# Society Role in Drinking Water Treatment with *Ipomoea carnea*

**Sri Poerwati[1(CA)], Aries Prasetyo[2], Waella Septamari Budi[3]**
[1(CA)] 1 Department Of Environmental Health, Health Polytechnic Ministry Health Surabaya, Indonesia
poersripoerwati@gmail.com
[2] *Department Of Environmental Health, Health Polytechnic Ministry Health Surabaya,* Indonesia
arewinderika@gmail.com
[3] Department Of Environmental Health, Health Polytechnic Ministry Health Surabaya, Indonesia
wseptamarixx@gmail.com

## ABSTRACT

drinking that safe and affordable for all. One of the bacteriological requirements for safe drinking water is the total *coliform* content must be absent (0). Society has done drinking water treatment by *Ipomoea carnea* as an antibacterial as a natural alternative. The most effective concentration of *Ipomoea carnea* as antibacterial drinking water managed by the society is 0.15 grams of leaf extract in 100 mL of drinking water samples which can reduce the number of germs to 80.33%. The purpose of this study to analyze the acceptance and to use of antibacterial *Ipomoea carnea* for drinking water treatment by society. This research is the field conducted in Magetan Regency. Method data collection was carried out by interview using a questionnaire and observation of people who treat drinking water. Analysis quantitative descriptive, based on mean using *central tendency.* The results people received *Ipomoea carnea* as antibacterial for drinking water treatment as many as 56.67% and all those people agree to use *Ipomoea carnea*. It is recommended that society use Ipomoea carnea as an antibacterial for drinking water. It is also to boil water for drinking water.

Keywords : Society, drinking water, *Ipomoea carnea*

## INTRODUCTION

One of the targets for sustainable development (Sustainable Development Goals) in Indonesia by 2030 is to achieve universal and equitable access to safe and affordable drinking water for all. The high access to adequate household drinking water provides optimism for achieving the SDGs targets while continuing to seek, maintain, and improve basic services for safe drinking water for urban households. Access to adequate drinking water sources for rural residents who still need attention from the government [1].

Some areas in Magetan district provide clean water by the society, namely by the society and/or individuals, with the form of clean water management based on the water source used, namely protected springs/sources, wells (deep/shallow) either protected dug wells, dug wells using pumps, drilled wells using pumps, and rainwater reservoirs [2] .

Based on the Regulation of the Minister of Health Number 429/MENKES/PER/IV/2010 concerning Drinking Water Quality Requirements. The requirements state that drinking water must not contain all types of bacteria (*E coli* and Coliform Bacteria). Clean water for drinking water in society nonPDAM as much as 93.64% still does not meet the bacteriological requirements, namely 2 to 1898 /100 mL of the water sample. Water sources come from types of clean water facilities, both from dug wells, deep dug wells, pipelines, and drilled wells[3].

People treat drinking water using antibacterial *Ipomoea carnea* as an alternative to nature. The decrease in bacteriological content was 80.33% from 0.15 grams of *Ipomoea carnea* leaf extract in 100 mL of society-treated drinking water samples. *Ipomoea carnea* contains active ingredients Alkaloids and Flavonoids which can be used as antibacterial [4] .

The purpose of this study was to assess the acceptance and use of antibacterial *Ipomoea carnea* by society in drinking water treatment.

## METHODS

This research is the field conducted in Magetan Regency with a sample of 30 respondents. Respondents in this study were the head of the family, mother, or family member who was responsible for the use of drinking water sources at home. The sampling technique in this study used a purposive sampling method with criteria

of antibacterial *Ipomoea carnea* for drinking water treatment by the society. Method data collection was carried out by interview using a questionnaire and observation of people who treat drinking water.
The independent variable in this study was antibacterial *Ipomoea carnea* for drinking water treatment by the society, while the dependent variable in this study was acceptance and to use of antibacterial *Ipomoea carnea* for drinking water treatment by the society. Acceptance of antibacterial *Ipomoea carnea* for drinking water treatment by the society variables were knowledge, confidence, awareness, risk, altruistic, and egoistic. Use of antibacterial *Ipomoea carnea* for drinking water treatment by the society variables were method, time, concentration and behavior.
Data analysis in this study use quantitative descriptive, based on mean using *central tendency*, and chi-square.

