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Phonological Processes in Words Adopted from Arabic to Spanish

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ABSTRACT

The language contact between Spanish and Arabic, resulting from the 800-year period of Muslim presence in Spain, has had a considerable impact on Spanish idioms, and modes of speech and especially lexis. The aim of this study is to contribute to illuminating the phonological processes involved in the incorporation of Arabic words into Spanish, taking into consideration the deep differences between the sound systems of the two languages. The methodology consists of three core phases: gathering the data, organizing and categorizing it, and conducting a phonological analysis. The study examines the phonetic alterations that have taken place as a result of these borrowings. Deletion, epenthesis, and fricativization are among the most observed sound alterations that occurred when Spanish integrated Arabic words. It is imperative to prioritize the study of Andalusian Arabic as it was the direct source from which Spanish borrowed these terms during that period. The study highlights practical applications in historical linguistics and language teaching. It uses the Arabic influence on Spanish during Al-Andalus as a case study to explore borrowing and sound change, thereby enriching phonological studies. Additionally, it clarifies the phonological processes of Arabic loanwords in Spanish, improving pronunciation teaching for both Arabic and Spanish learners.

Keywords: Arabic; Spanish; Contact; Borrowing; Phonological Processes

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1. Introduction

In the year 711^[1], the efforts of Muslims led by General Tariq ibn Ziyad were successful in crossing the Strait of Gibraltar and establishing a foothold on the Iberian Peninsula. It was the beginning of the era of the Arabic rule in Spain, namely *Al-Andalus*, which comprised a substantial section of what is today known as Spain, in addition to Portugal. One of the most significant facts in the history of Spain, this Arabic presence, which spanned over eight centuries left indelible marks on Spanish society and culture. The extent to which modern Spanish culture is observably marked by Arabic culture is evidence that this presence was more than just a conquest. The reign of the Umayyads in Al-Andalus established it as the main center for learning and civilization in the whole of Europe at the time. According to Zapata-Barrero^[2], Al-Andalus flourished as a renowned hub for education, cultural growth, and scientific progress during the period when it was governed by Muslims. The Arabic language which was the main motor of all these activities, became dominant and was broadly used in different areas and aspects of Spanish and Portuguese life. While Spanish was naturally the language used by the Spanish people, Arabic was not only the official language, but also the language employed in different everyday occasions, activities and crafts, many of which were newly introduced. The result is that the Spanish language came to be impregnated by the influence of the Arabic language whether in the form of loan words, or as idioms and expressions that were in Spanish but originated from Arabic. The element of Arabisms is one of the characteristic features of Spanish that cannot be found in any other European languages.

In sum, as a consequence of the use of Arabic over such an extended period of time, the influence of the Arabic language is observable and clear in different aspects of the modern Spanish language^[1]. It is noteworthy that on the whole, Arabic had a greater impact on Spanish idioms and modes of speech than it did on specific words^[3]. As noted by Versteegh^[4], around four thousand terms have been borrowed from Arabic into Spanish. The majority of these words pertain to topics such as commerce, warfare, building, and horticulture. Verbs were the least common type of words that were borrowed, whereas nouns were the most common. The phonological dimension in this language change is the main focus of the present study, and it can only be characterised

through scrutiny of the involved phonological processes of the type theorised by phonologists. Hence, Cser^[5] explained that there were three distinct sound modifications that were discovered: deletion, epenthesis, and fricativization.

1.1. Spanish-Arabic: The Language Contact

The conquest of over three-fourths of the Iberian Peninsula by the Muslims in the year 711 signified not only a long struggle of conquest and re-conquest of territory, but also the coming into contact of two widely different cultures, and more specifically languages. It is a fact that Arabic culture left deep and multi-dimensional influences that are observable in different aspects of the country's culture, and that have attracted, and continue to attract, the attention of researchers as a rich and fascinating area of investigation and study. At the level of language, starting from the eighth century, a large number of Arabic words were introduced into Spanish, adding a recognizable Arabic dimension to the language. At the lexical level most prominently, we can cite the examples of words that start with "al", such as álgebra / al-ɛb̩ra /, alcoba /al'koβa/ (bedroom), and others like jefe (boss) from the Arabic word khalifa / ka'lifa / (chief), and fulano / fu'lano / (somebody) from the Arabic fulan (someone), which are enduring testament to the influence of Arabic^[6-8]. To a lesser extent, Arabic influenced expressions and phrases like si Dios quiere (God willing) and Dios le guarde (may God keep you) derived from the Arabic Insh'allah /(Insh'allah), which means God willing in English^[9,10], and the construction of sentences like ojalá que llueva / oxa'la 'ke 'Aweβa/ (may God will that it will rain). More examples are provided later when discussing the phonological processes involved in the incorporation of these loanwords.

