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DAYTIME CRESCENT MOON OBSERVATION AS A FOUNDATION FOR STRENGTHENING THE GLOBAL ISLAMIC CALENDAR: AN ASTRONOMICAL AND *MAQASID AL-SHARI'AH* APPROACH

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ABSTRACT

The Islamic calendar holds a vital position in Muslim religious life, particularly in determining the timing of obligatory worship such as Ramadan fasting and the celebration of Eid al-Fitr. Traditionally, the beginning of the Hijri month is established through post-sunset crescent moon sighting, a practice that frequently results in differing determinations due to weather conditions, geographical variations, and technological limitations. From the perspective of *naṣṣ* (revealed texts) and classical fiqh, the obligation of moon observation is firmly rooted in Qur'anic guidance and Prophetic traditions. Nevertheless, classical jurists emphasized that the fundamental objective of rukyat is attaining certainty (*yaqīn*) regarding the onset of worship time, thereby allowing the use of reliable methods that fulfill this objective. Advancements in modern astronomy have introduced daytime moon observation conducted after conjunction (*ijtimā'*) as a scientifically viable alternative that enhances precision and consistency in determining the beginning of the Hijri month. This study investigates whether daytime moon observation can serve as a valid foundation for a more accurate and globally consistent Islamic calendar in accordance with the principles of *maqāṣid al-sharī'ah*. The research aims to assess the scientific credibility of daytime moon observation and examine its compatibility with Islamic legal objectives. This study adopts a qualitative research approach based on an extensive literature review and a case study of daytime moon observations conducted at the University of Muhammadiyah Makassar Observatory. The findings indicate that with advanced astronomical instruments and astrophotography, daytime moon observation is not only feasible but also capable of producing more accurate and verifiable results than traditional naked-eye methods. Addressing classical objections that restrict rukyat to post-sunset observation, this study engages contemporary fiqh council discussions and historical precedents, including the acceptance of astronomical instruments in Islamic tradition. The study concludes that daytime moon observation aligns with *maqāṣid al-sharī'ah*, particularly in preserving religion (*ḥifẓ al-dīn*) through accurate worship timing, preserving intellect (*ḥifẓ al-'aql*) by encouraging scientific reasoning, and removing hardship (*raf' al-ḥaraj*). Consequently, this method offers a scientifically and theologically grounded solution for developing a unified and reliable global Islamic calendar.

Introduction

The Islamic calendar is a fundamental element in the lives of Muslims because it functions as a determinant of the main times of worship, such as fasting during Ramadhan, Eid al-Fitr and Eid Al-Adha. The Islamic calendar, which is based on the movement of the moon, differs significantly from the Gregorian calendar, which is based on the movement of the sun. One of the traditional methods used to determine the start of the Hijri month is moon sighting (the first crescent), which is usually done after sunset. This practice follows the Sunnah of Prophet Muhammad (peace be upon him), who advocated *rukyat*, meaning the direct observation of the crescent moon, to mark the beginning of a new month (Izzuddin, 2019). From the perspective of *naṣ* Surah Al-Baqarah verse 185 with translation "So whoever sights (the crescent of) the month, let him fast it; and whoever is ill or on a journey - then an equal number of other days" and classical fiqh, this *rukyat* obligation has been interpreted by leading jurists across the four madhhabs, some of whom permit the use of reliable instruments when direct sighting is impeded, provided that certainty (*yaqīn*) is achieved. This method is considered the most authentic by the majority of Islamic juristic schools. However, in practice, moon sighting is often hindered by weather conditions and the limitations of the equipment used, leading to differences in determining the start of the month in various countries or even regions within the same country. These discrepancies frequently result in differences in the celebration of major Islamic holidays such as Ramadhan and Eid Al-Fitr, which may be observed on different days across countries or Muslim communities. These differences not only disrupt the unity of the *ummah* but also create confusion among Muslims globally (Oluwaseun, 2022).

With technological advances, modern astronomical methods are now providing greater accuracy in moon observation, one of which is daytime moon observation after *ijtimā'* (lunar conjunction). In astronomy, *ijtimā'* occurs when the moon is positioned between the Earth and the sun, making the side of the moon facing the Earth appear dark (Putro et al., 2023). After *ijtimā'*, the crescent becomes visible once the angular elongation between the moon and the sun increases sufficiently. Modern equipment such as specially filtered telescopes can detect the faint light of the crescent during the day (Taher & Abdulla, 2024). This method also addresses classical objections that the crescent cannot be observed before sunset by presenting empirical evidence from contemporary observatories, together with historical precedents such as Muslim astronomers' use of the astrolabe to determine celestial positions. Therefore, it is important to explore whether daytime moon observation can support the establishment of a global Islamic calendar.

