JFatwa
ISSN: 2232-1047
eISSN: 0127-8886
Journal of Fatwa Management and Research
مجلة إدارة وبحوث الفتاوى | Jurnal Pengurusan dan Penyelidikan Fatwa

JAN 2026 | VOL. 31 | NO. 1
ISSN: 2232-1047 eISSN: 0127-8886
www.jfatwa.usim.edu.my

ASSESSMENT OF SOIL SUITABILITY FOR SERTU PURIFICATION BASED ON GEOLOGICAL AND FIQH VIEWS

Wan Ainaa Mardhiah Wan Zahari[1a], Faizal Pakir[2bc]*, Aziman Madun[3bc], Nur Zainatul Nadra Zainol[4a] and Syaza Azhari[5d]

[a] Islamic Studies Department, Centre for General Studies & Co-curricular, Universiti Tun Hussein Onn, MALAYSIA.
E-mail: mardhiah@uthm.edu.my[1]
E-mail: nadra@uthm.edu.my[4]
[b] Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn, MALAYSIA.
[c] Research Centre for Soft Soil, Integrated institute for Engineering, Universiti Tun Hussein Onn, MALAYSIA.
E-mail: faizalp@uthm.edu.my[2]
E-mail: aziman@uthm.edu.my[3]
[d] Faculty of Science and Technology, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800. Nilai, Negeri Sembilan, MALAYSIA.
E-mail: syaza@usim.edu.my[5]

*Corresponding Author: faizalp@uthm.edu.my
Received: 5 August 2025 *Accepted:3 January 2026* *Published: 30 January 2026*
DOI: https://doi.org.10.33102/jfatwa.vol.31no1.738

ABSTRACT

The sertu purification process is an essential aspect of Islamic jurisprudence for removing najs mughallazah (severe impurities), such as contamination from dogs or pigs and their descendents. A key requirement in this process involves using water mixed with soil. However, ambiguity remains regarding the specific types and characteristics of soil that are suitable for use. This uncertainty raises practical and legal concerns, particularly as sertu is increasingly practiced in both personal and industrial contexts, and commercial soil products for sertu become more common. This study aims to evaluate the suitability of different soils for use in the sertu process based on their physical and chemical properties. Seven soil samples of varying origins and depths were analyzed using laboratory tests including particle size distribution, specific gravity, pH, organic content, X-ray diffraction (XRD), X-ray fluorescence (XRF), and cation exchange capacity (CEC). The results were assessed to determine whether differences in soil composition affect their performance and compliance with fiqh requirements. Findings indicate that while most soils share similar mineral compositions, variations in acidity, texture, and organic matter may influence their effectiveness. This study offers a scientific basis for selecting appropriate soil for sertu, supporting both technical validation and fiqh clarity in religious purification practices. The integration of geotechnical data with Islamic jurisprudence enhances the understanding and reliability of sertu, ensuring its correct implementation across various settings

Keywords: *Sertu, Taharah, Najs Mughallazah, Soil Suitability, Islamic Purification*

1. INTRODUCTION

The concept of purification (*taharah)* is a fundamental element in Islamic jurisprudence, particularly in dealing with *najs* (impurities). Najs means anything that is impure or filthy. In Islamic law, it refers to something impure that prevents the validity of prayer, such as blood and urine. Every category of *najs* must be purified, whether it is tangible and can be seen and felt by the senses (*'ayni*), or intangible and cannot be seen or felt by the senses (*hukmi*), such as what may be found on the body, clothing, or place. There are three categories of *najs*: *mukhaffafah* (light), *mutawassitah* (moderate), and *mughallazah* (severe). The details of these categories are as follows (al-Khin, 1992):

i. *Najs mukhaffafah* is the urine of a male child under two years old who consumes nothing except his mother's milk.

ii. *Najs mutawassitah* is all impurities other than *mukhaffafah* and *mughallazah*, for example, blood, adult urine, human and animal feces, alcohol, and so on.

iii. *Najs mughallazah* is dogs and pigs, as well as anything born from both or from either one of them.

Thus, for puriying *najs mughallazah* consisting of dog, pigs and their descendants are by doing *sertu* process which is considered a *ta'abbudiy* in Islam. According to Shaarani (2021), t*a'abbudiy* refers to rulings in Islamic law whose meaning, cause, or rationale (*'illah*) behind their legislation is not known. In such matters, a person is required to simply carry out what is commanded without needing to know the underlying *'illah* or reason. Among the definitions given by scholars regarding *ta'abbudiy* is (al-Khin, 1992):

> "It is something whose purpose is not understood by the intellect, whether it pertains to acts of worship or other matters."

Sertu means to purify any part of the body that comes into contact with *najs mughallazah* (severe impurities, specifically dogs and pigs) by washing once with water mixed with soil and six times with pure water; in other words, it means tanning (Kamus Dewan Fourth Edition, 2017). While definition of *sertu* in terminology refers to the purification method from *najs mughallazah*, which involves washing the affected item (whether it is clothing, the body, or a place) seven times, one of which must be with water mixed with soil. This applies whether the impurity is *najs aini* (visible impurities with physical attributes such as colour or smell like faeces, urine and blood) or *najs hukmi* (impurities that have dried and left no visible trace, colour, or smell) (al-Hadhrami, 2019).

