



Recent Archaeological Investigation in Jalandhar District of Punjab: Special Reference to Black Slipped Ware Sites

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Abstract: Pottery is a valuable tool for understanding the lifestyle of any civilization and culture. A gradual development of pottery traditions is seen in Northern India. In these pottery traditions, information about settlements using Black Slip Ware has been found from time to time in Punjab. In the present investigation, evidence of settlements by people who used this (BSW) pottery type has been found on a large scale in the Jalandhar district of Punjab. In this research paper, an attempt has been made to throw light on the development and expansion of these settlements in Jalandhar district. Through FT-IR spectra, an attempt was made to understand the firing technology of Black Slipped Ware pottery.

Keywords: Kali Bein, Safed Bein, BSW, Painted grey ware.

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1. Introduction

Geographically, the state of Punjab has been divided into three parts: Malwa, Majha and Doab. The area pertaining to the study is Jalandhar district, which is a part of the Doab region (area lying between the Beas and Sutlej rivers). It is divided into two geographical units:

- (1) Upper plain
- (2) Satluj flood plain.

Upper Plain – This area is formed by old alluvial plains and spreads over more than three-fourths of the total area of the district. Its altitude is between 244 and 259 meters above sea level. However, the western part (around Jalalpur, Mala, and Rupewali villages in Nakodar tehsil) is somewhat interrupted by scattered dunes.

Sutlej Flood Plain: The Sutlej River enters Jalandhar from the eastern side near Malakpur village. It runs westwards, forming the southern boundary of Phillaur and Nakodar tehsils, and separates the

district from Ludhiana district. Sutlej flood plain lies along the southern boundary of the upper plain, which is locally known as *Bet* (District Gazetteer 1883-84:2-3).

2. Previous Work

The potential of the rich archaeological wealth of the Jalandhar district was brought to light by several archaeological surveys that have documented many sites spanning from the beginning of settled village life from the Late Harappan to the Medieval period. The credit for initiating archaeological fieldwork in the study area goes to Y.D. Sharma. He explored and reported the remains of Harappan and Painted Grey Ware culture from the Madhopur and Dhogari (IAR 1956-57: 79). After this, K.N. Dixhit and Y.D. Sharma (IAR 1963-64: 28) also confirmed the existence of Harappan and Painted Grey Ware from the sites of Katpalon and Nagar, PGW, Black slipped ware, Black and red ware from Dhuleta, PGW, Black and red ware from Apra and Ashour. In the Punjab region, stratified evidence of Black Slipped Ware (BSW) was recorded from archaeological excavations conducted at the sites of Dadheri and Nagar (IAR 1976-77: 42-43), where BSW pottery was found along with PGW and Associated Red Ware. During exploration, various scholars from different Universities (Appu Singh, Anil Yadav, Amit Kumar, Swati Rao, Harsh Dev Tomar) documented BSW sites from time to time in the Punjab or its adjoining areas. Black Slipped Ware in the study area (Jalandhar district) was reported for the first time by K.N. Dixhit and H.K. Narain from Kathpalon, Nagar, and Dhuleta (IAR 1963-64:27). After that, J.P. Joshi and Madhubala recovered BSW from *Chini Kanjiri ka Theh*, Karalan, and Malsian (IAR 1976-77: 42-43).