## RESULTS

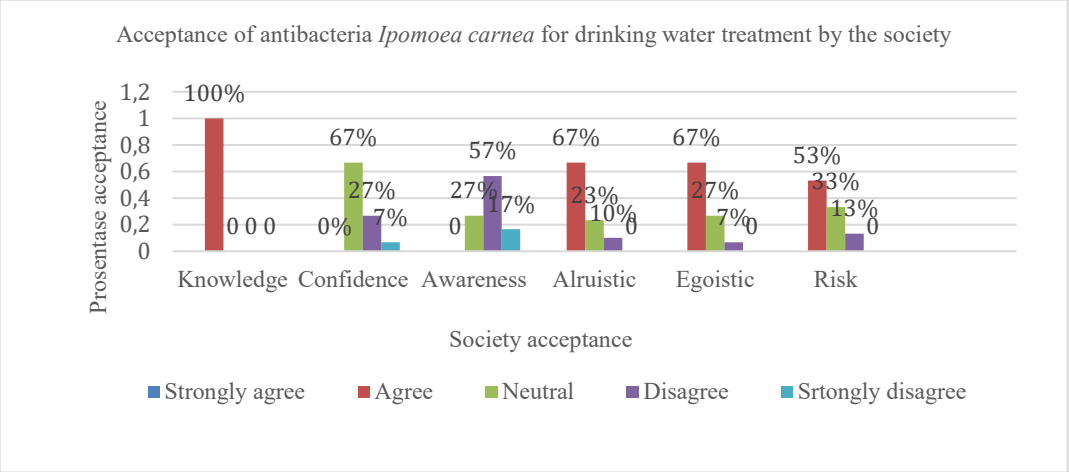


Figure 1. Acceptance of antibacteria *Ipomoea carnea* for drinking water treatment by the society

Society acceptance as shown in figure 1, the society knows about *Ipomoea carnea* by 100%, the society has a belief that 66.67% accepts *Ipomoea carnea* as an antibacterial in drinking water, but as much as 56.67% of the society has a neutral awareness of the acceptance of *Ipomoea carnea* antibacterial. Society agrees that *Ipomoea carnea* can provide welfare for themselves and others by 66.67%, and the society by 53.33% accepts the risk of *Ipomoea carnea* as an antibacterial drinking water

Table 1 Chi-Square Test Results of Respondents' Characteristics of Acceptance

| Respondents' Characteristics | | Acceptance | Not Acceptance | ρ | Description |
|---|---|---|---|---|---|
| Region | | | | 0,19 | No difference |
| - | Poncol Districs | 3 | 3 | | |
| - | Plaosan Districs | 3 | 0 | | |
| - | Sidorejo Districs | 0 | 3 | | |
| - | Panekan Districs | 5 | 4 | | |
| - | Kawedanan Districs | 2 | 2 | | |
| - | Parang Districs | 4 | 1 | | |
| Gender | | | | 1,00 | No difference |
| - | Male | 10 | 8 | | |
| - | Female | 7 | 5 | | |
| Family Status | | | | 0,10 | No difference |
| - | Head of family | 10 | 5 | | |
| - | Housewife | 7 | 5 | | |
| - | Member of family | | | | |

| | | | | |
|---|---|---|---|---|
| | 0 | 3 | | |
| Education | | | 0,68 | No difference |
| - Elementary School | 3 | 1 | | |
| - Junior High School | 3 | 1 | | |
| - Senior High School | 10 | 10 | | |
| - College | 1 | 1 | | |
| Water Sources | | | 1,00 | No difference |
| - Springs | 12 | 10 | | |
| - Deep wells | 5 | 3 | | |

Chi-square test results of respondents' characteristics of acceptance are shown in table 1, this means that the technology is accepted by all levels of society, both male and female, in all locations, at all levels of education, whether using springs or deep wells.