According to the Shāfiʿī school of thought, the purification process requires one wash using water mixed with soil, followed by six additional washes with pure water (al-Nawawī, n.d). The basis for this ruling is derived from the following *hadith*:

> *"The purification of the vessel belonging to one of you if a dog licks it is to wash it seven times, the first time with soil."*
>
> (al-Bukhari, Kitab al-Wudu', no. 172; Muslim, Kitab al-Haiḍ, no. 279)

This ruling reflects the emphasis placed on ritual cleanliness in Islam, which extends beyond individual practice and applies equally to shared and public spaces such as homes, mosques, schools, and communal facilities (Ibn Qudāmah, 1997; Ibn Hajar, 2003). Therefore, ensuring that *sertu* is implemented correctly and confidently is crucial in contemporary Muslim life.

In general, there are many writings that discuss issues related to *sertu*, including *al-Majmu' Sharh al-Muhadhdhab*, *Nihayah al-Muhtaj ila Sharh Minhaj*, *al-Raudah al-Talibin wa Umdatal-Muftin*, *al-Umm*, and *al-Risalah*. Some of these efforts represent the endeavors of fiqh scholars who strive to identify the various areas and methods of purification (Ahmad et al., 2023).

Among the wisdoms behind *sertu* is to prevent diseases caused by germs carried by animals and to demonstrate that Islam places great emphasis on cleanliness in the use of everyday utensils (JAKIM, 2013). The ruling on *sertu* is based on several evidences, including a hadith that prescribes washing a vessel licked by a dog seven times, one of which must be with water mixed with soil. According to the Shafi'i school, it is recommended (sunat) to use the soil mixture in either the first or second washing, and this soil mixture cannot be substituted with other materials such as soap, plants, or others (al-Aizh, n.d.).

Although the obligation to use soil in *sertu* is clearly stated in hadith and classical legal texts, there remains ambiguity about what constitutes valid soil. Based on the text of the hadith, the Prophet Muhammad (peace be upon him) did not specify the particular type of soil that should be used. Therefore, this matter remains under its general ruling, meaning that any type of soil may be used as long as it is not contaminated with impurities (*najs*). However, in today's context, there is a need to establish a standard for the soil to be used in the *sertu* process, as some equipment and tools are sensitive to the use of ordinary soil (Abd Aziz et al, 2021).

Soil varies significantly in its physical and chemical characteristics, depending on its source, composition, and even depth. Key properties such as particle size, pH, organic matter, mineral content, and cation exchange capacity may

influence its ability to purify. In Malaysia, processed soils such as kaolin or bentonite are increasingly commercialised for Islamic cleansing (*sertu*) purpose. However, questions remain whether such materials meet the fiqh requirement of ṭurāb ṭāhir (pure, natural soil) (Talib et al., 2017; Md Nor et al., 2020). This raises important questions: Is any kind of soil valid for *sertu*? Do processing methods or depth of collection compromise the legitimacy of the soil? These uncertainties are increasingly relevant as *sertu* becomes more widely practiced, and as commercial soil products for purification become available (Hashim et al., 2021).

The lack of standardised scientific evaluation presents a potential risk. Without empirical assessment aligned with Islamic principles, inappropriate use of soil may render the *sertu* process invalid. Previous works have highlighted this gap, calling for a more rigorous integration of geotechnical testing and fiqh analysis to guide *sertu* applications (Omar et al., 2019; Abd Rahman et al., 2020). Moreover, interdisciplinary approaches in halal studies increasingly support the harmonisation of scientific evidence and Islamic law in matters of purification practice (Kamali, 2006; Zainul et al., 2018).

Hence, this study aims to evaluate the suitability of various soils used in the *sertu* process by examining their physical and chemical characteristics while aligning these findings with the requirements of Islamic jurisprudence. It also seeks to bridge the gap between geotechnical understanding and *fiqh* principles to ensure that *sertu* practices are implemented correctly, effectively, and with confidence among the broader Muslim community.

2. METHODOLOGY

This study adopts an interdisciplinary methodological framework that integrates fiqh-based document analysis with geological and laboratory-based soil characterisation to assess the suitability of soil for the sertu purification process. The methodological design is structured to reflect the dual nature of sertu, which involves both religious requirements grounded in Islamic jurisprudence and physical–chemical interactions associated with soil materials.

Accordingly, the methodology is divided into two main components. The first component focuses on the analysis of classical fiqh texts, contemporary fatwas, and authoritative guidelines to identify the jurisprudential criteria governing the use of soil in sertu purification. The second component involves the collection, preparation, and laboratory testing of soils from different geological backgrounds to evaluate their physical and chemical properties in relation to these fiqh-derived criteria.