3. Study Area

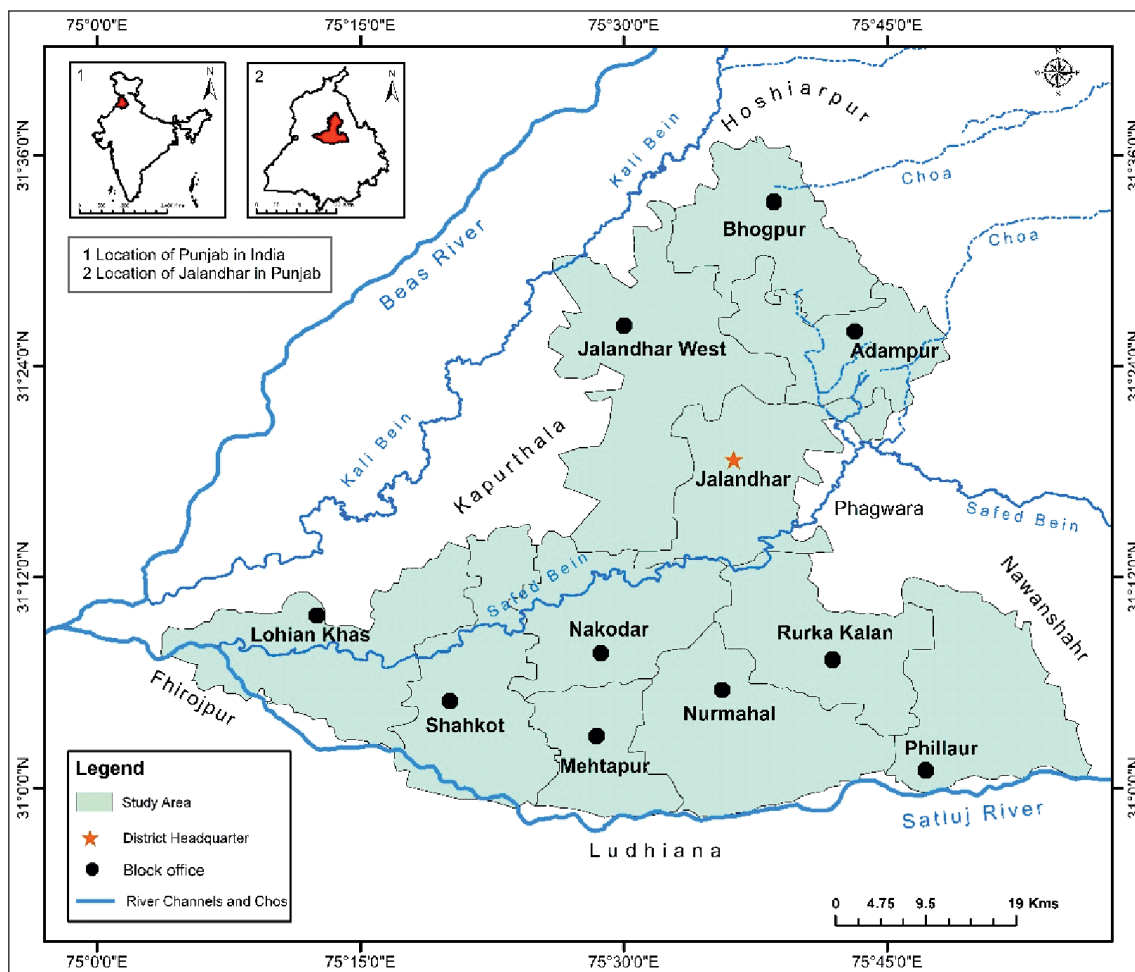
Jalandhar is one of the 23 districts of Punjab. It is located between 30° 58' and 31° 37' north latitude and 75° 08' and 76° 18' east longitude (Map 1). The Sutlej River flows along its southern border, along with northern boundary of Ferozpur, Moga, and Ludhiana. It is bounded on the western side by Kapurthala, Hoshiarpur in the north, Phagwara block of Kapurthala, and south-eastern border with Shaheed Bhagat Singh Nagar district. Jalandhar is divided into 11 blocks (Adampur, Bhogpur, Jalandhar East, Jalandhar West, Nakodar, Lohian Khas, Shahkot, Nurmahal, Mehtapur, Rurka Kalan, Phillaur). The total area of the district (954 villages) is 2,624 square kilometers (Bhatnagar 2011: 8).

4. Methodology

The present work is primarily based on first-hand information, collected through an extensive and intensive village-to-village survey of Jalandhar district of Punjab. A two-member team visited all 954 villages and voyaged around 4000 km on a motorbike in the years 2022-2024. The sites were surveyed by using a grid pattern. During this survey, a large number of cultural remains, mainly consisting of pottery and other cultural material, artefacts as well, were collected from the surface and exposed sections of the archaeological sites, which were classified according to their cultural context. A GPS application (My Elevation by RDH Software version 1.80) was used to provide the accurate location of ancient mounds. Main objective of the survey to understanding the pattern of Black slip ware settlements in the study area. This study used a Bruker IFS 66v/S spectrophotometer for FT-IR measurements from pottery samples for understand the firing technology.