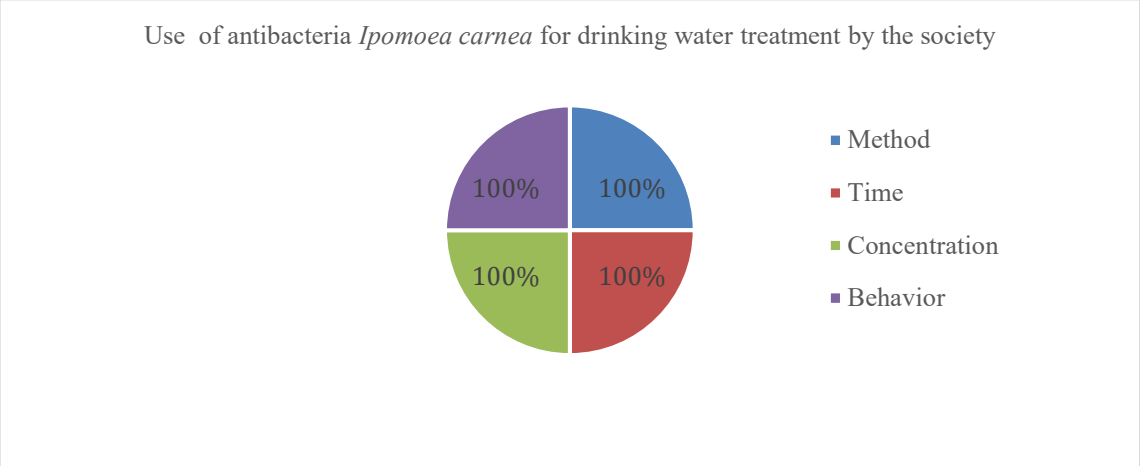


Figure 2. Use of antibacterial *Ipomoea carnea* for drinking water treatment by the society

The results of observations of the use of *Ipomoea carnea* were analyzed from the method, time, concentration, and social behavior in treating drinking water. The respondent's method of using *Ipomoea carnea* as an antibacterial 100% answered yes. The time the respondent used *Ipomoea carnea* as an antibacterial 100% was appropriate, namely before the drinking water was used the extract was put into the drinking water reservoir. The concentration of *Ipomoea carnea* as an antibacterial used by respondents was 100% appropriate, namely 0.15gram extract/100 mL water sample. The society uses the conversion concentration, which is 15 grams/10 liters of water in drinking water reservoirs.
Respondents' behavior includes: washing hands before and after the mixing process, closing drinking water reservoirs, maintaining cleanliness around drinking water reservoirs and regularly cleaning drinking water reservoirs 100% answered yes. Figure 2 showing the use of antibacterial *Ipomoea carnea* by the society for drinking water treatment.

## DISCUSSION

The results show acceptance of 56.67% average and 43.33% < average, so it can be accepted. The acceptance of *Ipomoea carnea* by the society for drinking water treatment consists of several variables, namely knowledge, belief, awareness, welfare for others (Altruistic), own welfare (Egoistic), and risk to new technology. The knowledge variable with yes and no answers used an average of 50% accepted and < 50% did not accept, while