It is important to note here that even though it is always Arabic that is mentioned, Berber dialects were also involved as a source of such linguistic contact. It was reported by Kennedy^[11] that following the Islamic invasion, Arabs resided in the northern part of the Iberian Peninsula, while Berbers occupied the southern part of the country. However, it was Arabic that had the most important and long-lasting influence. As the eleventh century saw the beginning of the effective establishment of Islamic civilization, Arabic was the official language and the language of literature, education and science. For centuries, it was the language of learning and prestige whose impact extended to other European coun-

tries, mainly France and England. In the Spanish language, it is noteworthy that Arabic had a greater impact on idioms and modes of speech than it did on individual Spanish words. This is not to neglect the fact that Latin continued to have a significant amount of influence on Spanish, as on the other European languages. At the lexical level, an increasing number of Arabic terms were, over time, incorporated into the vocabulary of Spanish, acting as one of the foundational source streams for modern Spanish. This process encompassed not just nouns, but also verbs and adjectives that have now become frequent in ordinary language^[1].

A substantial literature on the subject is available, as numerous authors have devoted a significant amount of research to the complex fact of interrelation between Spanish and Arabic. However, not enough research has been devoted to the phonological dimension of this unique language contact. Undoubtedly one of the most prominent academics now working on the topic, Frederico Corriente focuses on the junction of Spanish and Arabic languages, providing significant contributions to the field. His book *A Grammatical Sketch of the Spanish Arabic Dialect Bundle* investigates the interaction between the Arabic dialects that were introduced into Spain during the time of Muslim control and the varieties of Spanish dialects in such regions as Granada and Valencia. Most importantly, the book examines the influence that Arabic had on the Spanish language and presents a number of examples to illustrate this influence. These writings were translated into English to enable international readers who are not familiar with Arabic script so that they can understand the linguistic features and the cultural references.

Notably, Cachia^[1] conducted an in-depth investigation of the various historical elements that have had a role in the evolution of the Spanish language. He devoted a sizeable portion of his work to investigating the influence of Arabic, highlighting the significance of this period as a turning point in the evolution of the Spanish language. Two basic views that might give significant insights when examining Spanish phonology are the descriptive and the historical^[12,13].

The *Dictionary of Arabic and Allied Loanwords: Spanish, Portuguese, Catalan, Galician and Kindred Dialects*^[14] provides a comprehensive collection of Arabic loanwords that have been borrowed into several different languages. The book concentrates specifically on the most recent forms of these borrowed phrases, evaluating both the syntax and

lexicon of these terms. He investigates the lexical borrowings that have occurred from Arabic into Spanish, Portuguese, Catalan, Galician, and other languages and dialects that are connected to Arabic. Additionally, the current study makes use of this source in order to enrich the collected material that will allow for the evaluation and the phonological analysis of the borrowed lexical terms.

Moreover, Versteegh^[4] offered a detailed examination of the multiple developmental phases that the influence of Arabic on Spanish has gone through throughout the course of its history, linguistically, socially, and historically. These chronological stages of language contact and influence include an initial contact and borrowing phase, followed by a bilingualism and code-switching phase, then a deep lexical and structural phase, and finally a decline and residual phase. Versteegh particularly noted that the young people who lived in Al-Andalus, rather than learning Latin or Romance languages, tended to learn Arabic and use it as their language of choice. Even those who did not achieve a high level of fluency in Arabic and who spoke a Romance language as their primary language commonly used Arabic script for written communication during that time. This wide interest in Arabic among the cultured elite paved the way for various Arabic terms to be incorporated into the Spanish language. In a number of typical contexts and situations, the speakers of Spanish were likely to use Arabic more than their mother tongue. By way of characteristic case studies, Zapata-Barrero^[2] offered insightful examples of Spanish terminology that have been taken from Arabic.