5. Importance and limitations of the present work

Archaeological surveys are the first step to uncover the cultural importance of any archaeological site. Now, the existence of archaeological sites is threatened due to the adverse effects of ever-increasing



Map 1: Showing the Study Area

human activities such as agriculture, mining, etc. During the present survey, it was also observed that a large part of archaeological sites (sometimes an entire area of a site) have been covered by present habitation or are being destroyed due to modern activities, which makes it difficult to apply traditional survey techniques for the survey of any ancient settlement. For this reason, only the exposed area of the sites could have been surveyed by using the grid pattern technique and efforts were made to collect the cultural material found scattered in all the areas for the assessment of their cultural importance and chronology. Pottery is the most common material found during any archaeological survey or excavation and it is considered the main base for the identification of cultural chronology. It also gives us information about the cultural antiquity and several aspects about different cultures that existed at any archaeological site. During the present survey, archaeological material recovered from the different sites was studied comparatively with the published material from excavated archaeological sites in nearby areas in a relative manner. Therefore, an attempt was made to determine their cultural sequence of the sites surveyed. So, the objective of the present research paper is to collect information about the Black Slipped Ware sites located in the research area by conducting a field survey. The pottery found during the survey was obtained from surface level, thus instead of studying them quantitatively, their cultural context has only been provided in a relative manner and effort has also been made to determine cultural context of other material such as beads, bangles, beads by identifying similarities with published material of sites excavated located in nearby region.

6. Exploration Results

After the village-to-village exploration in the Jalandhar district of Punjab. A total of 49 sites (Map 2, Figure 1) belonging to Black Slipped Ware (Figure 3) were documented, and a considerable number of these sites (46 sites) were previously unknown. Most of the sites are represented by thick cultural deposits, but are presently in highly disturbed condition due to rigorous cultivation.

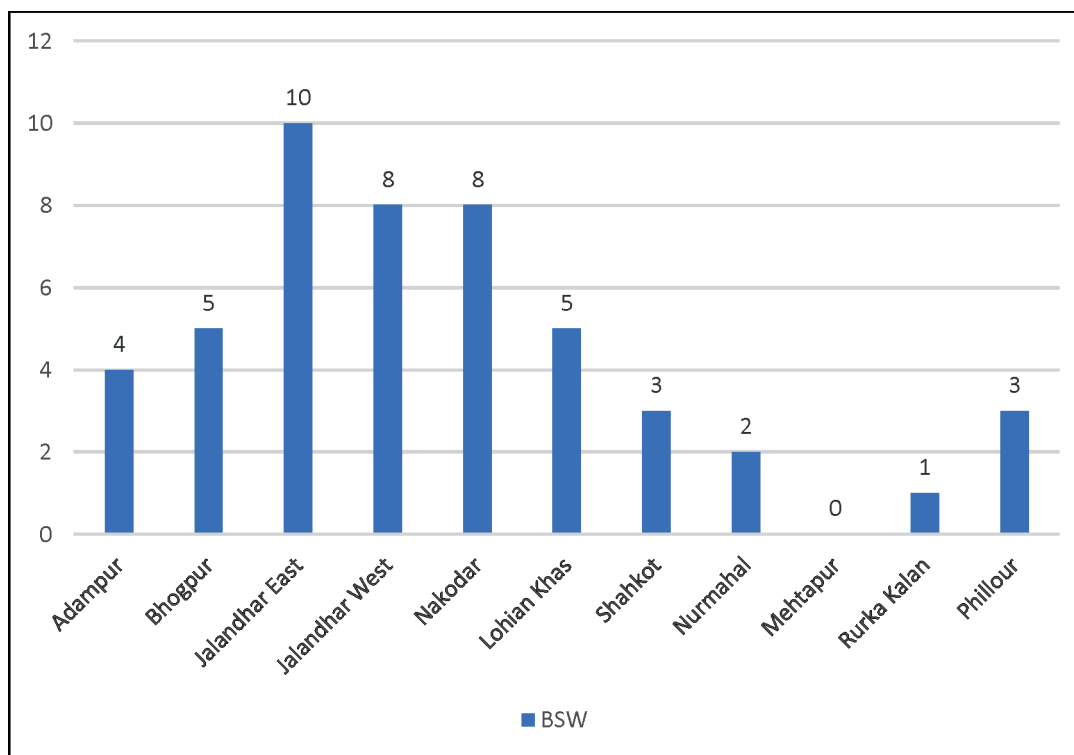
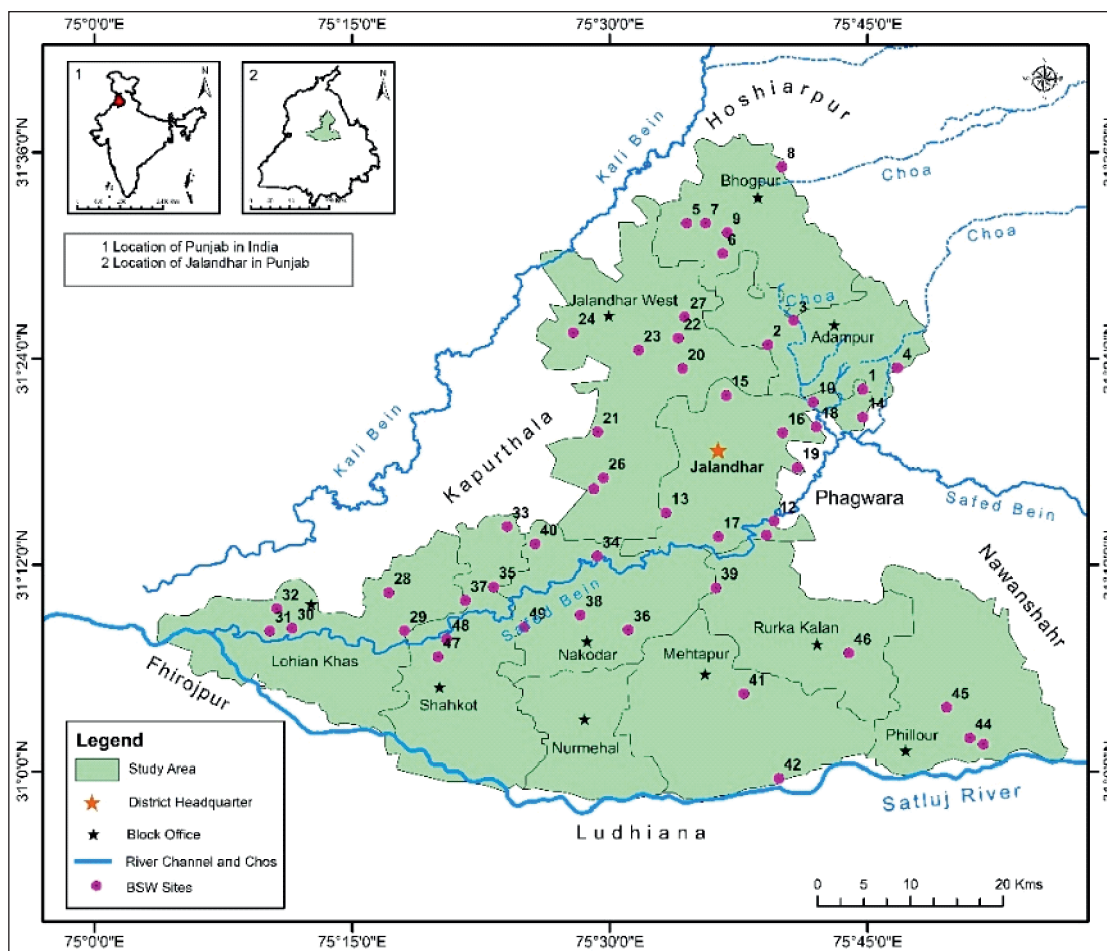