the answers from the belief, awareness, altruistic, egoistic, and risk variables using the options strongly agree, agree, neutral, disagree and strongly disagree agree to use the mean with these intervals and categories.
The application in the society using antibacterial *Ipomoea carnea* leaf extract with a concentration of 15gram/10,000mL in society reservoirs has a significant germ number value with the value of the germ number that was examined for total Coliform MPN in the laboratory with the lowest germ value 2 colonies/100mL drinking water samples and the highest 38 colonies/100 mL of the drinking water sample. Application with an antibacterial treatment of *Ipomoea carnea* leaf extract with a concentration of 15 grams/10,000 mL in society reservoirs.
Characteristics of respondents which include region, gender, status in the family, education and water sources used show > 0.05 so that the antibacterial technology of Ipomoea carnea is accepted by all circles of society, both male and female. and women, in all locations, at all levels of education, whether using springs or deep wells.
Society accepts *Ipomoea carnea* as an antibacterial for drinking water treatment as much as 56.67% and people who agree that all use *Ipomoea carnea*.
Acceptance was obtained from 100% of the people knowing about *Ipomoea carnea* shown by this plant by 97%, people easily encountering *Ipomoea carnea* by 97% and knowing how *Ipomoea carnea* reproduces by 90%. 60% male respondents with 50% family head status and 66.7% graduated from high school have knowledge that exceeds the average knowledge of the respondents. and women, in all locations, at all levels of education, whether using springs or deep wells.
Society accepts *Ipomoea carnea* as an antibacterial for drinking water treatment as much as 56.67% and people who agree that all use *Ipomoea carnea*.
Acceptance was obtained from 100% of the people knowing about *Ipomoea carnea* shown by this plant by 97%, people easily encountering *Ipomoea carnea* by 97% and knowing how *Ipomoea carnea* reproduces by 90%. 60% male respondents with 50% family head status and 66.7% graduated from high school have knowledge that exceeds the average knowledge of the respondents. Women tend to pay more attention to the prices of products and services and are more cost-conscious than men. Furthermore, women are usually more involved in purchasing and thus more responsible and careful with money than men[5] . Given men's propensity to play with technology, the value men charge for technology is likely to be higher than the value women place for the same technology[6]. In research it was revealed that gender can reduce the effects of anxiety. Women tend to be more sensitive to their feelings and social roles are closer to the social mirror effect of the surrounding environment. These two reasons ultimately make the effect of anxiety greater for women than men. Second, gender is empirically proven to reduce the relationship of hedonic motivation, price values, habits, and anxiety on behavioral intentions. In addition, gender also reduces the relationship between habits and conditions that facilitate use behavior. Men have stronger effects on hedonic motivation and behavior, while women have stronger effects on value, anxiety, and facilitating conditions. In family status, the head of the family and the housewife as the wife have the same rights in determining the attitude and behavior of accepting a technology. The advantages of men over women are functional. This means that a man who is in charge of finding and being able to meet the needs of his wife and family, then he can become a leader in the household. Men and women also have the same social function, namely carrying out domestic tasks in the household. Therefore, if a man cannot fulfill his obligation to meet the needs of his wife or family, and the wife is the backbone of the family, then the advantages of being the leader of the family certainly belong to the woman (wife)[7]. Concerning a person's healthy behavior, the existence of education is a process that is deliberately sought in society to educate, foster, and build individuals both in the home environment or in their social environment and is responsible for being a driving force towards progress. Every human being, both individually and in groups, has different behavior. Some people behave always consider all aspects around them and some act as they please. School as an educational institution, in which a person can learn how to behave in a good and healthy manner, learn the norms or rules that are obeyed. So it is hoped that education can change a person's behavior or healthy living behavior for the better because one of the functions of education is to develop patterns of behavior (social) following existing norms and rules. Therefore, one's education will change a person to understand everything such as knowing healthy living behavior that should be done by the society which will change the quality of the social environment to be cleaner, healthier, and more comfortable, because if we know about maintaining health, it is something that must be done by the society. person or society. Education is something that affects our daily behavior and environment so that education is the main capital in all things[8].
Public belief 66.67% neutral accepts *Ipomoea carnea* because they do not agree, all parts of *Ipomoea carnea* can be used both roots, stems, leaves, flowers, and fruit except 53.33% of respondents strongly agree that stems can be used. 70% of the society strongly agree that the existence of *Ipomoea carnea* will disturb the environment if it is not used and 73.33% of the society strongly agree to use it so that the environment is clean/no weeds. This belief is 46.7% of men as heads of neutral families with 50% education graduating from high school.

Public awareness does not agree to accept *Ipomoea carnea* by 56.67%, although people are very aware that *Ipomoea carnea* can be used as antibacterial drinking water, people are aware that their drinking water sources contain bacteria and people are aware that they will give antibacterial *Ipomoea carnea* to drinking water sources both tofu and tofu. contain bacteria or not. The educational background of those who graduated from high school was 36.7% disagreed, male and female and 13.3% housewives were neutral.

The altruistic value, namely the welfare benefits for other people is neutral, obtained from 73.33% of the society strongly agree that using *Ipomoea carnea* as an antibacterial, 60% of the society strongly agree that the environment will be clean, drinking water will meet health requirements while the society agrees 43.33 % using antibacterial *Ipomoea carnea* in drinking water sources will reduce diarrheal disease at a low cost. The neutral altruistic value of the respondent's characteristics was obtained from the family status of the head of the family by 23.33%, educated people who graduated from high school with male gender 26.7% agreed.