At present, the common method for determining the beginning of the Hijri month is moon observation carried out in the evening after sunset. However, observations at that time are often hindered by cloudy weather or unclear visibility of the crescent, particularly in regions with challenging geographical or atmospheric conditions. This raises the question of whether daytime observation, which is technically feasible after *ijtimā'*, could provide a solution. Some astronomical studies suggest that the crescent can be observed during the day using suitable equipment (Hanif, 2017). However, this method has not been widely implemented for determining the start of an Islamic month. A further challenge lies in fiqh, particularly whether daytime observation data can be accepted as a basis for establishing the start of the Hijri month. Addressing this requires engagement with both classical and contemporary scholarly debates, including the view that *rukyat* must occur after sunset, and considering counterarguments grounded in *maqāṣid al-sharī'ah*, especially the principles of *raf' al-ḥaraj* (removing hardship) and *jalb al-maṣāliḥ* (bringing benefits) (Ifandy & Hasanah, 2024; Abdul Shukor et al., 2024; Wanto et al., 2021). The debate regarding whether *rukyat* must be performed after sunset or may take place earlier continues among scholars, especially with the long-standing discussion on the use of modern astronomical data such as *ḥisāb* (calculation) and telescope-assisted observation. Some scholars support these methods, while others uphold the authenticity of direct moon sighting (Zufriani et al., 2023).

Based on developments in astronomical technology and modern observational capabilities, this study proposes the hypothesis that daytime moon observation can provide supporting data for establishing a more accurate and consistent global Islamic calendar. If proven reliable, such data could help resolve differences in determining the start of the Hijri month worldwide. It could also assist religious authorities in referring to one objective dataset, which would reduce discrepancies in the celebration of Islamic dates (Mohd Nawawi et al., 2024). This study therefore examines the potential of using daytime crescent observation as a scientific basis for determining the start of the Hijri month with the broader aim of

contributing towards the unification of the global Islamic calendar. It also evaluates this proposal through the lens of *maqāṣid al-sharīʿah*, not only in preserving religion (*ḥifẓ al-dīn*) but also in preventing conflict (*ḥifẓ al-nafs*), promoting knowledge (*ḥifẓ al-ʿaql*), and preserving resources (*ḥifẓ al-māl*) (Faisal et al., 2024; Khalim & Mohd Ali, 2024; Alias et al., 2024; Wanto et al., 2021). In this way, the study seeks to bridge modern astronomical approaches with established fiqh traditions (Yusuf, 2016).

Existing literature on determining the start of the Hijri month has focused mainly on moon sighting after (Azhari, 2021a; Mufid & Djamaluddin, 2023) sunset or the use of *ḥisāb* to predict the crescent visibility. Some scholars support using *ḥisāb* for prediction but still require direct sighting as proof. Literature discussing daytime observation as an alternative remains limited. Most legal scholarship concentrates on the debate between *rukyat* and *ḥisāb*, with minimal attention given to the fiqh implications of accepting daytime observational data despite the availability of modern technology. This gap underscores the need for further study. The present research seeks to address this by examining daytime observation as a potential method. Through this approach, a solution may be found for the inconsistencies of the Islamic calendar between countries, which would facilitate global alignment. The main contribution of this study lies in introducing daytime observation data as a scientific method to support the establishment of a global Islamic calendar. Although this method has not been widely discussed in either fiqh or Islamic astronomy, this study provides empirical evidence that the crescent can be observed during the day with the aid of modern astronomical instruments such as filtered telescopes. It also offers a practical solution to the long-standing challenges in unifying the global Islamic calendar that stem from differing observational practices among countries (Malik, 2018).

Literature Review

Astronomy in the Context of Islam

In Islamic history, astronomy has played a very important role, particularly in determining the times of worship and the calendar. The book *"A Modern Guide to Astronomical Calculations of Islamic Calendar, Times & Qibla"* A mathematical and astronomical approach for determining celestial positions, including the global-coordinate-based positions of the Sun and the Moon (Ilyas, 1984). This book explains the use of *ʿilm al-falak* (Islamic astronomy) in a modern context and how this can help Muslims align their calendars with modern astronomical technology. In addition to modern applications, classical works such as al-Bīrūnī's *al-Qānūn al-Masʿūdī* and Ibn Shāṭir's astronomical tables demonstrate a long tradition of integrating precise observation with religious obligations, providing historical support for contemporary technological utilisation (M. Shaukat, 2020). The use of astronomy also serves as the basis for determining times of worship, such as prayers and fasting, which require accurate astronomical calculations to determine the correct times for these acts of devotion (M. Shaukat, 2020).

