na, Mg). Physically, the water source at Tirtha Empul Temple is suitable for use and the good time that the community can do (pamedek) is in the morning from 06.00-10.00.

Keywords

Water Quality Study, Tirtha Empul Temple, Manukaya Village, Bali.

1. Introduction:

Water as the first and foremost gift in the Hindu viewpoint has a special place and respect in the life of the Hindu community in Bali. Hinduism by the Balinese has even been referred to as Tirtha Religion or Water Religion (Anadhi, 2016a). Since almost no ritual is completed without the presence of water, the existence of water is seen as very important in the cycle of life on a "physical" and "spiritual" scale. Water is a need that cannot be separated from human life, water resources are indispensable for various activities such as drinking, agriculture, industry, and households (Wu et al., 2021). So that water becomes a natural resource that meets the needs of many people that need to be protected so that it can still be useful for human life and life and other living things on earth (Faisal & Atmaja, 2019). Because as a source of drinking water and rituals, it must fulfill several aspects, especially in terms of quality, it must meet the requirements of physical, chemical and microbiological qualifications (Talanipa et al., 2018). Therefore, it is important to gather relevant information about water quality (Romero et al., 2016).

(Talanipa et al., 2018), stated that the analysis of the quality of the Motonuno springs in Lohia District, Muna Regency, shows that the quality standards of clean water and drinking water are in accordance with the regulations of the Minister of Health and are suitable for consumption by residents. So, there is no pollution in the Motonuno springs, further (Sulistiyorini et al., 2016), stating that the analysis of water quality at springs in Karang and Kaliorang Districts, East Kutai Regency, analysis of the quality of water from each class is arranged based on its possible uses. for a water designation, based on the results of water quality tests that have been carried out from three locations of springs in the unfavorable category.

These studies on water quality take samples at several points to confirm the quality of water in an area. However, changes in the quality of a water source point, with sampling at different times, are extremely rare. Therefore, this study aims to test the quality of one point of water sources by taking samples at three different times, namely morning, noon, and night. The water source chosen in this study is believed to be a spiritual spiritual cleansing / panglukatan water source located at Tirtha Empul Temple, Gianyar, Bali, Indonesia. The spring at Tirtha Empul Temple is very sacred to Hindus, therefore people from all over Bali, even from outside Bali, use it for self-cleansing and consumption.

The element of sacredness in the water sources that will be investigated gives its own color to the objectives of this study, which is different from the objectives of previous water quality studies which were mostly limited to the quality of water used for drinking water only. In this study, in addition to confirming the quality of water for consumption purposes, the results of this study are also expected to provide confirmation of why the investigated water source is believed to be a spiritual cleansing medium, as well as providing advice on the most appropriate time to collect water for consumption and cleaning purposes self.

Hindu theology views water as very special, Vishnu is one of the Tri Murti gods who uses water as a symbol, besides fire is a symbol of Lord Brahma and wind is a symbol of Lord Shiva. In the Religious Perspective of the Balinese, there is a belief that maintaining the water cycle means maintaining the prosperity of life, maintaining peace of mind and peace of mind, so that water is called tirtha amrta sanjiwani (water as a source of prosperity) and tirtha panglukatan (water as cleansing) (Anadhi, 2016).

Melukat is part of the implementation of the manusa yadnya ceremony, which has the aim of cleansing and purifying the person physically and mentally. Cleansing of negative things and calamities due to the influence of the results of past actions that still affect us today as well as from the deeds of living today. This ceremony is a traditional tradition of Balinese Hindus which is still being carried out from generation to generation (Artana. I Wayan, 2018). In the Sacred Pustaka "Manawa Dharma Sastra" Chapter V sloka 109, stated as follows:

Adbhir gatrani cuddhyanti, manah satyena cuddhyti, cidyatapobhyam buddhir jnanena cuddhyatir.