Laboratory testing was conducted to characterise the physical and chemical properties of selected soil samples. The tests included particle size distribution, specific gravity, pH value, organic matter content, mineralogical composition via X-ray Diffraction (XRD), elemental composition via X-ray Fluorescence (XRF), and cation exchange capacity (CEC). Parameters such as pH, CEC, and mineralogy were chosen due to their influence on the soil's ability to bind and neutralise contaminants, as supported in soil behaviour studies (Mitchell & Soga, 2005; Brady & Weil, 2008).

2.1 Document Analysis

The primary sources used in this study are classical fiqh texts and fatwa/ Islamic ruling or opinion from national and international authorities. While other sources are halal certification guidelines such as Garis Panduan Sertu Menurut Perspektif Islam, 2013 and scholar interpretations.

2.2 Soil Sampling and Preparation

To reflect the diversity of geological materials that may be encountered in practical sertu applications, soil samples were collected from locations with different geological and mineralogical backgrounds. Table 1 shows the seven (7) varieties of soil that were chosen in total. Each sort of soil is gathered from various geological formations. Five soil samples were collected from various areas surrounding Parit Raja and Ayer Hitam. Sampling for residual soil was done on slopes at various altitudes along Sri Gading Road: 0.3, 3 and 5 meters. Clay soil samples were taken at the Universiti Tun Hussein Onn Malaysia (UTHM) campus at a depth of approximately 1.5 meters below the surface. The acidic residual soil was collected from the Ayer Hitam region. Two (2) industrial soils, kaolinite and bentonite, were obtained from Kaolin (M) Sdn Bhd, which mines and provides industrial players.

Table 1. Soil types that were chosen for this study.

No.	Type of Soil	Description of Soil
1	Three types of residual soil	Weathered granite soil at different depth: 0.3 meter 3.0 meter 5.0 meter
2	Acidic soil	Residual soil resulting from the weathering of metasedimentary rock. (1.5 meter below surface)
3	Clay soil	Marine sediment soil
4	Two types of industrial soil	Industrial soil bentonite Industrial soil kaolinite

All samples were prepared using a consistent drying method. The soil was oven-dried at 105°C for 24 hours to remove moisture, then manually crushed and ground into finer particles. The soil is then crushed and ground before being sieved to a size of less than 63 microns.

2.3 Laboratory Test

Each prepared soil sample was tested in the laboratory to determine its physical and chemical properties relevant to its suitability for the *sertu* purification process. The physical tests included particle size distribution, specific gravity, moisture content, Atterberg limits (liquid and plastic limits), pH value, and organic content. These tests were used to assess the texture, density, and consistency of the soil.

For chemical analysis, X-ray diffraction (XRD) was used to identify the mineral composition of each sample, while X-ray fluorescence (XRF) was conducted to determine the major chemical elements. Cation exchange capacity (CEC) was also measured to evaluate the soil's ability to retain and exchange ions. Soil pH was further assessed in the chemical tests to support the interpretation of chemical reactivity.

All tests were conducted according to standard laboratory procedures, including BS 1377 and instrument-specific analytical protocols.

3. RESULTS & DISCUSSION

3.1 Sertu in Fiqh Perspective

The discussion on *sertu* will review the concept of *najs* according to the four schools of thought; Hanafi, Maliki, Shafi'i and Hanbali. All schools of thought agree on the ruling of prohibition (*haram*) concerning every part of a pig's body, as its prohibition has been explicitly stated in the revealed texts (*nas shara'*). The pig is also considered *haram* because it consumes more filth and is regarded as filthier than the dog, to the extent that it is impermissible to keep it under any circumstances and it is even allowed to kill it.

However, each school of thought differs in its opinion regarding the impurity of dogs. The explanations are as follows:

a) Hanafi school – The dog itself is not considered impure (*najs*) in its entirety; only its saliva is regarded as impure. Washing the vessel licked by a dog is not viewed as an act of *ta'abbudiyy* (pure worship) because washing such a vessel

is not considered an act of devotion (al- Kāsānī, n.d).

b) Maliki school – The dog is not considered impure, whether it is used for guarding or hunting. Only its licking is considered impure. Meanwhile, washing the vessel is viewed purely as an act of *ta'abbudiyy* (ritual devotion) (Sahnūn, n.d).

c) Shafi'i and Hanbali schools – Both schools agree that the dog is entirely impure (*najs* as a whole) (al-Nawawī, n.d. & Ibn Qudamah, n.d).

Meanwhile, the methods of purifying *najs mughallazah* (severe impurities) from dogs and pigs according to each school of thought are as follows:

Firstly, the Hanafi school prescribes washing it three times or until the traces of the impurity are removed using *mutlaq* (pure) water. Secondly, the Maliki school views dogs as pure overall (no impurity) (Ibn ʿĀshūr, 1946 & Khalil ibn Ishaq, n.d.). Thus, washing contaminated area by a dog seven times is *ta'abbud*i (worship-related, not for mandatory impurity removal), and soil is not required (al-Dardīr & ʿAlī, 1995). For pig impurity, it must be washed until the traces disappear, without specifying a number of washes. Both schools do not require water mixed with soil during the sertu process.

