

Beyond art technical sources: understanding colour production in Andalusí texts

Para além das fontes documentais de técnicas de produção artística: a produção de cor nos textos andaluzes

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Abstract

The study of colour production in al-Andalus has been mostly directed towards art technical documentary sources, such as al-Qalālūsī's *Tuḥaf al-Ḥawāṣ* (*The Treasures of the Select*), the 13th century Andalusí instructional book. The focus of the said research falls on the ingredients and procedures to create colour. However, the technical-centred approach tends to overlook social, economic, and cultural aspects of colour-making, such as the social perception towards dyers, prices, colour etiquette, besides the context under which such manuals were written. Other types of texts – such as geographical, normative, technical, and epistolary – can help to fulfil such gaps, by providing information regarding the production, commerce, transportation, symbolism, and further uses of raw materials used in colour production, such as alum, cinnabar, and indigo. A multifaceted approach which combines the analysis of different types of coeval sources, primarily Andalusí, can contribute for a more comprehensive insight on colour production in al-Andalus.

Resumo

O estudo da produção de cor no al-Andalus tem maioritariamente incidido sobre fontes documentais de técnicas de produção artística, tal como o *Tuḥaf al-Ḥawāṣ* (*O Tesouro das Elites*), o manual de preparação de tintas do séc. XIII de al-Qalālūsī. O foco da investigação recai nos ingredientes e procedimentos para a criação de cor. Contudo, esta abordagem tende a descurar os aspetos sociais, económicos e culturais correlacionados, tais como a perceção social quanto aos tintureiros, preços, etiqueta da cor e o contexto da redação destes documentos. Outros textos – geográficos, normativos, técnicos ou epistolares – podem ajudar a preencher tais lacunas, fornecendo informação relativa à produção, comércio, transporte, simbolismo e demais utilizações de matérias-primas tais como o alúmen, o cinábrio ou o índigo. Uma abordagem multifacetada que integre a análise de diferentes fontes coevas, sobretudo andaluzas, pode contribuir para uma visão mais abrangente acerca da produção de cor no al-Andalus.

KEYWORDS

Colour production
Colour commerce
Colour use
Medieval pigments
Al-Andalus
Andalusí texts

PALAVRAS-CHAVE

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Pigmentos medievais
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Introduction

Colour production is intertwined with multiple dimensions of collective life. It is deeply embedded in economy, and, therefore, it intersects with agriculture, manufacture, commerce, and professional activities such as colour production. It also has a cultural dimension which refers to symbolic connotations given both to colours and raw materials from which they are made of.

Considering the omnipresence of colour, both in the Christian Middle Ages and in Islam, in architecture, clothing, manuscripts, and overall decoration, colour production holds a political dimension as well. The existence of colour-preparation manuals commissioned by rulers or governors, such as al-Qalālūsī's *Tuḥaf al-Ḥawāṣ* (d. 1308 CE) – or even written by sovereigns, such as *Umdat al-kuttāb*, allegedly authored by Fatimid caliph al-Mu'izz Ibn Bādīs (d. 1062 CE) – reflects such importance.

The material and technique-centred approach emphasises physico-chemical characterization tests which seek to identify the components and processes for colour preparation. The study of art technical sources (from now on ATS) has contributed to the study of colour artifacts from multilayered and intricate historical contexts, such as the Medieval Iberian, which intertwined Ancient Greek and Roman, medieval Christian, and Islamic influence.

Attention towards the Islamic influence in colour production in medieval Christian milieu via al-Andalus has recently increased and has prompted the study of colour preparation Arab treatises, with a focus on inks used in manuscripts. Such is the case of the studies of Díaz Hidalgo et al. [1], and of Vieira et al. [2] on specific black and red inks and colours.

Despite its contribution to this field of study, this approach does not entail the fundamental process of comparison, addition, and crosschecking with other coeval sources. Furthermore, it does not address the multidimensionality of colour production.