The egoistic value, namely the welfare benefits for oneself, 66.67% agree, where 53.33% strongly agree that using *Ipomoea carnea* as antibacterial drinking water will meet health requirements, 56.67% strongly agree that it can reduce diarrheal disease, 50% strongly agree because reduce weeds and 40% agree to use low cost. 23.3% of men agreed, 20% of family heads and educated people who graduated from high school agreed.

The risk of the benefits of the new technology 53.33% agree, because the society 53.33%, strongly agree that it is not disturbed, 60% is easy to use *Ipomoea carnea* as an antibacterial and 43.33% strongly agrees because it is suitable for new technology, 40% agrees because it is cheap.

All genders, 16.7% neutral, including housewives, 20% of educated people who graduated from high school, strongly agree.

The attitude factor of each user behavior with two variables, namely ease of use and usefulness[9]. These two variables can explain aspects of user behavior, so user acceptance is influenced by benefits and convenience. Perceptions about the ease of use of technology are defined as a measure by which a person believes that the technology can be easily understood and used, i.e. the technology is very easy to learn, does what the user wants, easily improves user skills, and is easy to operate. Perception of usefulness is defined as a measure where the use of technology is believed to bring benefits to those who use it, including usefulness, namely: making work easier, more useful, increasing productivity and effectiveness, namely enhancing effectiveness and developing job performance[10] .

Technology has increasingly focused on perceived risk and benefit. The general public's perception of risk is usually based on factual information[11], but is also important on feelings, ethics, preventive differences, and attitudes, and can be ambiguous. Perhaps not always fact based, decision making about technology is influenced by perceptions of risk, and these perceptions are based on terms of reference and knowledge. The perceived risks and benefits of technology are not just concepts, they are constantly subject to change by the current cultural understanding, which is an acceptable risk. New technology can be perceived as risky, but when it is embedded in routine behavior, that perception can change to not being risky. In addition, perceived risks and benefits also affect each other; the level of perceived benefit affects the level of perceived risk acceptance. The ease with which the technology is used will not affect the respondent's attitude towards the use of technology. There is no effect between perceptions of the ease of using technology and user attitudes[12]

The use of *Ipomoea carnea* as an antibacterial is very good on the method, time, concentration, and behavior of the society. People use *Ipomoea carnea* extract by directly putting the extract into 10 liters of drinking water without stirring it before use with a concentration of 15 grams. Society washes their hands before and after the mixing process, closes drinking water reservoirs, maintains cleanliness around drinking water reservoirs, and regularly cleans drinking water reservoirs. Health status is a related relationship between health behavior and overall health. Interventions are often more effective in holistic health outcomes[13] . States that the effects of health promotion interventions take up to 6 weeks and 14 days to get a chance, so behavior requires time to change[14] [15]. People-based on their knowledge and knowing the risks and benefits of the new technology obtained will accept the antibacterial *Ipomoea carnea*, because the general public's risk perception is usually based on factual information, but is also important on feelings, ethics, preventive differences, and attitudes, and can ambiguous. Perhaps not always fact-based, technology decision-making is influenced by the perception of risk; and this perception is based on a frame of reference and knowledge. People use antibacterial *Ipomoea carnea* very well because the perceived risks and benefits of the technology are not fixed concepts; rather, they are constantly subject to change by today's cultural understanding of acceptable risk: a new technology may be perceived as risky, but when it is embedded in routine behavior, that perception may change to be non-risky. In addition, perceived risks and benefits also affect each other; the level of perceived benefit affects the level of perceived risk acceptance. In addition, the acceptance and use of antibacterial *Ipomoea*

*carnea* requires a process so that behavior requires the application of time to change. The variable that has the biggest influence on people's behavior is the characteristics of innovation[16].

## CONCLUSION

The society received *Ipomoea carnea* as an antibacterial by 56.67% and of the people who received it they all used *Ipomoea carnea* for drinking water treatment.