Next, the Shafi'i and Hanbali schools agree that *najs mughallazah* must be washed seven times, with the first washing using water mixed with soil.

In conclusion, there are clear differences in determining the ruling on the impurity of dogs and pigs and also the methods of purification for both types of *najs mughallazah* based on the perspectives of the different schools of thought (Yusof & Zahari et al., 2023).

3.1.1 Soil in Al-Quran

Soil is a collection of natural materials found on the earth's surface, organized in horizons and composed of mineral substances, organic matter, water, and air, functioning as a medium for plant growth (Arifin et al., 2019).

Al-Qur'an discusses soil using various terms. At least four different words are used to refer to soil in the Al-Qur'an. Below are some of the most frequently mentioned terminologies in al-Quran:

1. *Turab* (تراب)

The word *turab* (تراب) and its derivatives—*turab* (,(تراب *atrab* (,(أتراب *taraib* (ترائب ,(and *matrabah* (مترتح)—appear 22 times in the Qur'an. According to *al-Mu'jam*

al-Wasith, *turab* means dust, referring to fine particles from the earth's surface (Majmaʿ al-Lughah al-ʿArabiyyah, 1960).

2. *Shalshal*(صلصال)

The term *shalshal* (صلصال) is mentioned four times in the Qur'an, all in the same form and always in the context of human creation. *Shalshal* refers to clay that has dried due to the sun's heat, not through firing like pottery. Ibn Manzur (2010) explains that *shalshal* is sun-dried clay mixed with sand (Majmaʿ al-Lughah al-ʿArabiyyah, 1960 & Ibn Manẓūr, 2010).

3. *Ardh* (أرض)

The word *ardh* appears 448 times in the Qur'an, always in its singular form (*mufrad)*. It means the ground on which humans stand. Although its plural form is *ardhun* (,(أرضون this plural never occurs in the Qur'an (Al-Ashfahani, 2009). According to Ibn Faris (n.d), the most common meaning is "everything below and facing the sky." For example, when riding a horse, the sky is above, and the *ardh* (earth) is the ground beneath its feet. Similarly, it is what humans walk upon (al-Rāghib al-Iṣfahānī, 2009; Ibn Fāris, n.d.).

4. *Thin* (الطين)

The word *thin* (الطين) appears 12 times in the Qur'an without any derivatives. *Thin* means *al-wahl*—mud, clay, or earth mixed with water. It is the verbal noun (masdar) of the root *thana* (,(طان which carries the meaning "to smear with mud" (Al-Rāghib al-Iṣfahānī, 2009).

All the aforementioned soil types are permissible in Islam for sertu implementation, provided the soil remains pure and free from any impurities (najs).

3.1.2 Fatwa and Islamic Ruling Analysis Related to Sertu

This section analyses national and international fatwas or Islamic rulings on *sertu* implementation.

First, fatwa from Muzakarah of the National Fatwa Committee of National Council for Religious Affairs Malaysia (MKI) on 9th Muzakarah 1985 regarding the National Fatwa on severe impurities (najs mughallazah) and *sertu* entitle "Ruling on Purifying Najs Mughallazah Using Pure Water and Soil" mentioned the decision that (*JAKIM,* 2016):

> *The soil used for sertu must be pure and uncontaminated. It cannot be substitute with other materials except in cases of dire necessity and this must be approved by Shariah experts.*

Second, the 76th Muzakarah of the National Fatwa Committee (21-23 November 2006) ruled on *Ruling of Samak for Najis Mughallazah Using Clay Soap (JAKIM,* 2016):

> *"Permissible to use clay/tahara soap if natural, clean, and free from impurities, with clay content exceeding other substances. Processed/fired clay(ceramics) invalid."*

Fatwa from Selangor State entitles the Ruling on using clay for *sertu* purification mentioned the decision:

> *Permissible to use clay if it is natural, clean and free from impurities. Processed or fired clay (such as ceramics) is not valid for use.*
>
> sertu for najis mughallazah is an act of ta'abbud (ritual servitude) and therefore must be carried out by Muslims only. It highlights two key reasons: first, the washing procedure is considered a form of worship that stems from faith in Allah's command; second, limiting the process to Muslims is treated as a precautionary measure (ihtiyat) to ensure the sertu is performed exactly as required by Islamic law.

Fourth, Perlis State Fatwa Committee Meeting No. 64/2023 on 28-29 August 2023 / 11-12 Safar 1445H; Decision No. 1/64 stated:

> *Soil must be clean and free from impurities. Process sertu by first wash with soil-water and 6 times with mutlak (pure) water washes. The scope limited to areas or equipment confirmed contaminated by dog saliva. No full premises sertu required.*

"Perlis State Fatwa Committee (Meeting 64/2023) mandates clean, impurity-free soil for sertu, following standard 1 soil + 6 water washes on confirmed contamination sites only (Jabatan Mufti Negeri Perlis, 2023)

> *Recognises the use of soil in solution or powder form, as long as it originates from pure soil and does not change the fundamental principles of sertu.*

Next, the International Fatwas and Opinions regarding the *sertu* implementation are as follows:

Fatwa from Dar al-Ifta' al-Misriyyah, n.d stated that soil is an essential component in cleansing heavy impurities, based on hadith. It is also permissible to replace soil with something that can take its place in the present

time, such as modern substances that can achieve purification. This is because what is ultimately required is the attainment of purity (*taharah*).