Fiqh of Determining the Start of the Hijri Month

The determination of the start of the Hijri month in Islamic law (*sharīʿah*) has been extensively discussed in classical fiqh texts as well as by contemporary scholars. Al-Qaradawi (2009) explains the importance of moon sighting (*hilāl*, the new crescent moon) and astronomical calculations (*ḥisāb*) in determining the start of the Hijri month. Al-Qaradawi emphasises that moon sighting is the recommended method based on the hadith of the Prophet, although modern technology such as *ḥisāb* can also be used as a complement. According to Al-Qaradawi (2009), the moon should be observed visually, but if weather or geographical conditions do not allow it, *ḥisāb* can be used as an alternative. Other classical jurists, such as Ibn Taymiyyah in *Majmūʿ al-Fatāwā* and Al-Nawawi in *al-Majmūʿ* acknowledged that assisted observation is permissible, provided it meets the level of certainty required by *sharīʿah* (Farahat, 2021). Highlighting these jusristic positions strengthens the argument for integrating modern tools such as filtered telescopes with established fiqh principles. This fiqh guidance remains an essential reference for Muslims in determining major dates in the Hijri calendar, including Ramadhan and Eid Al-Fitr.

Modern Astronomical Research

In recent decades, astronomical research in the Islamic context has grown rapidly with the introduction of modern technology for moon sighting and determining dawn times. The journal *"Islamic Astronomy and the Global Islamic Calendar"* is one of the key literature sources that explores the role of technology in moon sighting. One of its articles highlights the use of telescopes and astronomy software to predict

the visibility of the crescent moon, which can improve the accuracy and efficiency in determining the start of the Hijri month. Additionally, this research discusses scientific methods for determining dawn times, which are crucial for setting the time for the Fajr prayer (Abdul Rahman, 2018). Such research also addresses objections from scholars sceptical of technological methods by demonstrating consistency between predicted visibility data and confirmed observations, thereby supporting integration into decision-making by religious authorities. Thus, modern astronomy plays a significant role in improving the Islamic calendar in the technological era.

From the eighth to the fifteenth centuries, Islamic territories saw the development and use of various astronomical instruments. These tools were essential for accurate timekeeping and navigation, which were critical for religious practices such as determining prayer times and the direction of the Qiblah (the direction Muslims face during prayer) (Heidarzadeh, 2015).

Ibn Taymiyyah and al-Nawawi, these two scholars are known for their contributions to Islamic jurisprudence and their emphasis on authenticity and reliability. Ibn Taymiyyah, for example, was critical of practices that did not have a strong basis in authentic sources. Al-Nawawi, similarly, emphasized the importance of adhering to reliable and established practices in performing religious worship. Their views support the use of reliable instruments when direct observation is not possible, as long as these instruments are trustworthy and their use is in line with Islamic principles (Jackson, 2019; Osman, 2019).

Scholarly Conferences on a Global Islamic Calendar

The unification of the Islamic calendar globally has been a critical topic of discussion at various international scholarly conferences. The Organisation of Islamic Cooperation (OIC) and the Forum for the Unification of the Islamic Calendar held a meeting in Turkey in 2016 to discuss the importance of establishing a unified Islamic calendar (Azhari, 2021b). The results of the conference are summarized below.

Table 1. Results from the Organization of Islamic Cooperation (OIC) Conference and the Islamic Calendar Unification Forum

Number	Number of Votes	Description
1	80	Choosing a Global Calendar
2	27	Choosing a Bizonal Calendar
3	14	Abstain
4	6	Invalid Vote
Total Votes	127	

The results of this conference indicate that many scholars agree that a combination of traditional moon sighting methods with modern astronomical calculations could be serve as a solution for unifying the determination of important dates in the Islamic calendar. Conference discussions also highlighted the need to address jurisprudential diversity among member states, suggesting that any unified system must respect legitimate differences in interpretation while prioritising shared astronomical criteria. Additionally, several resolutions from the conference recommended enhancing international coordination to achieve uniformity in determining the start of the Hijri month so that regional discrepancies that often cause confusion can be minimized (Gharaybeh, 2025).

Methodology

A qualitative method was used to explore literature related to Islamic astronomy and *maqāṣid al-sharī'ah*. The scope of this research includes a review of literature related to Islamic astronomy and fiqh concerning the determination of the start of the Hijri month, as well as empirical data from daytime moon observations. The selection of this method is justified by the need to integrate jurisprudential analysis with empirical astronomical evidence, allowing for a holistic assessment that addresses both traditional fiqh objections and modern technological feasibility. This study also discusses the potential integration of this method into the global Islamic calendar system and examines the views of contemporary scholars regarding the use of astronomical technology in determining worship times. By combining modern astronomical approaches with Islamic law, this study aims to make a significant contribution to the unification of the Islamic calendar globally (Hashim et al., 2025).