Figure 1: Block-wise Distribution of Black Slipped Ware sites in Jalandhar district

Table 1: Recently Explored Sites by Author

Sr. No.	Block	Village	Latitude	Longitude	Size	Culture
1	Adampur	Dhandhuri	31.37013	75.74525	3.2	Grey/BSW, EM
2	Adampur	Dhogri	31.39768	75.63395	2.5	LHP, Grey/BSW, EM
3	Adampur	Goal Pind	31.43663	75.6779	2.5	LHP, Grey/BSW, EM
4	Adampur	Kalra 2/Chini Kanjiri ka Theh	31.38426	75.78184	1.6	LHP, Grey/BSW
5	Bhogpur	Bhallowal	31.5314	75.57376	1.6	BSW, Historical
6	Bhogpur	Kandhala Guru	31.50198	75.60886	5	Grey,BSW, EM
7	Bhogpur	Kurala	31.5315	75.59223	1.6	LH , Grey/BSW, EM
8	Bhogpur	Rastgo	31.58557	75.6742	2	LH, BSW, E.med
9	Bhogpur	Singhpur	31.52248	75.61337	4	LH, BSW/Gray, Hist.,
10	Jalandhar East	Budhiana/ Nauli	31.35796	75.69686	10	LH, BSW,Hist. Gray/ B&R Ware
11	Jalandhar East	Chachowal	31.22859	75.65136	2.5	BSW, EM
12	Jalandhar East	Hardo Pharala	31.242259	75.658783	2.5	LH Bara Decoration, BSW, Historical
13	Jalandhar East	Lambra	31.25221	75.52807	4	BSW/Gray, Historical , EM
14	Jalandhar East	Musapur/Ucha	31.33854	75.75622	3.2	BSW/Gray, EM