Topics such as availability, price, transportation, multiple applications, and legal surveillance both on colour-production and colour-production ingredients are nearly absent from ATS. Moreover, ATS pose some obstacles regarding their practicality in a workshop environment. As Fani points out, this knowledge was commonly passed on “through empirical methods, direct observation and the repetition of traditional procedures in a transfer of knowledge that did not usually entail a written form” [3]. This means that such texts could be produced mainly to encapsulate and display theoretical knowledge on the matter, for the writer's or his patron's prestige. This is just an example of the multiple challenges posed by written technical sources previously discussed elsewhere [4-8].

In short, problems with analysis of documents relate to the subjectivity inherent in texts as they are highly dependent on the writer, his historical context, as well as his theoretical and practical knowledge of the subject. Some of the frequent problems (deliberate or not) are imprecisions, anachronisms, vague or incomplete information. Given the known complexity of interpreting documentary sources, this is particularly true when it comes to technologies no longer in use.

Consequently, research on the subject requires an additional set of sources which, in fact, attests to the existence of colour production in al-Andalus, and how it was conducted. This study seeks to provide an overview on the possibilities of other types of Arabic texts – geographical, normative, technical (other than ATS), and epistolary – mainly Andalusí, to support and enrich the inquiry on colour production in al-Andalus.

Al-Andalus and the Mediterranean world

Al-Andalus refers to the Iberian Peninsula territory which was under Islamic governance from 711 CE to 1492 CE [9]. The period of al-Andalus comprised different political stages which

corresponded to different territorial extensions and different dynamics with the remain Islamic and Mediterranean world. Therefore, political evolution impacted on trade and overall material and intellectual exchange, including in colour-production materials and techniques.

The first political stage – the emirate – is divided in two phases: during the dependent emirate (711-756 CE) al-Andalus was dependent on Qayrawān, in today's Tunisia, head of the province of Ifriqiyya. Qayrawān answered before the Umayyad caliph, settled in Damascus. In 750, the Umayyads were overthrown by the Abbasids, who transferred the head of governance to Baghdad. In 756, al-Andalus became an independent emirate settled in Cordoba, by the hand of a member of the Umayyads, who had escaped to the Maghreb during such events.

The second stage refers to the caliphate of al-Andalus, established in 929 by 'Abd al-Raḥmān III as a response to both the Abbasid and the Fatimid rival caliphates settled in Baghdad and Cairo, respectively. In 1031, after a long civil war between different factions for the caliphal seat, the caliphate of al-Andalus collapsed, and around 30 independent kingdoms emerged. Al-Andalus transitioned from one ruler settled in Cordova to a multitude of petty kingdoms – taifas, after *ṭawā'if* (sing. *ṭā'ifa*), which, in this context, means factions or parties – spread throughout the Andalusí territory. These party kings sought to replicate the Umayyad court model throughout al-Andalus, which prompted the construction of military and palatine buildings, the production and dissemination of luxury items, and both the displaying and sponsorship of written culture as a symbol of power [10].

In the following two centuries, al-Andalus was annexed to the Berber empires – by the end of the eleventh century, the Almoravid empire, and, by the middle of the twelfth, the Almohad empire. The Almoravids were a confederation of Lamtūna, Gudāla, and Massufa tribes originated near the Niger and Senegal rivers, which controlled the caravan Saharan trade. They professed an orthodox view on Islam and created an empire which reached al-Andalus in 1090. The Almohad empire was, in turn, formed by Mašmūda tribes based on the Atlas Mountains. As opponents to the Almoravids, they had a literal and messianic stance on Islam and, since the middle of the twelfth century, they formed an empire which stretched from the Almoravid-founded city of Marrakesh until today's Libya.

Andalusí territory contracted as the Christians advanced towards the south, mostly after the fall of the Caliphate. However, the inclusion of al-Andalus in both Berber empires allowed it to widen its commercial and cultural network, which encompassed the Islamic west and connected to all *dār al-islām*. Circulation due to trade and religion promoted proximity between both north and south shores of the Mediterranean, encouraged East/West cultural transfer, and accentuated the ongoing orientalising process in Iberia since the ninth century [11].