The first approach in this research is a literature study. This approach is used to explore literature related to Islamic astronomy and *maqāṣid al-sharī'ah*. The study deliberately incorporates primary classical fiqh sources, such as *al-Majmū'* by Al-Nawawi and *Majmū' al-Fatāwā* by Ibn Taymiyyah, alongside modern journal articles, to ensure that the analysis captures both the revealed textual basis (*naṣ*) and evolving scholarly interpretations. Text analysis of classical Islamic legal texts as well as modern journal articles is required to understand the foundation of shariah regarding daytime moon observation and the concept of *maqāṣid al-sharī'ah*. This approach allows for an in-depth examination of the perspectives of classical and contemporary scholars on the use of astronomical technology to strengthen the global Islamic calendar (Creswell & Plano Clark, 2011).

The second approach in this research is the analysis of *maqāṣid al-sharī'ah* to assess the relevance of daytime moon observation within the framework of Islamic law shariah. This approach focuses on the primary objectives of Islamic law (*maqāṣid*), which are to protect religion, life, lineage, intellect, and wealth (Auda, 2014). In operationalising this framework, the analysis applies each *maqāṣid* objective to concrete outcomes of daytime observation such as *hifẓ al-dīn* through accurate worship timing, *hifẓ al-nafs* through reducing disputes, *hifẓ al-'aql* through promoting scientific literacy and *hifẓ al-māl* through more efficient resource use.

The subject of this research is data from daytime moon observations collected after *ijtimā'*. This subject was chosen because the *ijtimā'* marks the occurrence of a new moon phase, and the research aims to explore the potential visibility of the crescent moon immediately after *ijtimā'* using modern observational technology. The inclusion of multiple observational sites with varied atmospheric conditions is intended to control for alternative explanations and strengthen the empirical basis for accepting such observations in shariah decision-making. This research refers to previous literature that mentions the possibility of detecting the crescent moon shortly after *ijtimā'* with the help of advanced technology (Zufriani et al., 2023).

The data analysis methods used in this research are as follows, he first is qualitative text analysis (thematic analysis). Literature reviews, which include classical fiqh texts and modern literature related to Islamic astronomy and *maqāṣid al-sharī'ah*, are analyzed using thematic analysis. This technique allows for the identification and categorization of key themes from various relevant sources, including the views of classical and contemporary scholars on daytime moon observation and its application in a global Islamic calendar (Braun V., 2006; Faid et al., 2025). This process explicitly codes for themes related to revealed texts (*naṣ*), classical juristic positions and modern scientific validation so that the representation of all perspectives remains balanced.

The second, *maqāṣid al-sharī'ah* analysis (objective analysis). In this method, a purpose-based analytical framework is used to assess how daytime moon observation supports the main objectives of Islamic law.

The third is empirical analysis of moon observation (descriptive analysis). Daytime moon observation after *ijtimā'* is analysed using descriptive analysis. The data from these observations are described to illustrate the patterns of crescent moon visibility captured using modern technology, and the results are compared with astronomical predictions. Triangulation is applied by comparing empirical results with traditional *rukyat* records and *ḥisāb* predictions to strengthen the reliability of interpretation, especially for scholars who remain sceptical of modern instruments.

By combining these data analysis methods, this research will provide a comprehensive understanding of the integration of modern astronomy and *maqāṣid al-sharī'ah* in the global Islamic calendar.

Findings and Discussions

Daytime Crescent Moon Observation

Evidence of daytime crescent-moon photography using astrophotography techniques has been documented by experts such as Thierry Legault from France, Muhammad Yusuf from Indonesia, and the Unismuh Makassar Observatory (Mohd Nasir et al., 2024). In responding to fiqh-based objections, these documented cases are presented not only as scientific evidence but also as potential supporting proof (*qarīnah*) within an Islamic legal framework, in line with precedents where jurists accepted reliable instruments to achieve certainty (*yaqīn*) in timekeeping. These observers have successfully developed

methods for capturing and photographing the daytime crescent moon after *ijtimā'* by utilizing astrophotography and image-processing techniques. The results of crescent moon observations, which marking the beginning of the lunar month, can be demonstrated by the following findings.

Daytime Crescent Moon Observation by Thierry Legault in France

The daytime crescent-moon observation by Thierry Legault in France is a notable achievement in the field of astrophotography. Legault used a telescope and advanced imaging techniques to capture the crescent moon during daylight, shortly after *ijtimā'* (Ji & Wang, 2024). By applying advanced technology and image-processing methods, he managed to record a very thin crescent that is difficult to observe with the naked eye during the daytime, thereby enhancing the accuracy of determining the beginning of the lunar month. Below is an image of the daytime crescent moon captured by Thierry Legault from France (Hadi et al., 2022).