<i>Sr. No.</i>	<i>Block</i>	<i>Village</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Size</i>	<i>Culture</i>
15	Jalandhar East	Nangal Salempur/ Nurpur	31.36437	75.61244	1.6	LHP, BSW, EM
16	Jalandhar East	Paras Rampur	31.32817	75.66723	6	BSW, EM
17	Jalandhar East	Saprai	31.22703	75.60467	3.2	BSW, EM
18	Jalandhar East	Sarnana	31.33396	75.69989	5	BSW, EM
19	Jalandhar East	Semi	31.29348	75.69067	10	BSW/Gray/B&R Ware, EM
20	Jalandhar West	Bansian	31.39009	75.56987	2.5	Grey/BSW, EM
21	Jalandhar West	Gazipur	31.32914	75.48801	3.6	BSW, EM
22	Jalandhar West	Kala Bahian	31.41973	75.56587	1.6	BSW,Grey/Hist., EM
23	Jalandhar West	Mari Harnia	31.40804	75.52784	3.2	Grey/BSW, EM
24	Jalandhar West	Para Pind	31.42489	75.46414	1.6	Grey/BSW, EM
25	Jalandhar West	Pawar	31.27364	75.48421	1.2	BSW,EM
26	Jalandhar West	Sada Chak/ Pawar	31.28432	75.49356	1.6	BSW, EM
27	Jalandhar West	Warinha	31.44031	75.57188	1.2	Grey/BSW, EM
28	Lohian Khas	Chachowal	31.17317	75.28549	3.5	Gray/BSW, EM
29	Lohian Khas	Darapur	31.13626	75.30078	5	LH(Bara), BSW/Coarse Gray Ware, Historical, EM
30	Lohian Khas	Jalanpur Kalan	31.13776	75.18643	3.5	BSW/Gray, EM
31	Lohian Khas	Jamsher	31.14392	75.18004	2.5	Grey/BSW, EM
32	Lohian Khas	Sabuwal Karah	31.15772	75.17646	8	BSW/Coarse Gray Ware, EM
33	Nakodar	Addi	31.23701	75.39993	2	Grey/BSW, EM
34	Nakodar	Awan Charharmi	31.20824	75.48755	2	Grey/BSW, EM
35	Nakodar	Bal Khona	31.17873	75.3868	2.5	Grey/BSW, EM
36	Nakodar	Chak Mughlani	31.13697	75.5177	4.2	BSW, EM(TC Ball)
37	Nakodar	Dhadda Hundal	31.16573	75.35933	16	Grey/BSW, EM
38	Nakodar	Mehmudpur	31.15143	75.47089	2.5	LHP, BSW, EM
39	Nakodar	Thabalke	31.17781	75.6022	3.2	Grey/BSW, Historical
40	Nakodar	Uggi	31.21843	75.4305	3.2	Grey/BSW, EM
41	Nurmahel	Gumtala	31.075	75.62926	5	BSW/Gray, Historical
42	Nurmahel	Sangowal	30.99307	75.66349	8	BSW, EM
43	Phillaur	Ashaur	31.02588	75.86176	1.5	Grey/BSW, EM
44	Phillaur	Katpalon	31.03189	75.84871	1.5	LHP, Grey/BSW, Hist., EM
45	Phillaur	Tehang	31.06177	75.82613	1.2	Grey/BSW, EM
46	Rurka Kalan	Bir Bansian	31.11455	75.73174	5	Grey/BSW, Hist, EM
47	Shahkot	Kotli Gazran	31.11079	75.3333	3	Grey/BSW, Hist, EM
48	Shahkot	Malsian	31.12809	75.34171	8	LH, Grey/BSW, Hist., EM
49	Shahkot	Nurpur 1	31.13947	75.41621	5	Grey/BSW, EM



Map 2: Showing BSW Sites in Jalandhar District

6.1a. FT-IR Analysis

This study used a Bruker IFS 66v/S spectrophotometer for FT-IR measurements from pottery samples. The setup included a Globar lamp source, KBr beamsplitter, and DTGS/MIR detector, with a spectral range of 4000 cm^{-1} - 400 cm^{-1} . About 2mg of material was drawn from a pot sherd to avoid damaging the ceramic body. The great advantage of FT-IR spectroscopy is its high sensitivity, which permits the determination of many components, even in very small amounts. Frequencies (cm^{-1}) obtained from recorded spectra of one clay sample are tabulated with corresponding minerals in Table 2. The different types of minerals were identified in the potsherd, such as quartz, Calcite, Iron oxide, clay minerals (Kaolinite/Illite), and organic carbon from the IR absorption bands of Black slipped ware pottery powdered sample.