Hence, the general conclusion is that *sertu* is obligatory for severe impurities (*najs mughallazah*) such as dogs, pigs or their descendants, before use in halal contexts. The soil must be utilised, but its form may be adapted, provided it retains the original properties which are pure, natural, and uncontaminated. In industrial settings, modifications in implementation soil-based product or solutions are permissible if verified by Shariah experts. The *Garis Panduan Sertu Menurut Perspektif Islam by JAKIM* should also be referred to as the primary reference for all *sertu* practitioners."

3.2 Soil from Geological Perspective

3.2.1 Soil Physical Testing

Several physical tests were conducted to identify the basic characteristics of each soil sample. These included particle size distribution, specific gravity, moisture content, Atterberg limits (liquid and plastic limits), soil pH, and organic content. The tests were carried out according to BS 1377 standards to determine the texture, consistency, and general classification of the soils.

Particle Size Distribution

A particle size distribution test was performed on seven soil samples, including residual soil from various depths, clay, acidic soil, and two industrial soils. The "Hydrometer Analysis" approach revealed that only Industrial Soils A and B had 100% silt and clay. The acidic soil had 7% sand, whereas clay had 27%. The remaining soil had much more sand (51%, 73%, and 62% at depths of 0.3m, 3m, and 5m), but less than 50% silt and clay. The data suggest that soils with high sand content, notably residual soil and clay, contain unweathered quartz and organic components, whereas acidic and industrial soils have more homogeneous mineral composition but no organic matter.

Table 2: Particle size distribution results for soil samples.

No	Type of Soil	Particle Size Distribution (%)			
		Gravel (< 2 mm)	**Sand (2 mm - 0.064 mm)**	**Silt (0.064 mm - 0.002 mm)**	**Clay (> 0.002 mm)**
1	Residual soil (0.3m)	0	51	24	25
2	Residual soil (3.0m)	0	73	17	10

3	Residual soil (5.0m)	0	62	29	9
4	Clay soil	0	27	44	29
5	Acidic soil	0	7	81	12
6	Bentonite	0	0	90	10
7	Kaolinite	0	0	83	17

Specific Gravity (SG)

The specific gravity test was performed on seven soil types to determine their density in relation to water, which has a density of around 1. The tests were conducted using a pycnometer with hoover aid in accordance with BS 1377: Part 2: 1990. The results revealed that specific gravity values varied from 2.39 to 2.78, with no significant variations amongst the samples. Variations in these values were linked to the organic content of the soils, resulting in a lower total specific gravity.

Table 3: Specific gravity results for soil samples.

Type of Soil	Specific Gravity
Residual soil (0.3m)	2.53
Residual soil (3m)	2.78
Residual soil (5m)	2.76
Clay soil	2.66
Acidic soil	2.63
Bentonite	2.48
Kaolinite	2.39

pH

The soil pH test was carried out to assess the acidity or alkalinity of the soil, which ranged from 0 to 14. A pH reading of 6.5 to 7.5 is considered neutral; over 7.5 denotes alkalinity, while below 6.5 suggests acidity. Rainfall, organic matter decomposition, soil mineralogy, groundwater flow, and rock weathering are all elements that can have an impact on soil pH. The technique utilised in this test on seven distinct soil types was BS 1377-3:1990. A METTLER TOLEDO pH Meter was used to measure the pH of each soil sample, and the findings are shown in Table 4 . The findings revealed that all examined soil types were acidic, with pH values less than 7.

Table 4: pH value results of soil samples.

Type of Soil	pH Value
Residual soil (0.3m)	4.09
Residual soil (3m)	5.06
Residual soil (5m)	5.27
Clay soil	3.19
Acidic soil	2.64
Bentonite	6.91
Kaolinite	4.13

Organic Content (loss on ignition)

The loss on ignition test is designed to evaluate the organic content of soil samples collected for investigation. Because the samples were gathered from regions containing organic elements such as twigs, plant roots, and the remains of other species, determining organic content is critical. The organic matter content is evaluated by heating all soil samples to extremely high temperatures. The weight difference before and after the loss on ignition procedure represents the proportion of organic matter in the soil samples. This test conforms to BS 1377-3:1990. The Table 5 displays the results of the organic content test. The data indicates that the organic content of all studied soil types is extremely low, with little substantial variation between them.

Table 5: Organic content results for soil samples.