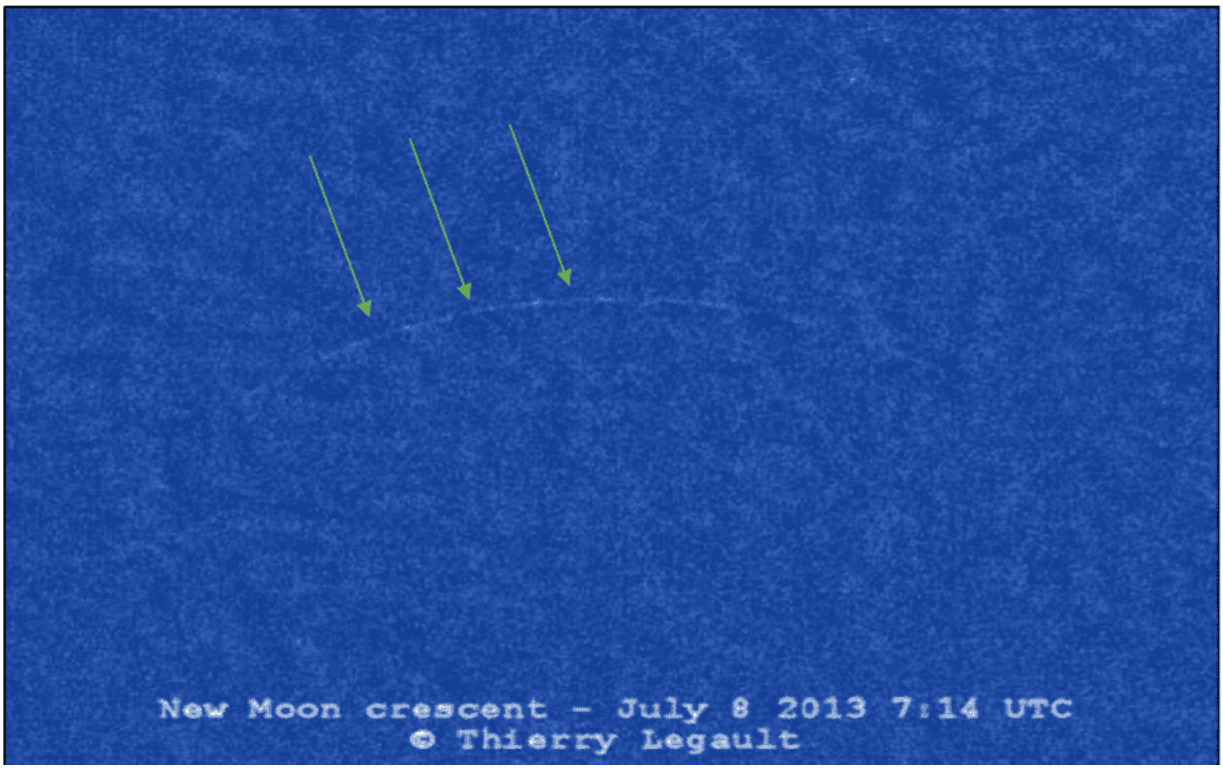

Figure 1. Thierry Legault Successfully Captured the Crescent Moon During the Day After the Conjunction (France)

Daytime Crescent Moon Observation by Muhammad Yusuf in Indonesia

The daytime crescent moon observation by Muhammad Yusuf in Indonesia represents an innovation in astrophotography techniques for determining the start of the Hijri month. Using a telescope and image processing methods, Yusuf successfully captured the crescent moon during the day after the *ijtimā'*, even though the crescent was very thin and difficult to see with the naked eye (Faid et al., 2023). This observation was conducted to improve the accuracy of determining the lunar month and to help resolve differences in the determination of the Hijri month (Faid et al., 2023). Muhammad Yusuf's contribution has become a significant step in the development of crescent moon observation techniques in Indonesia. Below is an image of the daytime crescent moon captured by Muhammad Yusuf from Indonesia (Isroqunnajah et al., 2022):