Translation:

The body is cleansed with water; the mind is cleansed with honesty; the spirit is cleansed with knowledge and asceticism; the mind is cleansed with wisdom. (Pudja & Sudharta, 2002).

With this basis in mind, it is necessary to conduct a study of the quality of water using several parameters, namely physical and chemical parameters. The results of this parameter study will be compared and adjusted to the quality standards that have been determined. Based on the description above, the aim of this research is to find out some physical and chemical water quality parameters from the panglukatan spring at Tirtha Empul Gianyar Temple, Bali which are taken in the morning, afternoon and evening, with quality standards that refer to the Ministerial Regulation. Health of the Republic of Indonesia NO.492 / MENKES / PER / IV / 2010 concerning the quality of drinking water.

2. Method:

The research design used in this research is quantitative. Water quality measurements were carried out at the Udayana University Agricultural Technology Laboratory. The sampling technique was done by using purposive sampling technique. The use of physical and chemical parameters in water quality analysis refers to government regulations regarding drinking water quality standards, so that the selected parameters are standard parameters. The standard of drinking water quality is according to the Regulation of the Minister of Health of the Republic of Indonesia NO.492 / MENKES / PER / IV / 2010.

Criteria for Panglukatan Water samples at the spring at Tirtha Empul Temple were taken

at different times (morning, noon, and night), so that the number studied was 3 samples. Analysis of physical parameters, namely temperature, smell and taste, electro conductivity, TDS. In temperature measurement, a solution thermometer is used, smell and taste inspection uses the senses of smell, taste, and sight, while for electro-conductivity measurements an EC-meter is used, and for TDS measurements a TDS-meter is used. Analysis of water chemical parameters, namely the determination of levels of Fe, Mn, Pb, Na, Mg using the AAS Atomic Absorption Spectrophotometer instrument. Atomic Absorption Spectroscopy is a type of spectrophotometric analysis where the basis of measurement is the measurement of the absorption of a light by an atom, the light that is not absorbed, is transmitted and converted into a measured electrical signal.

AAS is a popular method for metal analysis, because besides being simple, AAS is also sensitive and selective. The tools and materials used are AAS (Atomic Absorption Spectrometry), 50 ml measuring cup, 50 ml Erlenmeyer, standard solutions of Fe, Mn, Pb, Na, Mg. Then the measurement of Fe, Mn, Pb, Na, Mg metal levels in the Panglukatan water sample at the spring at Tirtha Empul Temple was taken at different times (morning, afternoon, and night). For the analysis of Cl levels, the titration technique was carried out. The chloride test in this water sample used the Mohr argentometric method in the range of 1.5 mg / L to 100 mg / L. Chloride compounds in the water sample are titrated with silver nitrate solution in a neutral or slightly alkaline atmosphere (pH 7 to pH 10), using a potassium chromate indicator solution. Silver chloride is deposited quantitatively before the end point of the titration occurs, which is indicated by the formation of silver chromate deposits which are brownish red in color. The water quality parameters obtained were compared with drinking water quality standards. Physically, good drinking water has the characteristics of being at an air temperature of ± 3 0 C, tasteless, colorless, has an electro-conductivity level of 250 mS / cm or a TDS of 500 mg / L. Meanwhile, chemically it can be seen from the chemical content in the water which cannot exceed the quality standard of drinking water according to Permenkes RI No. 492 / MenKes / Per / IV / 2010.

3. Results and Discussion:

Based on the analysis of research that has been carried out on samples of Panglukatan Water at a spring at Tirtha Empul Temple taken at different times (morning, noon, and night), the following can be reported:

3.1. Sample Overview

Kalebutan water used as a sample is in Jalan Tirta, Tampaksiring, Manukaya, Kec. Tampaksiring, Kab. Gianyar, Bali, which is located in the holy place or Tirtha Empul Temple, a bit far from the residential area (approximately 200 meters) and surrounded by large trees, so that the atmosphere of the sample location is very cool with good air quality and far from pollution. air. Water samples were taken using 3 bottles of jars, 1 bottle for morning panglukatan water, 1 bottle for afternoon panglukatan water, and one night panglukatan water. Water samples were taken at different times, namely in the morning at 09.00 WIB, afternoon at 12.30 WIB and at night at 20.00 WIB.