With the use of this literature, the present study was able to refer to a background of foundational knowledge (both historical and linguistic) for examining present-day Spanish words and phrases that originated in Arabic or bear its influence, the focus being on the phonetic modifications that took place as a result of their incorporation into Spanish.

1.2. Aim of the Study and Research Questions

This study therefore aims to analyze the phonetic alterations that have taken place in Arabic loanwords assimilated into the Spanish language. The study sets out to illuminate the phonological adaptation processes that have influenced the incorporation of Arabic vocabulary into Spanish by examining the sound changes introduced into these loanwords when taking their Spanish form and becoming an integral

part of the language referred to as Arabisms along with other types such as expressions and idioms that use Spanish words but stem from Arabic cultural influences. This inquiry endeavours to make a valuable contribution to the area of historical linguistics by examining the linguistic interactions between Arabic and Spanish. Specifically, it will focus on the influence of Arabic on the phonetic system of the Spanish language, providing valuable insights into this aspect. Beyond surface-level description, focusing on the phonological aspect allows for an in-depth examination of the process of adaptation, enabling loanwords from Arabic to become an integral part of Spanish. It can also reveal how a language such as Spanish has adapted to its phonological and morphological system words from a language that is widely different, with many sounds and sound patterns that are typical and distinctive of the Arabic language and non-existent in Spanish. The study provides an exceptionally rich case of borrowing that occurs between two languages belonging to widely distinct families, thereby involving phonological processes of adaptation that would not be so complex if the borrowing were from closer European languages.

The present study does not address the influence of Arabic on the morphology and syntax of Spanish; its primary focus is on exploring the phonological changes undergone by individual Arabic loanwords. Its main objective is to investigate the nature and extent of sound changes—particularly deletion, epenthesis, and fricativization—that occurred during the integration of Arabic vocabulary into Spanish. To this end, the study seeks to answer the following core research questions:

- What phonological processes characterize the adaptation of Arabic loanwords in Spanish?
- Which Arabic phonemes were modified, and in what phonological environments did these changes occur?
- And to what degree did Andalusian Arabic, rather than Classical Arabic, influence the phonetic shape of the borrowed terms?

To answer these questions, a corpus of examples was gathered and classified, with the purpose of covering the range of types of borrowing that took place and the most significant sound adjustments, as well as the kinds of phonological processes used to obtain them.

1.3. Scope of the Study and Sources for Data Collection

As the purpose is here not to establish an inventory of the Arabic loanwords in Spanish, the loanwords included in the study are far from being exhaustive and are selected with respect to their relevance to the chief aspect discussed that is the phonological processes involved in the borrowing process.

The main sources for collecting the data are the most widely recognized and reliable authorities in Spanish lexicography and etymology.

1. *Academia Española's Diccionario de la Lengua Española* (1956)
2. *Diccionario Histórico de la Lengua Española* (1960)
3. *Corominas and Pascual's Diccionario Crítico Etimológico Castellano e Hispánico* (1980)
4. *Dictionary of Arabic and Allied Loanwords: Spanish, Portuguese, Catalan, Galician and Kindred Dialects*

2. Materials and Methods

Winford^[15] asserts that research on language contact has been a central area of interest in linguistics since the earliest period of the scientific study of language in the 19th century. Historically, language contact occurred through conquest, trade, or migration of population. The impact of language contact is that a language bears the marks of the influence of the other language by incorporating a variety of elements. As an important case in point, the influence of Arabic on Spanish, the result of over 800 years of Arab presence in the Iberian Peninsula, has mainly produced a considerable lexical impact leading to a tremendous stock of Arabic loanwords incorporated into the Spanish language. The approximately four thousand Arabic terms borrowed into Spanish^[4], concerned lexical fields ranging from trade and crafts to the administrative and military domains to place names and assuredly also everyday life activities.

The current study used a corpus-based quantitative approach to identify and analyze Arabic loanwords integrated into Spanish mainly during the Al-Andalus period. The methodology is made up of three main stages: data collection, selection and classification, and phonological analysis.

2.1. Data Collection

For a representative sample, the study adopted the following criteria:

- The word must be of Arabic origin, verifiable through etymological evidence.
- The borrowing must date back to the period of Muslim rule in the Iberian Peninsula (711–1492).
- The words must display phonological adaptation were examined.

2.2. Classification of Processes

Each loanword occurrence in the corpus was examined and classified according to the three identified phonological processes it displayed.