Table 2: Possible Minerals in Kathpalon (KPL) Site Sample

Sample ID	Pottery	FT-IR Spectra Main Peaks	Minerals	Average Temperature
KPL1.06	Black Slipped Ware	3667, 3445	Kaolinite	~600–800°C
		2975	Organic	
		2332, 1584, 1394, 876	Calcite	
		1237, 1059	Quartz	
		557	Iron Oxide	

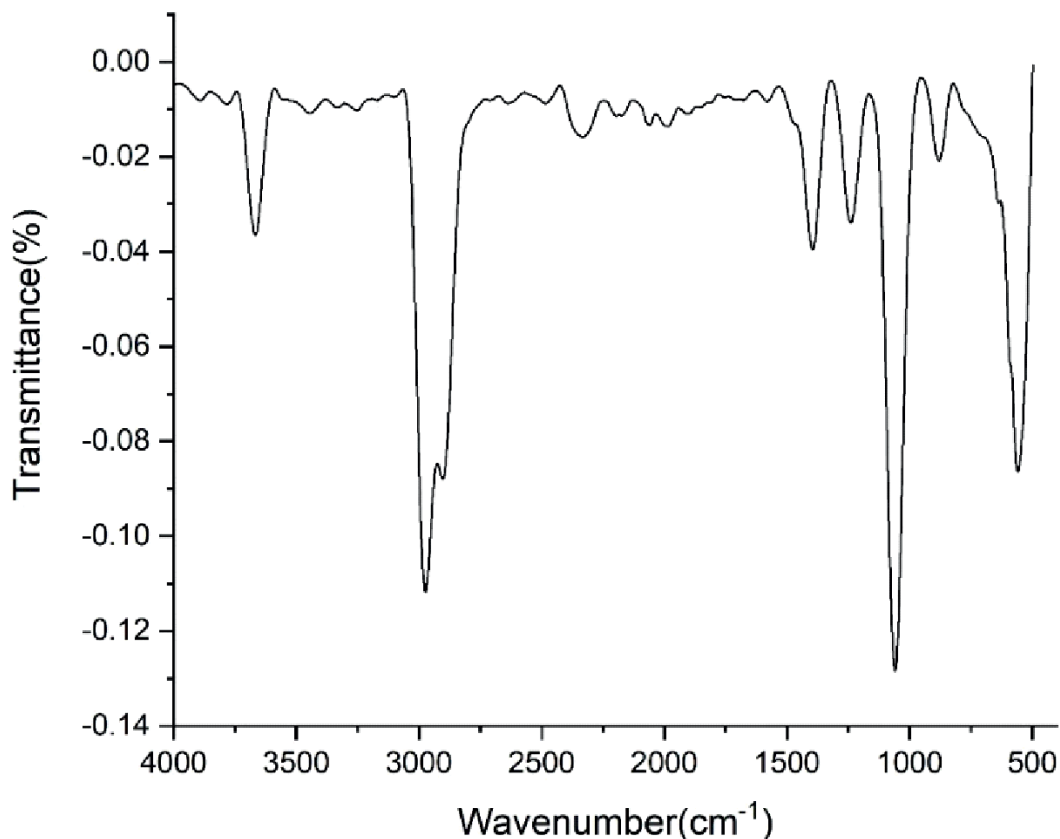


Figure 2: Showing FT-IR Spectra of BSW Potsherd (Chemistry Lab, Central University of Haryana)