After the water sample has been prepared, it is immediately delivered to the laboratory for physical and chemical testing of the water on the quality of drinking water which is associated with three different times.

3.2. Physical Characteristics of Samples

The results of the analysis of the physical characteristics of the quality of drinking water which were tested included smell / aroma, taste and temperature (Kementrian Kesehatan RI, 2010).

Tab. 1: Physical Characteristics of Samples

No	Analysis Parameters	Unit	STANDARD	NATURAL WATER TAKEN AT DIFFERENT TIME						
				MAX	MORNING	± Until	AFTERNOON	± Until	NIGHT	± Until
PHYSICS										
1	Smell		odorless	odorless			odorless		odorless	
2	Solids	mg/L	1000	616,91	19,148		418,96	35,34	418,9	35,34
3	Taste		tasteless	tasteless			tasteless		tasteless	
4	Temperature	oC	± 3	25,00	0,00		25,00	0,00	25,00	0,00
CHEMISTRY										
1	Iron (Fe)	mg/L	0,3	0,017	0,002		0,036	0,002	0,033	0,002
2	Cadmium (Cd)	mg/L	0,005	ttd			ttd		ttd	
3	Chromium (Cr)	mg/L	0,05	ttd			ttd		ttd	
4	Manganese (Mn)	mg/L	0,1	0,01	0,00		0,04	0,020	0,084	0,040
5	Silver (Ag)	mg/L	0,05	ttd			ttd		ttd	
6	Lead (Pb)	mg/L	0,05	0,160	0,010		0,24	0,010	0,26	0,04
7	Sodium (Na)	mg/L	200	3,70	0,08		3,87	0,012	3,91	0,03
8	Zinc (Zn)	mg/L	5	ttd			ttd		ttd	
9	Copper (Cu)	mg/L	1	ttd			ttd		ttd	
10	Magnesium (Mg)	mg/L	30-150	2,46	0,02		2,42	0,00	2,35	0,01
11	pH	-	6,5-8,5	7,2	0		7,2	0	7,5	0

Observation of sample characteristics is in accordance with the table above, when compared to health standards, it can be explained that the physical form of panglukatan water taken three different times (morning, noon, and night) provides requirements based on (Kementrian Kesehatan RI, 2010) Regarding the requirements for drinking water quality, so scientifically the criteria for drinking water meet the requirements of drinking water quality physically, based on the results of physical tests of water taken at different times did not show a significant difference in odor, solids, taste and water temperature when observed.

3.3. Chemical Characteristics of Samples

The chemical characteristics of panglukatan water in the springs at Tirtha Empul Temple taken at three different times (morning, noon and night) are presented in Table 2. In Table 2, it appears that some chemical tests are focused on the chemical quality of drinking water by analyzing the contamination parameters heavy metals and certain metals that may contaminate water sources.