- Deletion – removal of Arabic segments absent from or marked in Spanish (e.g., /ħ/, /f/).
- Epenthesis – insertion of vowels or glottal segments to fit Spanish syllable patterns.
- Fricativization – replacement of stops with fricatives due to articulatory or markedness constraints.

This classification enabled an examination of the phonological processes employed in the adaptation of Arabic-origin words into Spanish. Once the classification criteria were established, each word was systematically examined

and assigned to the category to which it belongs.

2.3. Data Illustration and Examples of Loanword Adaptation

Hence, in trade, as in *aduana*, / a'ðwana/, which means ‘customs’, from Arabic *diwa:n* / 'diwan/; war, as in *Almirante / almi'rante/*, which means ‘admiral’ to Arabic *ami:r*; construction, as in *albañil / alþa'nil/*, which means ‘mason’, from Arabic *bannā*; and horticulture, as in *albaricoque / alþari'koke/*, which means ‘apricot’, from Arabic *barqū*, are all possible explanations for the substantial majority of these. Regarding the categories, the nouns were the part of speech that was imported into Spanish the most frequently. The majority of these nouns were borrowed along with the definite article *al-*. In addition, a few adjectives were borrowed, such as the words “poor”, from the Arabic word /misk/. In addition, a relatively lesser number of verbs were borrowed into Spanish, such as the word *halagar / ala'yar/*, which means ‘to caress’, from Arabic *halaqa*, which means ‘to shave’. The morphology and syntax of Spanish were also influenced by Arabic during its history.

As for names of places, they constitute one of the most prominent aspects of this influence of Arabic on Spanish. Mostly, words starting with *Al-* and *Guada-* are names of cities or geographical places of Arabic origin and they are numerous in different regions of Spain. **Table 1** shows some representative examples:

Table 1. Examples of Spanish Toponyms of Arabic Derivation.

Spanish Toponym	Arabic Form and Phonetic Transcription	Meaning in English
Guadalquivir	<i>al-wādi al-kabīr</i> /al'wa:.di.al.kæ'bi:r/ (الوادي الكبير)	‘The great river’
Guadalupe	<i>wādī lubb</i> /'wa:.di.lubb/ (وادي اللubb)	‘Valley of the wolf’ or ‘hidden valley’
Almería	<i>al-Miraya</i> /al.mi'ra:.ja/ (المرية)	‘The Watchtower’
Guadalajara	<i>wādī al-hijārah</i> /'wa:.di.al.hi'.dʒa:.ra/ (وادي الحجارة)	‘Valley of stones’
Alcalá de Henares	<i>al-qal'a</i> /al'qal'.qa/ (القلعة)	‘The fortress’
Medina-Sidonia	<i>madīnah</i> /al.mi'ra:.ja/ (مدينة)	‘City’ (Medina = city)
Algeciras	<i>al-Jazīrah</i> /al.dʒa'.zi:.ra/ (الجزيرة)	‘The island’

Before delving into the elucidation of the alterations in sounds that occurred in such Arabic loanwords in the process of their borrowing, it is imperative to start with some crucial reminders.

First of all, it is noteworthy that of the four thousand words that have been incorporated into the Spanish language, the sound change is more or less important depending on the phonological features of the word: certain words remained

unchanged, while a lot others experienced significant alterations. Secondly, at the level of meanings of the words, some terms derived from Arabic have undergone semantic shifts in Spanish in comparison to their initial meaning in Arabic^[16]. As an illustration, the term ‘*almerida*’ first denoted a ‘sick woman’ in both Classical Arabic and Andalusian Arabic. However, when it was incorporated into Spanish, it acquired the connotation of a ‘pusillanimous person’. Naturally, the

study did not dwell on the semantic aspect, as it was not the primary focus of the research.

It must also be clarified that in the case of ‘al’ prefixed terms, they result from a misinterpretation of the grammatical morpheme ‘al’, which is the definite article in Arabic and is likely to precede any noun. This explains why the ‘al’ prefixed words were dominant among the Arabic loanwords in Spanish. In fact, all these words were borrowed with the definite article taken as making part of the word. Hence, in the loanword *alcove*, *almohada*, etc., the ‘al’ prefix is in fact the definite article ‘al’ to which the Spanish definite article was added, ‘*la alcove*’, ‘*la almohada*’. In his article ‘al’-Prefixed Arabic Loanwords in Spanish: Linguistic Implications’, Edward Y. Odisho (Zeitschrift für Arabische Linguistik, 1997, No. 33) views this as ‘a strong indication that the borrowing was accomplished pre-dominantly by the masses of the people in the market-place, the street and the workplace in their day-to-day conversations rather than by scholars and academia intentionally designing to enrich the Spanish vocabulary in areas where certain words were most needed’. He adds that if such borrowings had been the work of the latter group, the retention of the definite article ‘al’ would have been unlikely because the borrowers would have realized that the ‘al’ is an article, that is a separable morpheme and not part of the stem of the borrowed words.