Colour-production in medieval Christian milieu may have also had eastern and North African influence, through al-Andalus. For example, al-Qalalūsī, born in Estepona, near Málaga, studied poetry, astronomy, and inheritance partition in Fez, Marrakesh, and Agmat [12]. He might have been introduced to colour making techniques in such travels.

Knowledge transfer had been key since the early centuries of Islam. Andalusí rulers were equally committed with such endeavour. Byzantine emperor Constantine VII offered caliph 'Abd al-Raḥmān III (r. 912-961) a Greek copy of Dioscorides' *De materia medica*. However, there was no one in Cordoba able to read Greek. The byzantine monk Nicholas was sent to al-Andalus by the emperor to work in the Greek-Arabic translation with the Jew court physician Ḥasday b. Šaprūt [13, pp. 106-107]. The teachings of Dioscorides prevailed in the following centuries, and they are one of the main references in, for example, Ibn al-Bayṭār's (d. 1248) veterinary treatise *The complete book of medicines and simple foods* [14, pp. 62-63], which was also analysed for the present study.

After the Christian conquest, Arabic-Latin translations flourished in cities such as Toledo, Seville, and Murcia. Gerard of Cremona (d. 1187) was one of the most active translators, who rendered several Arabic texts into Latin, such as al-Rāzī's *Kitāb al-Manšūrī*. The so-called "Toledo School of Translators" synthesises the interest of the Christian monarchs, such as King Alfonso X, the Wise (r. 1221-1284), in preserving knowledge contained in Arabic books. Several works in

philosophy, astronomy, or cartography were translated from the Arabic to Latin, Hebrew, and, later, Castilian. Among these were the texts of Aristotle and Ptolemy, and their quoters such as Avicenna (Ibn Sīnā, d. 1037), which spread throughout Europe [14, p. 64]. Al-Andalus benefited both from an internal context and an intersecting geographical and cultural milieu, which favoured textual production on multiple topics, and possibly, on colour production as well.

Analysing Andalusí texts: method and text typologies

Al-Qalālūsī's treatise [15] was the starting point of this study, given its spatial and chronological overlapping with the medieval sculptures which are being studied within the Archaeology of Colour project.

Firstly, nearly 100 ingredients used to produce colour were identified, alongside with colour production techniques and other procedures such as ink removal and preparation of substitute components. Secondly, other types of texts were analysed, in the search for references of the abovementioned ingredients, and colour-making activities. These texts were classified as geographical, normative, technical, and epistolary.

Geographical texts

These texts correspond to the literary genre *al-masālik wa-l-mamālik* ("of roads and kingdoms"). The oldest surviving specimen was authored by Persian geographer Ibn Ḥurrdādhbih (d. 912). It describes the main cities and villages throughout the commercial routes, their resources, peoples, history, and travel time [16]. So far, the following authors and works have been studied:

- Ibn Ḥurrdādhbih, *Kitāb al-masālik wa-l-mamālik* (The book of roads and kingdoms) [17];
- Ibn Ḥawqal (d. 988), *Ṣūrat al-arḍ* (The image of the earth) [18];
- al-Bakrī (d. 1094), *Kitāb al-masālik wa-l-mamālik* (The book of roads and kingdoms) [19-20];
- al-Idrīsī (d. 1165), *Kitāb nuzhat al-muštāq fī iḥtirāq al-āfāq* (A diversion for the man longing to travel to far-off places) [21];
- Abū Ḥāmid al-Ġarnāṭī (d. 1170), *Tuḥfat al-albāb* (Gift of hearts) [22];
- al-Qazwīnī (d. 1283), *Āṭār al-bilād* (The wonders of creation) [23];
- Anonymous (fourteenth century), *Ḍikr bilad al-Andalus* (Description of the land of al-Andalus) [24];
- al-Ḥimyarī (d. 1495), *Kitāb al-rawḍ al-mi'ṭār fī ḥabar al-aqṭār* (The book of the fragrant garden with the description of the regions) [25].

Normative texts

These sources deal with rules and law. Here, three types of texts have been studied: *ḥisba* texts, compilations of *fatāwā*, and taxation texts.