	Organic Content (%)		
Type of Soil	**Batch A**	**Batch B**	**Average**
Residual soil (0.3m)	2.3	1.9	2.1
Residual soil (3m)	1.3	1.1	1.2
Residual soil (5m)	1.0	0.9	0.9
Clay soil	4.5	4.7	4.6
Acidic soil	1.0	1.0	1.0
Bentonite	0.7	0.8	0.7
Kaolinite	0.4	0.4	0.4

3.2.1 Soil Chemical Testing

Chemical tests were performed to analyse the mineral and elemental composition of the soils. X-ray diffraction (XRD) was used to identify minerals, while X-ray fluorescence (XRF) measured the chemical elements. Cation exchange capacity (CEC) was tested to assess the soil's ability to absorb ions. Soil pH was also measured to support the chemical profile. All tests followed standard laboratory procedures.

X- Ray Diffraction (XRD)

The laboratory results for the XRD test were found that all the soils contain the same minerals, which are commonly found in many soils: Quartz, Kaolinite, Illite, and Montmorillonite. The presence of kaolinite and quartz in all samples aligns with common findings in tropical residual soils (Brady & Weil, 2008) and may contribute to their cleansing capacity.

X-Ray Fluorescence (XRF)

The Table 6 below summarizes the results of the XRF tests conducted. The findings indicate that all types of soil tested in the XRF analysis have the same chemical composition, namely silicon, aluminium, iron, titanium, potassium, sulphur, magnesium, calcium, and phosphorus, with insignificant percentage differences. Silicon and aluminium are the most abundant elements (dominant) in the samples.

Table 6: X-ray Fluorescence (XRF) results for soil samples.

TYPE OF SOIL	PERCENTAGE (%)									TOTAL (%)
	Si	**Al**	**Fe**	**Ti**	**K**	**S**	**Mg**	**Ca**	**P**	
Residual soil (0.3)	48.6	45.5	4.49	0.57	0.39	0.14	-	-	-	99.69
Residual soil (3.0)	57.1	38	3.69	0.5	0.17	0.14	-	-	-	99.6
Residual soil (5.0)	55.3	39.2	4.23	0.42	0.55	0.16	-	-	-	99.86
Acidic soil	65	25	2.12	0.8	4.66	1.8	0.38	-	-	99.76
Clay soil	68	23	2.82	1.3	2.47	.29	0.69	0.19	-	98.76
Bentonite	57.4	32.8	6.63	0.66	1.74	0.17	-	0.21	0.22	99.83
Kaolinite	54.8	30.1	2.02	1.02	6.16	-	1.78	-	-	95.88

*__Si__=Silicone, __Al__=Aluminium, __Fe__=Ferum, __Ti__=Titanium , __K__=Kalium , __S__=Sulphur , __Mg__=Magnesium , __Ca__=Calcium , __P__=Phosphorus

Cation Exchange Capacity (CEC)

Cation exchange capacity (CEC) is a measure of the total negative charge in the soil that attracts plant nutrient cations such as calcium (Ca^{2+}), magnesium (Mg^{2+}), and potassium (K^{+}). Therefore, CEC is a soil property that describes its ability to supply nutrient cations to the soil solution for plant uptake. Based on the results of the study of seven soil samples used for the *sertu* process in the

Table 7 the CEC values obtained fall within the clay soil range of 15-40 mEq/100g. Since the soil is a mixture of different particle sizes (sand, silt, and clay), the type of clay minerals and organic matter in varying proportions, the dominant components and soil pH determine the CEC of the soil.

Table 7: Cation exchange capacity results for soil samples.

Type of Soil	**CEC mEq/100g**
Residual Soil 0.3m	26.19
Residual Soil 3m	17.83
Residual Soil 5m	24.22
Clay Soil	21.06
Acidic Soil	19.32
Bentonite	18.43
Kaolinite	19.95

The cation exchange capacity (CEC) of soil organic matter and several clay minerals varies with pH. Generally, CEC is lowest at soil pH levels of 3.5 to 4.0 and increases as pH rises, particularly when acidic soils are limed. Since CEC can differ with soil pH, it is common practice to measure CEC at pH 7.0. Additionally, it is important to note that some positive charges may occur on the surfaces of certain soil minerals at low pH. These positive charges can retain anions (negatively charged ions) such as chloride (Cl^-) and sulfate (SO_4^{2-}).

4. CONCLUSION

This study was conducted to discuss the sertu concept and implementation in Islamic and Science perspective. Islamic part mention about the concept of sertu and also the fatwa related to permissibility of sertu. Suitability of various types of soil for use in the Islamic *sertu* purification process as the soil is pure. Based on fatwa analysis, the review of authoritative Islamic legal sources including MKI and state fatwa shows that the primary requirements for soil used in *sertu* concern its religious purity rather than detailed scientific specifications. Fatwas consistently emphasise that the soil must be *ṭāhir* (clean and pure), naturally occurring in its original state, and free from any form of contamination or prohibited substances. No fatwa prescribes specific criteria related to particle size, mineral composition, colour, or chemical properties; thus, any natural soil is deemed acceptable so long as it fulfils the foundational conditions outlined in Islamic jurisprudence.