Lastly, while Classical Arabic served as the original source of the borrowed words, it is crucial to prioritize the study of Andalusian Arabic as it was the direct source from which Spanish speakers acquired these terms during that period^[4]. Concerning the borrowed words, it was determined that there were three unique processes: deletion, epenthesis, and fricativization^[5,6].

3. Results and Discussion

Phonological processes have been examined and theorised by linguists studying a variety of languages and language families, including varieties of Arabic and Spanish. These phonological processes are systematic rules that govern the way of articulating sounds of any language^[17]. They provide an explanation of how sounds alter or interact with each other in different linguistic contexts^[18]. Epenthesis, deletion, and fricativization are the three most common phonological processes that occur in diverse languages.

3.1. Deletion

One common phonological process is deletion, where certain sounds or segments are left out from words during speech production^[19]. For example, in English, the deletion of the final consonant in words like ‘cat’ or ‘dog’ results in ‘ca’ and ‘do.’ This process of deletion can be influenced by various factors such as phonetic constraints, lexical frequency, and speech rate^[5]. Researchers have noted that deletion can occur in different linguistic contexts and can lead to changes in the phonological structure of words^[20,21]. Understanding the phenomenon of deletion is crucial for developing insights into language acquisition and speech production mechanisms^[20].

Two sounds have been found to display the deletion process, which are as follows: $\hbar > \phi$ $h > \phi$.

These two sounds were deleted in some words after being borrowed, appearing in the words *aba* /'aβa/, *abacero* /aβa'θero/, and *albitana* /alβi'tana/, which in Andalusian Arabic were originally /hábba/, /s'áhbazzád/, and /albit'aán ah/. The /h/ sound was found deleted in two different environments in Spanish, initial and medial position, while /h/ was deleted in final position^[4,7,8].

For providing a proper illustration, when Spanish speakers were initially introduced to the sounds /h/ and /h/, they had difficulty in locating the identical sounds in their inventory. After that, it was inevitable that they would have to either eliminate or locate sounds that were comparable from their inventory and then smoothly combine them. As a result of the absence of the /h/ in the Spanish inventory and the fact that both were comparable to one another in terms of voicing and position of articulation, Spanish speakers were unable to discern between them in the majority of instances, which led to the deletion process that was outlined earlier.

In addition, the removal of sounds might be well explained by the concept of markedness (cf. citation). The Spanish language has never had pharyngeal or glottal sounds, with the exception of the sound /h/. The sounds /h/ and /h/ are considered to be marked sounds. As may be seen in this example done in Spanish^[4], one of the strategies that speakers occasionally employ when they come across marked sounds is the practice of deletion.

Furthermore, it should be noted that even though Classical Arabic always reserves the final /h/ in its words, Andalusian people tended to delete it such as /qas'aah/, /habbah/, and /marid'aah/ as /alqasába/, /habb a/, and /almarið'a/ re-

spectively^[4,9]. Thus, the Spanish speakers most likely got these words from Andalusian people after the /h/ had already been omitted in pronunciation, which made it easier for them to produce those sounds as in the words *zaba* /'θaβa/, *aba* /'aβa/, and *almerida* /alme'riða/. In fact, this is the most likely possible reason among all the reasons mentioned above.

The following examples illustrate how deletion was employed to eliminate marked or unfamiliar Arabic sounds during the borrowing process:

- *jarabe* /xa'raβe/ ("syrup") < *šarāb*: The pharyngeal /ʃ/ was deleted. The original pharyngeal consonant /ʃ/ in *šarāb* is not present in Spanish and is thus deleted. The resulting form, *jarabe*, reflects this simplification.
- *alhaja* /al'axa/ ("jewel") < *hāğā*: The glottal /h/, which is also absent in Spanish, is deleted. The initial /h/ is replaced with /x/, a voiceless velar fricative available in Spanish, and the resulting word loses the glottal feature entirely.
- *ojalá* /oxa'la/ < *in šā'a-llāh*: Elision of glottal and pharyngeal elements. This borrowing undergoes significant phonological simplification. Both the glottal stop // and the pharyngeal elements /ʃ/ or /h/ are omitted, yielding a more fluid and pronounceable form in Spanish. This is a particularly illustrative case of phonological reduction accompanying semantic borrowing.