Ḥisba means in Arabic something like "common good". It also refers to the function of promoting the observation of the religious rules in urban milieu, especially, in the markets [26]. The *muḥtasib* – like Ibn 'Abdūn (flourished. twelfth century) in al-Andalus – was the person entrusted with the *ḥisba*. In this study, two works were analysed so far: Ibn 'Abdūn's *Risāla fī al-qaḍā' wa-l-ḥisba* (Epistle on the office of judge and the market inspector) [27], and al-Šayzarī's (d. 1193) *Nihāyat al-rutba fī ṭalab al-ḥisba* (The utmost authority in the pursuit of *ḥisba*) [28].

Regarding *fatāwā* compilations, a *fatwa* is a legal opinion issued by an expert in Islamic law. The *al-mi'yār al-mu'rib* (The clear standard), authored by al-Wanšarīsī (d. 1508), provides *fatāwā* issued in the Islamic west up to the fifteenth century [29].

Finally, considering that taxation must, ideally, observe the religious canon, *Kitāb al-ḥarāğ* (The book on land taxation), by Abū Yūsuf Ya'qūb (d. 798) was also examined in the search for references to colour production elements [30].

Technical texts

In this study, “technical texts” correspond to texts on specific matters, mostly linked to sciences and crafts other than colour production. So far, the following documents were analysed:

Filāḥa texts

Filāḥa texts provide information on gardening and farming. The contribution of the *filāḥa* treatises for the study of textiles and dyeing plants have already been explored by Expiración García [31]. The books on agriculture of two authors who lived during the eleventh century and early twelfth, namely, Abū ʿl-Ḥayr al-Iṣbīlī and Ibn Baṣṣāl, both entitled *Kitāb al-filāḥa*, were examined [32-33].

Medical/veterinary/pharmacological texts

As the name indicates, these documents display information on medical and veterinary uses of plants and minerals. The following books have been studied: 1) Ibn Ḡanāḥ (d. 1055), *Kitāb al-tallḥiṣ* (Book of the commentary) [34]; 2) Ibn al-Bayṭār (d. 1248), *Kitāb al-ǧamiʿ li-mufradāt al-adwiya wa-l-aǧḍiya* (The complete book of medicines and simple foods) [35]; 3) al-Nuwayrī (d. 1333), *Nihāya al-arab fi funūn al-adab* (The ultimate ambition in the arts of erudition) [36-37]. Although al-Nuwayrī is usually described as an encyclopaedist, we used mainly pharmacological data in this study. For that reason we classified his text as “technical”.

Culinary texts

Culinary texts provide cooking recipes. So far, Ibn Razīn’s (d. 1293), *Fiḍālat al-ḥiwān fi ṭayyibāt al-ṭaʿām wa-l-alwān* (Best of delectable foods and dishes) has been analysed [38].

Epistolary texts

Finally, epistolary sources, namely, the Geniza letters [39]. These refer to correspondence exchanged between medieval Jewish traders who operated in the Mediterranean milieu, which was discovered at the Ben Ezra Synagogue in Cairo. Many of these documents were written in Arabic and used the Hebrew alphabet. They survived because they had the name of God in it, and therefore, they could not be destroyed. They were, instead, deposited in storage places called the genizas. Those which have been analysed for the Archaeology of Colour project were studied and translated by Shelomo Dov Goitein (d. 1985).

Analysing Andalusí texts: results

The following quotations contain references to colour production in the abovementioned types of Arabic texts, mostly – though not exclusively – of Andalusí origin. These excerpts are mere samples of a wider universe of data available in such sources, which require further in-depth and multidisciplinary research.

Geographical texts

The geographical texts analysed in this study provide information mostly on the provenance sites of some of the more frequently mentioned ingredients in colour-making. Other topics, such as exports and uses in architecture, are also addressed.