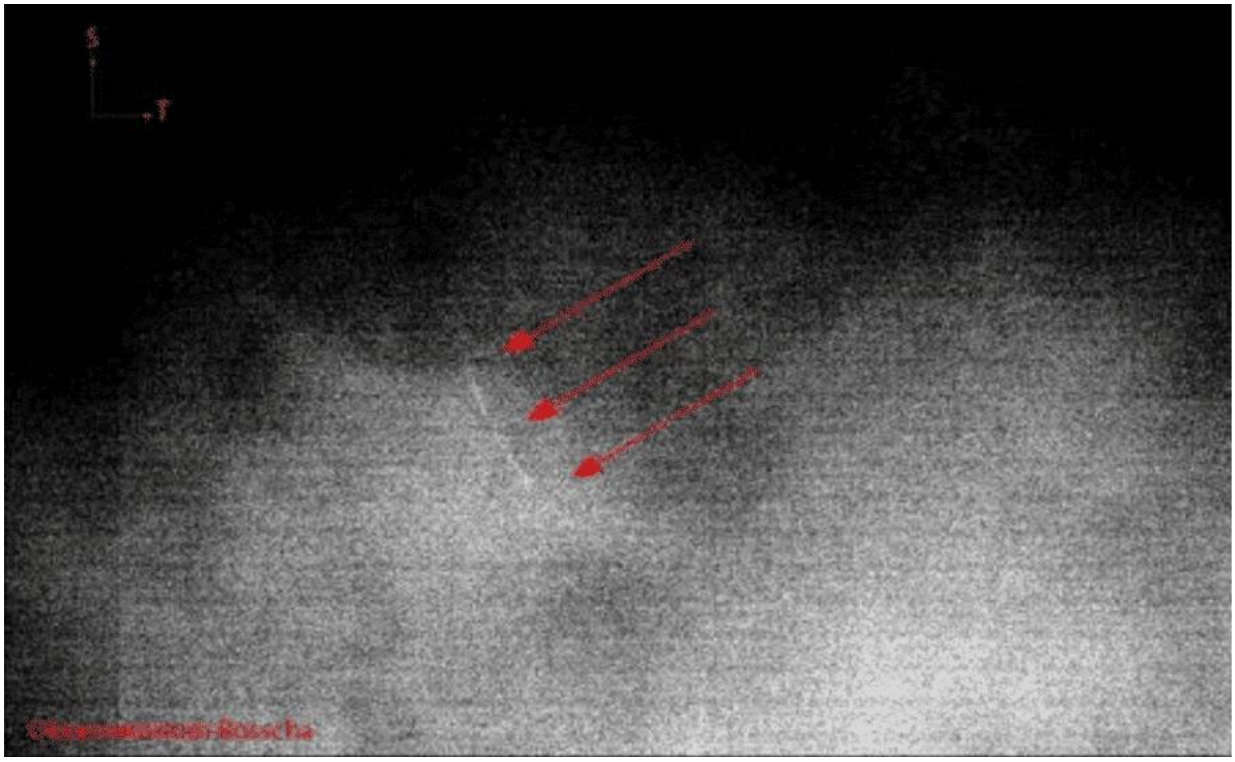

Figure 2. Muhammad Yusuf Successfully Captured the Crescent Moon During the Day After the Conjunction (Indonesia) (Mahasena et al., 2019)

Daytime Crescent Moon Observation by the Unismuh Makassar Observatory in Indonesia

The daytime crescent moon observation by the Unismuh Makassar Observatory in Indonesia is a scientific effort aimed at improving the accuracy of determining the start of the Hijri month. Using telescopes and astrophotography techniques combined with image processing, the team from this observatory successfully captured images of the crescent moon during the day, after the *ijtimā'* occurred (Zulkeflee et al., 2022). This observation seeks to enhance the method of determining the start of the lunar month and to reduce discrepancies in the determination of the Hijri month across different regions. The Unismuh Makassar Observatory plays a crucial role in the development of more reliable crescent moon observation methods in Indonesia. Below is an image of the daytime crescent moon captured by the Unismuh Makassar Observatory in Indonesia:

Figures 1, 2 and 3 depict the results of daytime crescent moon observations. In these images, the crescent moon is indicated by arrows, pointing to the faint crescent visible in the daytime sky after the *ijtimā'*. These observations were made using telescopes equipped with special filters to capture images of the crescent moon, which is difficult to see with the naked eye during the day. Such observations highlight the capability of modern technology to detect the crescent moon under challenging lighting conditions. Visually, the crescent appears very faint due to interference from bright sunlight. However, through advanced optical equipment, the crescent moon was successfully captured despite its low visibility. These findings support scholarly arguments that if empirical reliability is established, such data may complement traditional *rukyat*, particularly in regions with frequent cloud cover, thus fulfilling *maqāṣid* principles of removing hardship (*raf' al-ḥaraj*) and bringing benefit (*jalb al-maṣāliḥ*). These findings demonstrate the significant potential of daytime moon observation as a valid method for determining the start of the Hijri month (Hanif, 2017), who notes that the crescent can be detected before sunset using modern astronomical technology.