3.2. Epenthesis

One common phonological process is epenthesis, where certain sounds or segments are left out from words during speech production^[19]. For example, in English, the deletion of the final consonant in words like 'cat' or 'dog' results in 'ca' and 'do.' This process of deletion can be influenced by various factors such as phonetic constraints, lexical frequency, and speech rate^[3]. Researchers have noted that deletion can occur in different linguistic contexts and can lead to changes in the phonological structure of words^[21,22]. Understanding the phenomenon of deletion is crucial for developing insights into language acquisition and speech production mechanisms^[20].

This process could also be called paragoge^[10]. Due to two different reasons, a few terms featured vowels that were originally introduced by Spanish speakers. It is possible that Spanish speakers do epenthesis for some words

either because they have a propensity to conclude words with a vowel rather than a consonant or because they want to avoid forming clusters^[6,11]. This idea would be better understood by an in-depth examination of the borrowed terms that naturally include promptly inserted vowels. The following are some instances: /a ssirát/ > *acirate* /aθi'rætə/, /būq/ > *albogue* /al'boye/, and /assit'l/ > *acetre* /a'θetṛe/.

The first two words were originally produced with a consonant at the end, but when they were borrowed into Spanish, a vowel was added to the end of each. One possible explanation for this phenomenon is that the Spanish language favored not having a consonant word-finally. Additionally, it might be possible that Spanish speakers did not prefer that the word ends in a cluster, which resulted in the modification of this term to *acetre* /a'θetṛe/ instead of /assit'l/.

This process is also exemplified in several Arabic loanwords in Spanish, in which additional vowels were inserted to avoid consonant clusters or to align with Spanish syllable structure norms.

- *aceituna* /aθei'tuna/ ("olive") < *zaytūn*: In this case, a vowel was inserted between the initial consonant cluster to facilitate pronunciation. The original Arabic word, *zaytūn*, begins with a complex onset that is simplified through the addition of an initial vowel, resulting in *aceituna*.
- *alcázar* /al'kaθar/ ("castle") < *qaṣr*: A vowel was added at the end to avoid a final consonant cluster, which is not preferred in Spanish phonology.
- *alhaja* < *hāğā*: While this word also illustrates deletion (see below), the insertion of the vowel /a/ between the consonants to make it easier to articulate in Spanish.

3.3. Fricativization

Fricativization is a phonological process that involves the change of a sound segment into a fricative^[23]. Fricatives are sounds produced by forcing air through a narrow channel in the vocal tract, creating a turbulent noise^[24]. Fricativization can occur in various phonological contexts and can result in changes in the pronunciation of words^[25].

To summarize, epenthesis, deletion, and fricativization are phonological phenomena that occur in language. These processes are vital components of language learning and are required for comprehending the phonological system of a

language^[26]. They are employed to circumvent phonotactic limitations, streamline word pronunciation, and alter the phonetic quality of a word^[27]. By comprehending these processes, we may enhance our comprehension of the phonological system of a language and enhance our proficiency in successful communication^[28].

The two cases of fricativization observed are as follows:

/b/ > /β/

/q/ > /γ/

It should be mentioned that /q/ > /γ/ had two different processes. The first one was the merger /q/ > /γ/. Additionally, there was another process in some words after being borrowed, which was fricativization, in /q/ > /γ/ as well as /b/ > /β/. This change appeared in many words, including *aba* /'aβa/, *albitana* /albī'tana/, *zaba* /'θaβa/ and *calb* /kalβ/, which in Andalusian Arabic were originally pronounced /hábbá/, /albitā'ah/, /alqasāb a/, and /qalb/. The /b/ sound was found substituted in two different environments in Spanish, which were medial and final position, while the /q/ sound was substituted in initial and final position^[4,14].