The peaks at ~ 1237 and 1059 cm^{-1} are associated with Si-O stretching vibrations of quartz (silica), which remain stable across a wide range of firing temperatures. This primary peak in pottery clays reflects the presence of quartz as a major constituent. The peak at $\sim 1059\text{ cm}^{-1}$ is likely linked to Si-O-Si bending vibrations in quartz. This indicates that the quartz structure in the clay has not been significantly altered, suggesting firing below $\sim 1100^{\circ}\text{C}$, as higher temperatures would transform quartz into other phases (Paray 2024: 37). The peak at ~ 3667 and 3445 cm^{-1} is typically related to deformation vibrations of aluminosilicate minerals, such as kaolinite or muscovite. According to Dhanapandian et al. (2012: 593), kaolinite dehydroxylates at about $400\text{--}450^{\circ}\text{C}$ during heating in air. This peak suggests the presence of clay minerals, which might partially convert during firing but still retain their structural identity below $\sim 900^{\circ}\text{C}$. The peak of $\sim 2332, 1584, 1394, 876\text{ cm}^{-1}$ is likely associated with carbonate compounds, such as calcite (CaCO_3), which often remains in pottery that has not been fired at very high temperatures (Seetha and G. Velraj 2019: 5-6; Shoval 1988: 248). At higher temperatures, calcite decomposes to form calcium oxide (CaO) and releases carbon dioxide (CO_2). It shows the presence of Calcite (CaCO_3) in the sample. Therefore, the estimated firing temperature ranges from ~ 600 to $\sim 800^{\circ}\text{C}$ (Ravisankar et al. 2011: 370). The retention of clay mineral features suggests that the pottery was not primarily decorative but utilitarian. The absorption bands observed at 557 cm^{-1} could be assigned to the iron oxides. The presence of carbonates suggests firing in low-temperature kilns with limited control over maximum temperatures (Joshi and Madhu Bala 1993: 214-215). The temperature range ($\sim 600\text{--}800^{\circ}\text{C}$) aligns with early ceramic production techniques used in Black slipped ware ceramics. The black-coloured pottery (KPL1.06) has probably been fired in a reducing atmosphere for a long time.