The role of the society in drinking water treatment with the use of antibacterial *Ipomoea carnea* can be carried out in individual reservoirs on a household scale or a larger communal scale. So that the application of antibacterial *Ipomoea carnea* in a sustainable manner will be able to be carried out for the safety and feasibility of drinking water for the society, it can be a step to fulfill sustainable development goals.

## REFERENCES


1. Statistics Indonesia. 2019. *Potret Awal Tujuan Pembangunan Berkelanjutan (Sustainable Development Goals) Di Indonesia*, Badan Pusat Statistik
2. Dinas Kesehatan Kabupaten Magetan. 2019. *Profil Dinas Kesehatan Kabuapten Magetan Tahun 2019*
3. Dinas Kesehatan Kabupaten Magetan. 2019. *Laporan Hasil Pemeriksaan Bakteriologis*, Labkesda.
4. Poerwati, Sri,. Probandari,Ari,. Sutrisno, Joko,. Handono Ari Ramelan. 2019. Improved Drinking Water Safety using *Ipomoea Carnea. Indian Journal of Forensic Medicine & Toxicology. Vol. 13, No. 4Vol. 13, No. 4* : 761-766
5. Coombs, P. 1984. *Memerangi Kemiskinan di Pedesaan melalui Pendidikan Non-formal. Terjemahan H. Ahmed Manzoor.* Jakarta: CV Rajawali.
6. Ajzen, I., & Fishbein, M. 1980. *Understanding Attitudes and Predicting Social Behavior. Englewood Cliff : NJ : Prentice-Hall*
7. Ishaq, Zamroni. *2014. "Diskursus Kepemimpinan Suami Istri dalam Keluarga: Pandangan Mufassir Klasik dan Kontemporer", Jurnal Umul Qura,* Vol IV No 2.
8. Bloom, B. S. 1956. *Taxonomy of Educational Objectives: Handbook 1, Cognitive Domain. New York: David McKay.*
9. M., Zinatelh, N., Cragg, P., & Cavaye, A. 1997. *Personal Computing Acceptable Factors in Small Firms: A Structural Equation Model. MIS Quarterly*: 279-299
10. Davis, F. D. 1989. *Perceived Usefulness, Perceived Ease to Use of Information Technology Management Information System Quarterly : 42.*
11. Poortvliet, P., Marijn, Sanders, Liese, Weijma, Jan, dan Vries, J.R.D. 2017. *Acceptance of new sanitation: The role of end-users pro-environmental personal norms and risk and benefit perceptions.Elsevier Ltd. Water Research* 131 (2018) 90e99
12. Wibowo, A., 2017. *Kajian tentang Perilaku Pengguna Sistem Informasi dengan Pendekatan Technology Acceptance Model (TAM),* hlm.2-9 . Arief W. (edt) dalam Indonesia modern Dalam budaya Informasi. Konferensi Nasional Sistem *Informasi*, Yogyakarta.
13. Ufholz, Kelsey, Elise, dan Harlow, L., L. 2017. *Modeling Multiple Health Behaviors and General Health. Preventive Medicine,*105 : 127–134
14. George, S.M., Wilson, S.D.K., dan Horn, M.L.V. 2018. *Project SHINE: Effects of a Randomized Family-Based Health Promotion Program on The Physical Activity of African American Parents. Journal of Behavioral Medicine.* 41 (4) : 537-549.
15. Fisher, Karin, Laikin, Andrea, M., Sharp, Katianne, M. Howard, Criddle, Catherine, A., dan Karlson, C.W. 2018. *Temporal relationship between daily pain and actigraphy sleep patterns in pediatric sickle cell disease. Journal of Behavioral Medicine.* 41 (3) : 416-422.
16. Fanning, Jason, Walkup, Michael, P., Ambrosius, Walter, T., Brawley, Lawrence, R., Ip, Edward, H., Marsh, Anthony, P., dan Rajeski, W.J. 2018. *Change in health-related quality of life and social-cognitive outcomes in obese, older adults in a randomized controlled weight-loss trial: Does physical activity behavior matter?. Journal of Behavioral Medicine*. 41 (3) : 299-308.