

# GENESA DAN PENGOLAHAN AIRTANAH PAYAU SEBAGAI SUMBER AIR BERSIH WARGA DESA GADEN, KECAMATAN TRUCUK, KABUPATEN KLATEN, PROVINSI JAWA TENGAH

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## INTISARI

Airtanah masih dimanfaatkan sebagian besar penduduk di Indonesia untuk memenuhi kebutuhan sehari-hari. Permasalahan airtanah yang terdapat di Desa Gaden, Kecamatan Trucuk, Kabupaten Klaten, Provinsi Jawa Tengah adalah bersifat payau. Masyarakat sekitar pun tidak dapat menggunakan sumber air tersebut untuk kebutuhan domestik untuk dikonsumsi. Namun, masih adapula beberapa warga yang masih menggunakan air sumur untuk memasak, mandi dan mencuci. Apabila air tersebut dikonsumsi maka akan menimbulkan gangguan kesehatan. Tujuan penelitian adalah mengetahui genesa airtanah payau daerah penelitian, mengetahui kualitas airtanah daerah penelitian, dan merancang pengolahan airtanah payau untuk memenuhi kebutuhan penduduk di daerah penelitian.

Metode yang digunakan dalam penelitian adalah metode survey dan pemetaan lapangan, metode simple random sampling, systematic random sampling, dan metode purposive sampling, metode analisis laboratorium, metode Diagram Trilinier Piper untuk analisis hidrogeokimia airtanah dan metode wawancara. Parameter fisik pengujian kualitas air fisik yang diuji yaitu rasa, bau, kekeruhan, suhu, TDS, dan DHL. Parameter kimia yang diuji yaitu pH, salinitas, kesadahan sebagai  $\text{CaCO}_3$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$  dan  $\text{SO}_4^{2-}$  dengan acuan PerMenKes No.416/MENKES/PER/IX/1990 tentang Syarat-syarat dan Pengawasan Kualitas Air. Metode pengolahan airtanah payau yang digunakan yaitu menggunakan metode *fixed-bed*. Pengolahan dilakukan dengan 2 ukuran butir yang berbeda yaitu 0,3 cm dan 0,5 cm dengan waktu kontak 30 menit.

Hasil *plotting* Diagram Trilinier Piper terhadap sampel airtanah menunjukkan didominasi oleh kandungan NaCl. Airtanah payau daerah penelitian diakibatkan oleh connate water yaitu air laut purba yang terjebak. Nilai efektifitas percobaan pengolahan airtanah payau menggunakan kolom adsorpsi dengan bentonit ukuran butir 0,3 cm dapat menurunkan kadar TDS hingga 41,96%, DHL hingga 43,24%, salinitas hingga 30%, natrium hingga 29,74%, klorida hingga 27,01%, bikarbonat hingga 26,51% dan kesadahan hingga 13,58%, sedangkan dengan bentonit ukuran butir 0,5 cm dapat menurunkan kadar TDS hingga 35,87%, DHL hingga 41,74%, salinitas hingga 25%, natrium hingga 0%, klorida hingga 23,23%, bikarbonat hingga 24,71% dan kesadahan hingga 13,58%. Airtanah payau setelah pengolahan tersebut masih berada diatas standar bakumutu.

**Kata Kunci:** Airtanah payau, Pengolahan air, Adsorpsi, Bentonit

**BRACKISH GROUNDWATER GENESIS AND TREATMENT AS FRESH  
WATER SOURCE FOR CITIZEN IN GADEN VILLAGE,  
TRUCUK SUB-DISTRICT, KLATEN REGENCY,  
CENTRAL JAVA PROVINCE**

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**ABSTRACT**

*Most of the citizen in Indonesia uses groundwater as water source to fulfill their daily needs. The groundwater problem is found in Gaden Village, Trucuk Sub-district, Klaten Regency, Central Java Province are brackish groundwater. The community can't use the groundwater for domestic needs to consumption. However, many people are still use the well waters for cooking, bathing and washing. If the water is consumed it will cause health problems. Purposes of this research are to know the genesis of brackish groundwater in research area, to know the water quality in research area, and to know the experimental design in brackish groundwater treatment to fulfil their daily needs.*

*This research carried out survey and mapping method, simple random sampling and systematic random sampling method, purposive sampling method to determine sample taking, laboratory analysis method, Trilinear Piper Diagram method to analyze hydrogeochemical of the groundwater and interview method. Physical parameters consist of taste, smell, turbidity, temperature, TDS, and Electrical Conductivity. Chemical parameters consist of pH, salinity, hardness as  $\text{CaCO}_3$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$ , and  $\text{SO}_4^{2-}$ . The physical parameters of physical water quality testing tested were taste, odor, turbidity, temperature, TDS, and DHL. Chemical parameters tested were pH, salinity, hardness as  $\text{CaCO}_3$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$  and  $\text{SO}_4^{2-}$  with reference to Minister of Health Regulation No.416 / MENKES / PER / IX / 1990 concerning Quality and Quality Supervision Water. Brackish groundwater treatment is carried out fixed-bed method. Processing is done with 2 different grain sizes, namely 0.3 cm and 0.5 cm with a contact time of 30 minutes.*

*Piper Linear Diagram plotting results on groundwater samples are dominated by NaCl. Brackish groundwater in research area is caused by connate water, which is ancient sea water trapped. Experiment of brackish groundwater used adsorption columns shows that with grain size of 0.3 cm bentonite can reduce TDS levels up to 41,96%, EC up to 43,24%, Salinity up to 30%, Sodium to 29,74%, Chloride to 27,01%, Bicarbonate up to 26,51% and Hardness up to 13,58%, while with a grain size of 0.5 cm bentonite can reduce levels of TDS to 35,87%, EC to 41,74%, Salinity to 25%, Sodium to 0%, Chloride to 23,23%, Bicarbonate up to 24,71% and Hardness up to 13,58%. Brackish groundwater after processing is still above the quality standard.*

**Kata Kunci: Brackish groundwater, water treatment, adsorption, bentonite**