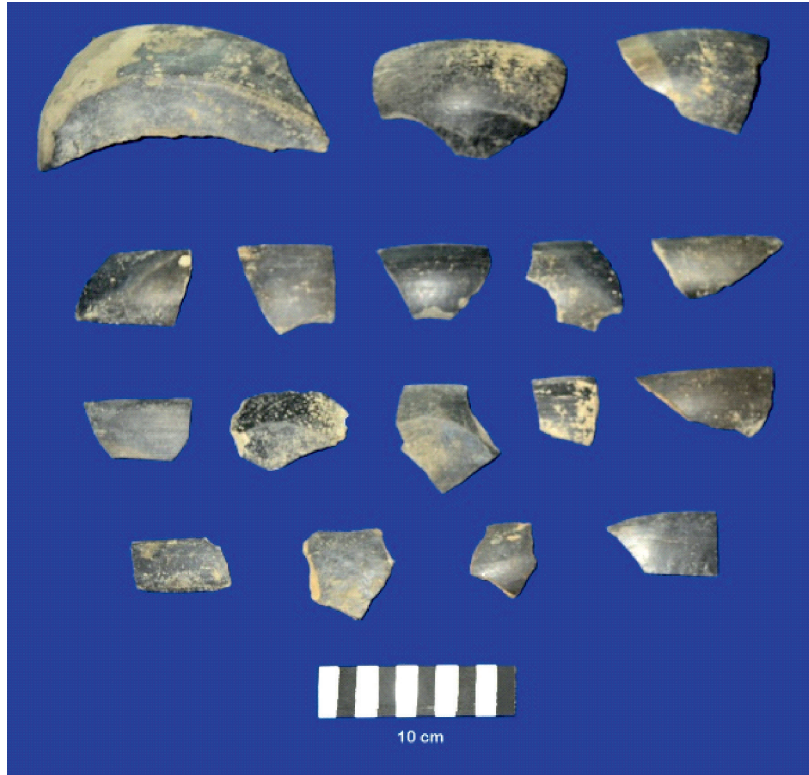


Figure 2 : Showing Black Slipped Ware potsherd

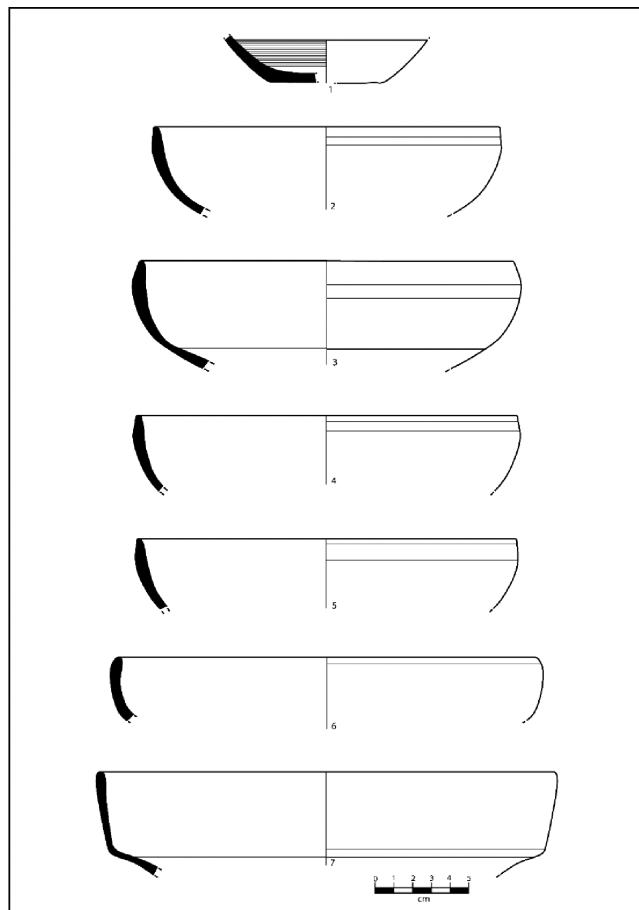


Figure 3 : Illustration of Black Slipped Ware

7. Discussion

Black Slipped Ware has been reported from a large number of sites extended from the Bikaner region of Rajasthan in the west to West Bengal in the East and from Jammu-Kashmir in the North to Andhra Pradesh (Nellore region) in the South (Singh and Vibha Tripathi 2022: 15), but it has received archaeological attention during Hastinapur excavation, where its occurrence was noticed along with Painted Grey Ware pottery (Lal 1954-55: 11). Pottery in this tradition has turned on fast wheel and treated with a fine black slip. Some specimens are found with having black and red exterior due to inverted firing techniques. In Punjab region, stratified evidence of Black Slipped Ware was recorded from the archaeological excavation conducted at the sites of Dadheri and Nagar (IAR 1976-77: 42-43) wherein BSW pottery has been found along with PGW and Associated Red Ware. Ceramic assemblage of BSW was obtained from the Bhagwanpura excavation too (IAR 1976-77: 44). After that, BSW was reported from Ropar period II (Sharma 1979: 21), Singh Bhagwanpur period I (IAR 1980-81: 49) in Doab region. Sanghol period III (IAR 1985-86: 68), Sunet period II (IAR 1983-84: 67), Brass (IAR 1993-94: 90). From Ghuram period IC (IAR 1976-77: 44), Rohira (IAR 1982-83: 66, Kumar 1982: 43), and Sunet period III (IAR 1983-84: 67) in Malwa region, BSW has been reported from Early historical to Sunga Levels. Due to its presence during PGW levels and its similarity with NBPW ware in terms of shape, utility, and decorations, B.B. Lal has suggested BSW as the forerunner of NBPW pottery. But it can be distinguished as a separate pottery tradition due to its lack lustrous surface as compared to the NBPW, and its existence during early historical period along with NBPW simultaneously. During the present course of study, Black Slipped Ware has been reported from 49 sites (Map.2), in which a site named Semi, located in Jalandhar East block, is the largest site (10 hectares) (Rahul 2024:30). Most of the sites are situated in the Northern and central parts of the district. The main shapes found during survey are bowls, dishes, and miniature pots (Figure 3) prepared by using well-levigated clay, turned on a fast wheel, and coated with a black solution both inside and outside. The results of FT-IR show the firing technology and temperature of black slipped ware. That type of ware was fired between (~600–800°C).

8. Conclusion

Black Slipped Ware holds a special place among contemporary pottery traditions due to its technical advancement that existed between PGW to later Mauryan period. In the study area, evidence of BSW has been found in the excavations from the archaeological sites like Katpalon and Nagar from the PGW phase, but in the nearby region, recovery of BSW during the early historical period has also been reported from several excavated sites, highlighting its existence as an independent pottery tradition along with contemporary traditions such as NBPW and Grey Ware. Geographically, most of the sites are situated in alluvial plains near the White River/Safed Bein and their *choas*. Only two sites, Chachowal (Lohian Khas block) and Bal Khona (Nakodar block), are situated in the Sand dunes. The finding of Black Slipped Ware during the present survey from a large number of archaeological sites in Jalandhar district indicates its importance during the first millennium BCE, and archaeological evidence confirms its continuous existence from PGW to Early historical period, which helps to establish a cultural connection between Proto-historic and Early historical cultures in Indian history. Although BSW is a distinctive pottery tradition of the first millennium BCE, it has received less attention than its contemporary pottery traditions, such as the PGW and NBPW. It has been studied merely as a concurrent pottery tradition. Therefore, the present work is an attempt to identify the BSW pottery tradition as a distinct pottery tradition, and in future excavations and archeological research on this pottery tradition can highlight its historical significance in a better way. The temperature range

(~600–800°C) aligns with early ceramic production techniques used in Black Slipped Ware ceramics and black-coloured pottery (KPL1.06) has probably been fired in a reducing atmosphere for a long time.

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