For the laboratory analysis of physical and chemical characteristics, tests included particle size distribution, pH, specific gravity, organic content, mineral composition (XRD and XRF), and cation exchange capacity (CEC) shows the results that all soil samples exhibited comparable properties, with

only minimal variation between them.

All tested soils demonstrated similar physical and chemical characteristics, with no significant differences that would disqualify their use for *sertu*. While there is currently not formally established scientific or religious standard defining acceptable soil parameters for *sertu*, the findings suggest that the soils examined are generally suitable and do not contradict the essential conditions outlined in Islamic jurisprudence. The soils meet the basic fiqh requirements of being clean, pure, and in a natural state, and no evidence was found to suggest that the minor scientific differences impact their ritual effectiveness.

This study provides an initial scientific foundation supporting the use of a wide range of natural soils in the *sertu* process, without the need to limit its application to any specific soil type, as long as the soil is clean and free from impurities. This conclusion offers reassurance to both the public and relevant authorities that common, naturally occurring soils may be valid and effectively used in *sertu* practices.

Future research is recommended to further explore the effectiveness and Islamic views of processed or commercial soil products, and to support the potential development of technical guidelines or standards that align scientific findings with established Islamic legal principles.

5. ACKNOWLEDGEMENT

This research was supported by Universiti Tun Hussein Onn Malaysia (UTHM) through MDR (Vot Q717). Communication of this research is also made possible through monetary assistance by Universiti Tun Hussein Onn Malaysia and the UTHM Publisher's Office via Publication Fund E15216.

6. REFERENCES

Abd Rahman, M., Salleh, M., & Yusof, N. (2020). Halal impurity removal: Soil composition and cleansing effectiveness. *International Journal of Islamic Studies*, 12(2), 55–67.

Abd Aziz, S., Salleh, M. M. M., Ab Halim, M. A., & Said, H. N. A. M. (2021). Amalan terbaik pelaksanaan sertu dalam industri halal di Malaysia: Best practices of Islamic cleansing (*sertu*) implementation in the Malaysian halal industry. *Journal of Fatwa Management and Research*, *23*(1), 29-52.

Ahmad, N., Zahari, W. A. M. W., Zainol, N. Z. N., Mustapha, A. S., Pakir, F., & Hussin, A. (2023). Konsep Samak dan Sertu: Satu Perbandingan Menurut Perspektif Islam: The Concept of Samak and *Sertu*: A Comparison According to Islamic Perspective. *Journal of Quranic Sciences and Research*, *4*(2), 8-18.

al-Aizh, Hajah Durriyyah. (n.d.). Fiqh al-Ibadat 'ala al-Mazhab al-Shafi'i. t.tp: t.pt.

al-Bukhārī, M. i. (2001). *Ṣaḥīḥ al-Bukhārī* (Jil. 1). Beirut: Dār Ṭaiyyibah.

al-Hadhrami, S. b. S. (2019). *Safinatun najah wa balaghatur raghib* (Z. M. al-Bakri, Penterjemah). Putrajaya: Institut Kefahaman Islam Malaysia (IKIM).

al-Kāsānī, ʿA. b. Y. (n.d.). *Al-Badā'i al-ṣanā'i fī tartīb al-sharā'iʿ* (Jil. 1). Beirut: Dār al-Kutub al-ʿIlmiyyah.

al-Khin, M. (1992). Al-Fiqh Al-Manhaji Mazhab Al-Syafie. Damsyik: Dar Al-Qalam.

al-Ashfahani, A.-R. (2009). Mufradat Alfadz Al-Qur'an. Dar al-Qalam.

al-Dardīr, A., & ʿAlī, Ḥ. M. (1995). *al-Sharḥ al-Ṣaghīr ʿalā Aqrab al-Masālik* (Vol. 1). Dar al-Fikr.

al-Manzur, I. (2010). Lisan Al-'Arab. Dar Shadir.

al-Nawawī, Y. (n.d.). Al-Majmū' sharḥ al-Muḥadhdhab (Jil. 2, Bab al-Taharah). Beirut: Dār al-Fikr.

al-Rāghib al-Iṣfahānī, Ḥ. M. (2009). *Mufradāt alfāẓ al-Qurʾān* (Ed. Ṣ. al-Miṣrī). Damaskus: Dār al-Qalam.

al-Shirazi, I. (2009). Al-Muhadhdhab fī Fiqh al-Imām al-Shāfiʿī. Beirut: Dār al-Kutub al-'Ilmiyyah.

Arifin, M., Putri, N. D., Sandrawati, A., & Harryanto, R. (2019). Pengaruh Posisi Lereng terhadap Sifat Fisika dan Kimia Tanah pada Inceptisols di Jatinangor. SoilREns, 16(2), 37–44.

Brady, N. C., & Weil, R. R. (2008). *The nature and properties of soils* (14th ed.). Pearson Prentice Hall.

Hashim, N. H., Zainol, N. N., & Mohd Arif, S. (2021). Halal cleansing products in the market: Compliance and perception. *Journal of Fatwa Management and Research*, 23(1), 22–35.