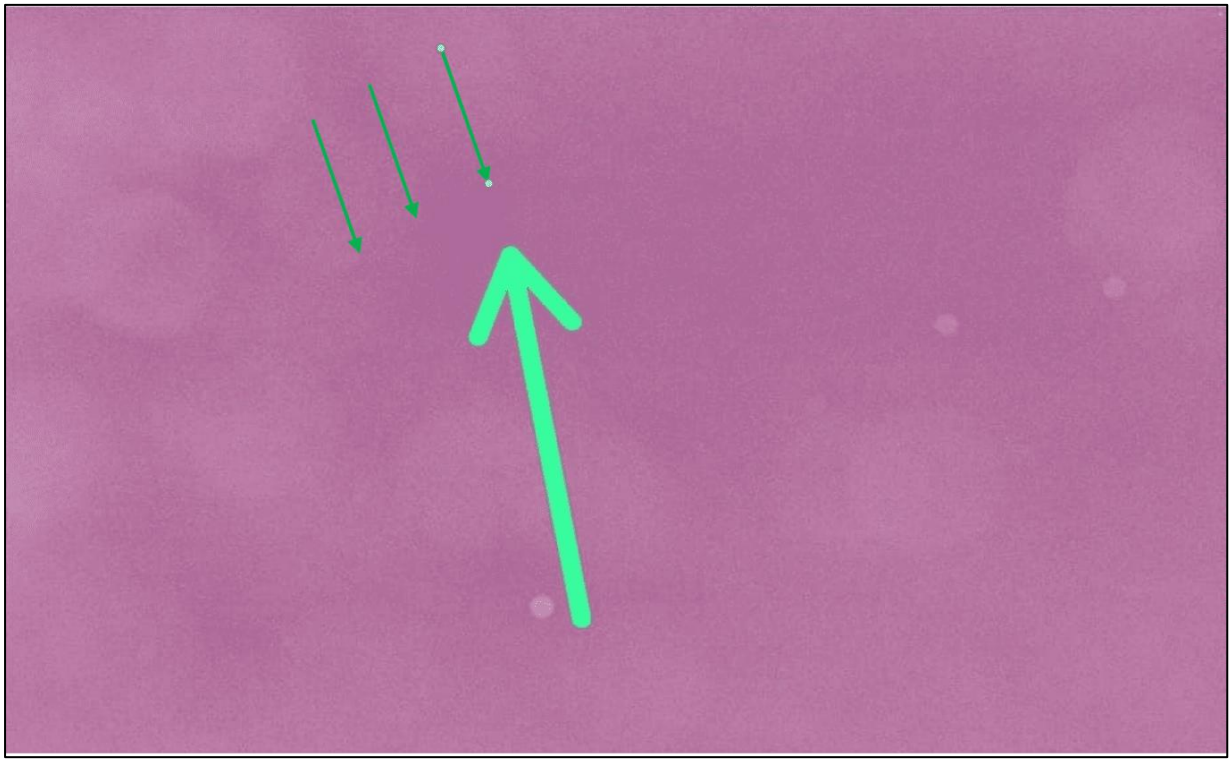

Figure 3. Unismuh Makassar Observatory Daytime Crescent Moon (Indonesia) on October 4, 2024

Daytime moon observation has long been a topic of debate among astronomers and Islamic jurists. In this study, observations show that the crescent moon (*hilāl*) can indeed be detected during the daytime after the *ijtimā'* using a filtered telescope. These findings are consistent with literature indicating that, with adequate optical technology, the crescent can be detected earlier than expected with traditional observation methods (Mahasena et al., 2019). By explicitly comparing these results with both *ḥisāb* predictions and classical *rukyat* records, the study addresses concerns raised by scholars who hesistate to rely on modern technology alone, demonstrating that it may function as a supplementary rather than a substitutive method. This strengthens the argument that modern astronomical technology can complement and improve the accuracy of determining the start of the month in the Islamic calendar. Figure 1 provides visual evidence supporting the hypothesis that daytime crescent observation may serve as an alternative in addressing limitations of moon sighting after sunset, particularly in regions where weather conditions often hinder visibility. Daytime observation technology allows for more consistent and accurate data collection, which can help reduce differences in determining the start of the Hijri month across countries. In line with research by Salim (2020), these findings indicate that daytime crescent moon observation can not only expedite the determination of the new month but also offer solutions to challenges posed by weather and geographic variations.

Daytime crescent moon observation in determining the start of the Hijri month is of great importance from the perspective of *maqāṣid al-sharī'ah* because it supports the attainment of the primary objectives of Islamic law, namely the welfare of the *ummah*. The first objective is to improve the accuracy of determining the start of the Hijri month, as daytime observation helps ensure the correct timing of worship such as fasting during Ramadhan and Eid Al-Fitr, thereby maintaining order in worship practices (*ḥifẓ al-dīn*). The second objective is that a consistent calendar can reduce conflicts and differences among Muslims regarding the start of the month, thereby preserving social and mental peace (*ḥifẓ al-nafs*). The third objective is that the use of technology and knowledge in moon observation reflects Islam's encouragement to use intellect and science in problem-solving, in accordance with the principles of Islamic law (*ḥifẓ al-'aql*). Additionally, by enhancing accessibility and reducing dependency on narrow weather windows, this approach aligns with *taysīr* (facilitation) in legal theory, ensuring that the determination of worship times does not impose undue hardship on the community.