**Tab. 2: Water Chemical Characteristics
(Panglukatan Water in the Springs at Tirtha Empul Temple).**

No	Analysis Parameters	Unit	STANDARD	NATURAL WATER TAKEN AT DIFFERENT TIME						
				MAX	MORNING	± Until	AFTERNOON	± Until	NIGHT	± Until
PHYSICS										
1	Smell		odorless	odorless			odorless		odorless	
2	Solids	mg/L	1000	616,91	19,148		418,96	35,34	418,9	35,34
3	Taste		tasteless	tasteless			tasteless		tasteless	
4	Temperature	oC	± 3	25,00	0,00		25,00	0,00	25,00	0,00
CHEMISTRY										
1	Iron (Fe)	mg/L	0,3	0,017	0,002		0,036	0,002	0,033	0,002
2	Cadmium (Cd)	mg/L	0,005	ttd			ttd		ttd	
3	Chromium (Cr)	mg/L	0,05	ttd			ttd		ttd	
4	Manganese (Mn)	mg/L	0,1	0,01	0,00		0,04	0,020	0,084	0,040
5	Silver (Ag)	mg/L	0,05	ttd			ttd		ttd	
6	Lead (Pb)	mg/L	0,05	0,160	0,010		0,24	0,010	0,26	0,04
7	Sodium (Na)	mg/L	200	3,70	0,08		3,87	0,012	3,91	0,03
8	Zinc (Zn)	mg/L	5	ttd			ttd		ttd	
9	Copper (Cu)	mg/L	1	ttd			ttd		ttd	
10	Magnesium (Mg)	mg/L	30-150	2,46	0,02		2,42	0,00	2,35	0,01
11	pH	-	6,5-8,5	7,2	0		7,2	0	7,5	0

Source : PERMENKES RI NO 492/ MENKES/PER/IV/2010

The results of chemical analysis of several minerals and pH showed that the panglukatan water taken in the morning, afternoon and evening on several minerals had slightly different levels. Based on the clean water quality requirements, some heavy metals Cd, Cu, Cr, Ag were not detected, except for Pb (lead) with levels exceeding the maximum

limit of 0.05 ppm, where there was an increase in the levels of water extracted day and night. The same thing also happened to Mn and Na metals, there was an accumulation of amounts that showed an increase in levels from the time of taking in the morning. The Mn level is still below the maximum standard of clean water.

Fe content analysis results in water taken in the morning meet the standards while those taken at noon and night exceed the maximum standard of Fe for clean water. Minerals Na and Mg are found in water samples with levels below the minimum requirement value, where the Na levels are increasing in day and night collection while Mg decreases but with insignificant value differences.

Meanwhile, the pH of water in the morning and afternoon has the same PH, and increases at night, but is still within the maximum threshold of pH requirements for clean water. This means that the water taken in the morning, afternoon or evening does not have much effect on pH parameters and is still within the criteria for clean water pH requirements.

Based on the water quality test, panglukatan taken at three different times (morning, afternoon, and evening), namely panglukatan water in the springs at Tirtha Empul Temple, Gianyar, Bali, can be said to be in a good category if the panglukatan is held in the morning from 06.00 to 10.00, and it is not good if the panglukatan is carried out from day to night from 11.00 to 24.00, it can be seen from the relatively high Pb, Mn, and Na. This is in accordance with what is stated in the Yauyurveda Scriptures: 34-35, namely:

*Pratarjitam bhagamugram huvema vayam putramaditeryo vidharta
Addhrascidyamannyamanasturascidraja cidyam bhagam bhaksityaha.*

Translation:

The morning time (pratah) was full of glory (jitam), full of wealth (bhagam), the bright light (ugram) of the son of outer space, Surya (aditehputram). And to God who controls the lokas (ya vidharta) to Him, we adore in our hearts (vayam havema), You know everything (yascit manyamana) that punishes evil (tirascit). You are the king of all creatures (kings). The Lord we worship (yam bhagam) I accept You (ecitbhaksi) who gives a message to all mankind that all worship Him and follow His rules (Griffith, 2005).

Moving on from the above explanation, it is clear that morning (brahma mukta), morning is the time before sunrise, God in his manifestation as Dewa Surya, which means worshipping Lord Surya. In the above mantra requested to Dewa Surya, namely his son Antariksa who has great light to give his power to humans so they can see this ala. It is this power of Surya that humans can see and do activities and if there is no power of Surya, it is difficult for humans to carry out their daily duties. So, at such a glorious time, namely the morning, it is time for humans to wake up and first ask God so that we will always remember Him.

4. Conclusion:

In terms of water physics, the spring at Tirtha Empul Temple is suitable for use and the good time that the community can do (pamedek) is in the morning from 06.00-10.00.

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