Ibn ʿĀshūr, Muḥammad al-Ṭāhir. (1946). *Maqāṣid al-Sharīʿah al-Islāmiyyah*. Tunis: Maṭbaʿat al-Dawlah.

Ibn Fāris, A. Ḥ. (n.d.). *Maqāyīs al-lughah* (Vol. 1, entri "ʾ-r-ḍ"). Kairo: Dār al-Hadīth.

Ibn Hajar al-Haytami. (2003). *Tuhfah al-Muhtāj fī Sharḥ al-Minhāj* (Vol. 1). Beirut: Dār al-Fikr.

Ibn Qudāmah, A. A. (1997). *Al-Mughnī* (Vol. 1). Cairo: Maktabah al-Qāhirah.

Isnad Arifin. (2025). Hubungan antara Al-Quran dan ilmu Sains dalam memahami tentang Tanah. Jurnal Cakrawala Akademika (JCA). Vol. 1 No 6. 1835-1846

Jabatan Kemajuan Islam Malaysia. (2013). Garis Panduan Sertu Menurut Perspektif Islam. Selangor: JAKIM.

Jawatankuasa Fatwa Majlis Kebangsaan Bagi Hal Ehwal Ugama Islam Malaysia. (2016). *Kompilasi Muzakarah Jawatankuasa Fatwa Kebangsaan* (Muzakarah ke-9, 22-23 Oktober 1985, hlm. 145-148). Putrajaya: Jabatan Kemajuan Islam Malaysia (JAKIM). Retrieved from https://www.islam.gov.my/images/ePenerbitan KOMPILASI_MUZAKARAH_MKI_2016.pdf

Jawatankuasa Fatwa Majlis Kebangsaan Bagi Hal Ehwal Ugama Islam Malaysia. (2016). *Kompilasi Muzakarah Jawatankuasa Fatwa Kebangsaan* (Muzakarah ke-76, 21-23 November 2006: Hukum Samak Najis Mughallazah Menggunakan Sabun Tanah Liat, hlm. 567-569). Putrajaya: JAKIM. Retrieved from https://www.islam.gov.my/images/ePenerbitan/KOMPILASI_MUZAKARAH_MKI_2016.pdf

Kamali, M. H. (2006). *An introduction to Shari'ah and science*. Kuala Lumpur: International Institute of Advanced Islamic Studies (IAIS) Malaysia.

Kamus Dewan Fourth Edition, 2017

Khalīl ibn Isḥāq. (n.d.). *Mukhtaṣar Khalīl*. Dār al-Gharb al-Islāmī. al-Dardīr, A. (1995). *al-Sharḥ al-Ṣaghīr*. Dār al-Fikr.

Majmaʿ al-Lughah al-ʿArabiyyah. (1960). *Al-Muʿjam al-Wasīṭ* (Jil. 2, ms. 1085-1086, entri "turāb"). Kairo: Dār al-Daʿwah

Md Nor, M. R., Yaacob, M. F. M., & Hussain, M. A. (2020). The development of halal cleaning agents for najis mughallazah purification. *Journal of Islamic Product Research*, 2(1), 12–25.

Mitchell, J. K., & Soga, K. (2005). *Fundamentals of soil behavior* (3rd ed.). John Wiley & Sons.

Muslim ibn al-Ḥajjāj. (n.d.). *Ṣaḥīḥ Muslim* (Hadith No. 279). Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī.

Omar, M., Ismail, R., & Halim, N. (2019). Scientific assessment of soil properties for halal cleansing (*sertu*). *Journal of Halal Research*, 5(1), 40–48.

Sahnūn, ʿA. b. Saʿīd. (n.d.). *Al-Mudawwanah al-kubrā* (Jil. 1, Bab al-Taharah). Beirut: Dār al-Kutub al-ʿIlmiyyah.

Shaarani, A. Z. M. (2021). Konsep Ta'abbudiy Dan Ma'qulat Al-Ma'na Dan Kesannya Dalam Pengeluaran Hukum Syarak Semasa: Analisis Aplikasi

Dalam Operasi Zakat Dan Produk Bersuci. *Journal of Fatwa Management and Research*, *26*(1), 114-136.

Talib, A. R. A., Ali, M. S. S., & Hussin, N. (2017). Halal purification method of najis mughallazah: Public understanding and practices. *Journal of Fatwa Management and Research*, 9(1), 1–16.

Yusof, U. A., & Zahari, W. A. M. W. (2023). Hukum Najis Mughallazah dan Kaedah Sertu Menurut Pandangan Empat Mazhab: The Concept of Samak and *Sertu*: A Comparison According to Islamic Perspective. *Journal of Quranic Sciences and Research*, *4*(2), 19-27.

Zainul, R., Hamid, S. N., & Wahid, H. (2018). Towards an interdisciplinary approach in halal studies: Integrating science and Shariah. *Journal of Islamic Science and Technology*, 2(2), 15–29.