Persian geographer Ibn Ḥurrdābih referred to brazilwood’s pharmacological properties, whose roots are “effective against deadly poisons” [17, p. 44]. The tenth century Nusaybin-born Ibn Ḥawqal reported that alum was found in Surt (presumably, Sirt, in today’s Libya) “in large quantities”, and was exported [18, p. 18]. He also mentions that leather fabrics, iron, lead, and

mercury were shipped towards the East [19, p. 50]. Moreover, iron, mercury, and lead could be found in al-Andalus [18, p. 66].

Granada-born traveller Abū Ḥāmid al-Ġarnāṭī briefly referred to Tunes being known for its corals [22, p. 112]. Al-Bakrī – eleventh century geographer and member of the ruling family of the taifa kingdom of Huelva and Saltés – mentioned the vast Andalusí production in alum, iron, and copper [19, p. 39]. Concerning the Maghreb, al-Bakrī informed that the inhabitants of Sebad (possibly in today's Tunisia) cultivated indigo [20, p. 27], and, according to him, “in the country of the Kutāma [a Berber tribe located in the north of present-day Algeria] excellent quality lapis lazuli is found, as well as copper and iron mines” [20, p. 83].

In fact, lapis lazuli (the Arabic word *lāzward*, which was also used to name other blue stones, as will be discussed further ahead in this study) is frequently mentioned by geographers. Al-Idrīsī, from Ceuta, affirmed that the Cordova main mosque ceiling had “cinnabar red, lead white, lapis lazuli, minium (red lead oxide), verdigris, and antimony black” [21, p. 201]. The anonymous author of the *Dīkr* also reported that among the improvements that caliph al-Ḥakam operated in the said building, chapiters were “carved from a single block of marble, engraved and inlaid with lapis lazuli and gold in its upper and lower parts” [24, pp. 41-42]. According to him, this blue stone could be found in Lorca, Almería, Baza, and Granada [24, p. 20]. Three centuries later, al-Ḥimyarī added that in the region of Lorca there was a yellow ochre quarry, and several red ochre quarries, whose product was exported [25, p. 343].

Not only Islamic western authors had a word to say about al-Andalus. The Persian geographer al-Qazwīnī wrote: “al-Andalus is rich in gold, silver, lead, and iron mines, which are found everywhere; there are also mines of mercury, red sulphur, yellow sulphur, excellent cinnabar, tutty (impure zinc oxide), and alum of all classes. There is also *kuḥl* that looks like the one of Ispahan” [23, p. 101].

Al-Idrīsī supplied information concerning mercury and cinnabar mines located near the fort of Abal (in Obejo, near Cordova), which employed around 1000 workers [21, p. 207]. Three hundred years after him, al-Ḥimyarī raised that number to 3000 [25, p. 33]. At the mine, work was distributed in the following way: “there is a team that goes down and extracts the mineral; another one that transports the wood needed for the oven; another one that manufactures the containers in which the metal is distilled and purified; finally, another one who builds the ovens and watches the boiler” [25, p. 33].

Normative texts

Most normative texts examined show concern regarding the quality and integrity of the colour-making products sold both in the market and in stores and prescribe techniques to evaluate them. Such products are also approached under the lens of tax status, and family life.

According to Kufa born Abū Yūsuf Ya'qūb's taxation treatise, minerals such as “ruby, turquoise, antimony, mercury, sulphur, and red ochre, do not pay the fifth and are treated as clay and sand alike” [30, p. 34]. During the conquests, a fifth of the land was due to the conquerors. According to Abū Yūsuf Ya'qūb, no further taxation was applied to minerals which were found in it, to avoid double taxation.

Regarding *ḥisba* texts, Ibn 'Abdūn, the twelfth century *muḥtasib* of Seville, warns: “one must ban dyers who dye green with dyer's broom and sky blue with brazilwood because it is a fraud, as these colours immediately disappear” [27, p. 154]. Furthermore, “saffron should not be sold in a paste from which pieces are cut, because then it is counterfeit and bad, but rather in loose stigmas” [27, p. 181].