To illustrate, Spanish speakers were trying to simplify most of the words they borrowed from Arabic. Hence, fricativization or lenition were among the processes they used to achieve this aim. The stops /b/ and /q/ changed to fricatives /β/ and /γ/. Specifically, in their inventory, Spanish speakers lacked /q/, which likely provided the reason for its substitution by another sound. Markedness can also explain this case since /q/ is a marked sound.

There also several Arabic loanwords into Spanish which show clear evidence of fricativization, where stops such as /b/ and /q/ have been replaced by fricative counterparts.

- *algarroba* /alya'roβa/ ("carob") < *xarrūba*. In this example, the Arabic /x/ becomes /γ/ in Spanish, and the bilabial stop /b/ becomes the fricative /β/. These changes illustrate a shift toward softer, more fricative sounds, aligned with Spanish phonology.
- *azúcar* /a'θu.kar/ ("sugar") < *as-sukkar*: /s/ > /θ/ (voicing/friction shift). The Arabic voiceless alveolar /s/ becomes the Spanish interdental fricative /θ/. This reflects a phonetic substitution based on articulatory similarity and is a typical fricativization process within a phonemic system that distinguishes between /s/ and /θ/.

- *alcoba* /al'koβa/ ("bedroom") < *qubba*. Here, two changes occur. The uvular plosive /q/—which does not exist in Spanish—is replaced with /k/ or, in some dialects, /γ/. Additionally, the bilabial /b/ becomes /β/, demonstrating fricativization of both segments.

4. Practical Applications

The findings of the present study can provide valuable practical applications, especially in historical linguistics, phonological studies and language teaching pedagogy. In historical linguistics education, lessons can be designed on language contact, taking as an example how and why Arabic influenced Spanish during the Al-Andalus period. This study offers a valuable case study to deepen the aspects of borrowing and the accompanying sound change. In language teaching, the clarification of the study of the phonological processes leading to present Arabic loanwords in Spanish can be used to improve both Arabic and Spanish pronunciation classes. Pronunciation exercises may be practiced to show how Spanish adapted characteristic Arabic sounds, and to enhance learners' awareness of the distinctive sound properties of Arabic and Spanish. In addition, etymology and phonological history can be included to deepen and enrich vocabulary teaching. In terms of phonology, the study offers the possibility of enhancing learners' awareness of sound change by asking them to break down words, such as 'almohada' from the Arabic word 'mikhadda' meaning pillow, and trace out sound patterns. This creates a cross-linguistic awareness through the knowledge of why most Arabic loanwords in Spanish start with 'al' due to the definite article accompanying Arabic nouns. Some examples are *Algebra* (al-jabr); *Alcazar* (al-kasr) meaning the palace, *algodon* (al-kutn) meaning the cotton; *Alubia* (lubia') meaning bean; *Alhondiga* (al-funduk) meaning the inn or public warehouse. The study can also inspire a classroom material that shows original Arabic words, phonological changes and resulting Spanish words as a chart or infographic that will develop etymological awareness and enrich vocabulary learning with cultural and historical knowledge.

5. Conclusions

The objective of this study was to investigate the phonological impact of Arabic on Spanish by examining some of

the words borrowed from Arabic. Deletion, epenthesis, and fricativization are among the most frequently observed sound alterations that accompanied various borrowing processes. The Andalusian Arabic consonants /h/ and /ħ/ were removed from some words when adopted into Spanish. This happened word-initially and word-medially with the letter /h/, whereas the letter /ħ/ was discovered to be removed word-finally. As a result of the fact that both were indicated and the /ħ/ sound was not present in the Spanish inventory, Spanish speakers frequently eliminated both^[29].

As a consequence of the inclination that Andalusian people had to omit the /h/ in pronunciation, in the last position, it is possible that Spanish speakers were never aware of its presence in the first place, and as a result, they deleted it. The instances of epenthesis in Spanish were word-final, and this may be due to the fact that Spanish speakers tended to finish words with a vowel or because they desired to avoid producing clusters at all costs. In the case of the word-medial and final /b/ > /β/, as well as the beginning and final /q/ > /y/, fricativization manifested itself. It is possible that the process of lenition took place due to the tendency of Spanish speakers to shorten pauses by using sounds that were easier to pronounce. Additionally, the Arabic Andalusian language may have brought on consonants that were considered unique or distinct.

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Data Availability Statement

The data used in this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

There is no conflict of interest to disclose in this research.

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