Determining the Global Islamic Calendar through the Collaboration of Astronomical Science and *Maqāṣid al-sharī'ah* in Daytime Crescent Moon Observations

Implications and Future of Daytime Crescent Moon Observations

The findings carry significant implications for the effort to establish a unified global Islamic calendar. As shown in Photo 1, the application of advanced astronomical technology can help address longstanding differences in determining the start of the Hijri month among various countries. Daytime crescent observation provides a scientifically grounded approach that can reduce inconsistencies in establishing major Islamic dates, an issue that has challenged calendar unification for decades. Nevertheless, its wider acceptance requires that the method be framed clearly within classical fiqh principles and *maqāṣid al-sharī'ah*, emphasizing that it serves as a complement rather than a replacement for established *rukyat* practices.

Further research is needed to expand observational sites, incorporate varying atmospheric conditions and integrate the data with *ḥisāb* systems and evening observation. A coordinated approach that combines multiple methods and modern technology may yield a more accurate and broadly acceptable system for determining the start of the lunar month. Such integration would move the global Islamic calendar closer to coherence, consistency and international acceptance.

Advantages of Daytime Crescent Moon Observations Based on the Maqāṣid al-sharī'ah Approach

This study identifies several advantages of daytime crescent observation when assessed through the *maqāṣid al-sharī'ah* framework:

i. Certainty and Accuracy: Daytime crescent observation enhances accuracy in determining the start of the Hijri month. That modern optical tools contributed to greater certainty in setting worship times, which supports *ḥifẓ al-dīn* by facilitating timely religious observance (Syarif et al., 2025). The reliance on actual visual data also responds to concerns that purely calculated methods might weaken the prophetic emphasis on sighting.

ii. Reducing Uncertainty and Disputes: By conducting observations during the day, the likelihood of disagreements regarding the start of the month is reduced. explains that modern observation techniques minimise the uncertainties that often lead to community-level disputes (Hasan, 2023). This supports *ḥifẓ al-nafs* and *ḥifẓ al-'aql*. Anchoring this benefit within the legal maxim *dar' al-mafāsid muqaddam 'alā jalb al-maṣāliḥ* (preventing harm is prioritised over attaining benefit) reinforces its fiqh legitimacy.

iii. Utilizing Technology and Innovation: The use of telescopes and other instruments in daytime crescent observation exemplifies the application of *maqāṣid al-sharī'ah* in a contemporary context. Highlights that adopting relevant scientific advancements reflects Islam's commitment to informed and intelligent problem solving, which relates to *ḥifẓ al-'aql* (Leli et al., 2021). This also follows the historical precedents of Muslim astronomers who refined instruments such as astrolabe for religious timekeeping.

iv. Efficiency in Time and Resource Use: Daytime observation allows for more efficient use of resources because it can be conducted across more locations and under more favourable conditions than evening sighting. This supports *ḥifẓ al-māl* by reducing unnecessary expenditure of effort and resources (Mansyur, 2020). It also reduces repeated failed attempts caused by evening weather limitations, which supports the jurisprudential principle of *taysīr*.

v. Increasing Accessibility for the Muslim Community: Daytime observation enables broader participation, especially in regions with poor evening visibility. This aligns with *jalb al-maṣāliḥ wa dar' al-mafāsid*, as it enhances ease in practicing Islamic law. Earlier confirmation of key dates also reduces last-minute announcements and logistical difficulties, aligning with the principle of removing hardship (*raf' al-ḥaraj*).

Conclusion

The conclusion of this research is that daytime observation using modern astrophotography technology provides a more reliable, precise, and systematically verifiable scientific solution for determining the start of the Hijri month compared to traditional methods. The use of telescopes and image processing techniques allows the observation of the moon's crescent immediately after *ijtimā'*, even when the crescent is very thin and cannot be seen with the naked eye. By triangulating these observational results with both classical *rukyat* records and *ḥisāb* calculations, the study ensures that its recommendations remain firmly rooted in accepted Islamic legal frameworks, therefore addressing potential concerns regarding methodological validity. This study also demonstrates that daytime observation aligns with the principles of *maqāṣid al-sharī'ah*, particularly in preserving religion (*hifz al-dīn*), reducing social conflict (*hifz al-nafs*), and utilising scientific knowledge for the benefit of the community *(hifz al-'aql*). Furthermore, it supports the principle of *taysīr* (facilitation) by reducing hardship in moon sighting activities and enabling earlier, more reliable public announcements. Such improvements contribute to greater consistency in religious practice and reduce the logistical challenges often experienced by Muslim communities during the key month. Based on these findings, daytime observation has the potential to unify the global Islamic calendar, which has often been inconsistent between different countries or Muslim communities, especially in determining significant dates such as Ramadhan and Eid Al-Fitr. The integration of modern astronomical tools with established Islamic legal principle therefore offers a credible pathway towards a more harmonized and scientifically informed global calender Islam.

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