In Syria, al-Šayzarī alerts to perfumers' scams involving the use of brazilwood: “Some of them (perfumers) cut *akshūt* (unknown ingredient) like the hair of hairy saffron and cook it with cooked brazilwood. They then add something to it dyed with saffron water and sprinkle a little ground sugar on to make it become heavy and coagulate. After this they mix it with an equal amount of saffron and put it in the baskets” [28, p. 73].

Al-Wanšārī's *fatāwā* compilation also offers some information regarding substances used in dye-preparation. A *fatwa* of Fez issued by al-Waryāḡilī (d. 1284) recorded that "a man who divorced his wife before the marriage had been consummated, demands from her the safflower that she had asked for to dye her clothes." Unfortunately, we have no information whether his claim was attended [29, p. 92].

Another *fatwa*, issued in Mahdiyya in the 1140s asked about the possibility of selling tartar to be used "as a fixative to dye wool red". The answer is ambiguous: "The question of impurity and purity of tartar is controversial. If we opt for its purity, like vinegar, its sale is permitted. If we declare it impure, we can authorize its sale by analogy with that of garbage, which we use out of necessity to manure the earth" [29, p. 127]. Finally, someone asked in an undated and unidentified *fatwa*: "Is it fraud to whiten clothes with sulphur? Answer: This is not permitted. It's a fraud" [29, p. 208].

Technical texts

Technical texts besides ATS provide a variety of material regarding colour making. Andalusī eleventh century *flāḥa* expert Abū l-Ḥayr describes the characteristics and uses of sumac: "Sumac leaf juice has the same benefits as acacia. [...] It abounds in different areas of Syria and al-Andalus." While the Syrian kind has a more intense red, the Andalusian variety "is a plant similar to the Alexandrian laurel in the shape of its leaves and in the size of its tree, except that its wood is weak, of a colour similar to purple, hollow, very astringent. Leathers are tanned with its leaves and its thin bark. Dyers use it to dye clothes red [...]. It abounds in Córdoba and Jaén." [32, p. 877]. Toledo-born expert Ibn Baṣṣāl wrote about the two classes of safflowers, one thorny and the other non-thorny, being the latter more adequate to use as dye [33, p. 154].

Pharmacology texts are also an important source of data for the topic. For example, Córdoba-based Jewish rabbi, physician, and grammarian Ibn Ḡanāḥ described the ingredients and procedure to make suppositories, possibly to treat constipation, but which could also be used in laundry: "The soap, the use of which the physicians recommend as a suppository, is dry and hard soap. It is obtained in the following way: One part quicklime and one part alkali ash are taken. If there is more quicklime than alkali ash it is better" [34, p. 940].

Malaga veterinarian Ibn al-Bayṭār listed the pharmacological benefits of the pomegranate: for stomach and digestion problems, fever, itching, scabies, drunkenness, ears, and eyes inflammation [35, p. 182]. Additionally, its juice could be used as an appetite suppressor, since it "is beneficial against fat women's appetite" [35, p. 180-181].

The Egyptian encyclopaedist al-Nuwayrī [36, pp. 5-104] provided information regarding the acacia wood – "Egypt has acacia wood, which, when it is burned for a whole day, its ashes only amount to a single palmful. It is a hard wood, quick to light, slow to die down. It is said that it is actually ebony, but that its habitat transformed its nature and so its wood became intensely red" [37, p. 38] – and acacia resin: "This is the resin of the acacia tree, and it is used exclusively in compounds and is not suitable for anything else. That is because it dissolves in water very quickly without clotting, while other resins that are gathered from flowering trees will corrupt a compound when they are added to it, such as sumac resin, rue resin, and marshmallow resin" [37, p. 214].

Cookbooks, such as the one authored by Ibn Razīn, from Murcia, describes that pomegranate arrived in al-Andalus during the reign of the emir 'Abd al-Raḥmān I (d. 788), who "collected in his garden rare plants from every part of the world", and "sent agents to Syria and other parts of the east to procure new plants and seeds" [38, p. 31].

Epistolary texts

Finally, the Letters of the Cairo Geniza show evidence regarding the Mediterranean trade of many ingredients used in colour-production. A letter from 1141 sent from Fez to Almería deals with the shipping of seven loads of alum. The product was cheaper than expected because the sender bought it before the official price had been announced. The sender, in Fez, said to the

recipient: “Had I had courage, I would have sent you 100 *quintārs* (1 *quintār*: c. 50 kgs). But I did not dare since there was a great demand for it” [39, pp. 267-268]. The writer was afraid that many Spanish merchants would do the same, shipped alum to Almeria, and its price would suddenly drop and secured no profit.

Another letter shows how Sa‘dān, while drunk, promised his son he would introduce him to the overseas trade. He said to the recipient of the letter: “If a *bahār* of lac which had fallen into the water comes your way, buy it for him. In case it does not, and the boy goes down to Alexandria, kindly advise him to leave with you the money for such a buy, until the occasion for it arises. Then you will buy it and send it to him.” In Goitein’s interpretation, the father wished the boy to come home with a big sack – a *bahār* normally comprised 300 pounds (around 136 kgs) – though he did not want to spend much money on it. So, he asked the recipient to buy damaged lac, which was cheaper [39, pp. 256-257].

Conclusions and challenges

The abovementioned samples reveal the potential of Arabic texts beyond ATS as a tool to understand colour production in al-Andalus. Geographical sources display information regarding productive activities which involve colour-making ingredients. Normative sources provide the legal and moral frame for the economic life, in which ink making products and ink production and selling are key sectors. Colour-making materials serve multiple purposes, and, for that reason, are present in technical sources, such as agronomical, pharmacological, and culinary texts. Finally, epistolary texts are a window to the everyday life of the Cairo-based community of Jewish traders who operated in the Mediterranean, and, thus, they show how such commodities are perceived from the merchants’ viewpoint.

However, these sources – and ATS as well – pose some challenges. Arabic texts tend to replicate themselves overtime. Respect for the *autoritates* is key, even if it is not clearly stated that they are quoting one. Vocabulary can be also misleading, as, for example, the word *kuhl*, which is usually translated in sources such as the letters of the Cairo Geniza as antimony, may refer to the pencil used as eyeliner and not to the substance which is used for the said purpose. In fact, there is discussion whether *kuhl* was made of antimony [40, p. 37, footnote 266] or of galena [41]. The Arabic term *lazward* (blue stone) is also subject of debate, as it has been translated as lapis lazuli, though in the Middle Ages, it was apparently used to name any blue stone, the same way as sapphire [42].

Among geographers, the use of secondary reports (instead of *in loco* observations, mostly in the case of non-Andalusi authors), may have distorted their view on reality. Normative texts, specially *fatāwā*, can also be challenging since they deal with specific situations. The legal opinion is frequently ambiguous, specially whenever the jurist addresses several inquiries in the same *fatwa*. Technical texts were written by an elite and they fulfil the desire both of sponsors in portraying themselves as patrons of arts and sciences, and of authors, in portraying themselves as polymaths, even if they did not master nor practised the subjects they wrote about. Most letters of the Cairo Geniza do not mention al-Andalus. Therefore, studies on the Andalusi context which rely exclusively on these documents may lack consistency.

Finally, most documentary sources analysed in this survey are dated from the eleventh-thirteenth centuries, which correspond to the taifa period, and the Berber empires period. The multiplication of the political, economic, and cultural centres following the collapse of the Umayyad caliphate in 1031 favoured textual production which presented the cultivation, extraction, circulation, and use of ingredients which are also used in colour-making. The increasing number of texts with such references during the Berber governance might also be a consequence of the attested diversification and expansion of the Andalusi – and overall Iberian – economy during this period.

Regardless of such limitations, this preliminary study shows evidence that a variety of other texts beyond ATS – geographical, normative, technical, and epistolary – can offer a multifaceted and broad view on colour production in al-Andalus. Research on this matter can be expanded by extending a similar inquiry to a set of texts from a wider chronological range, and by extending it to other types of sources, such as chronicles and poetry, with the aim of further advance in the subject and approach colour as a social product, instead of a purely technical one.

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