International Journal of Innovative Language, Literature & Art Studies 6(1):17-20, Jan-Mar. 2018

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Waste Iron Filings as Underglaze Effects for Aesthetic Finish on Stone Ware Ceramics

Okewu E. Jonathan[1*] and Zauro, T.D.M.[2]

[1*]Department of Visual and Creative Arts,
Federal University Lafia, Nigeria
jonathan.okewu@gmail.com

[2]Entrepreneurship Centre,
Federal University Birnin Kebbi, Nigeria
tukurzauro@yahoo.com

ABSTRACT
Previous studies as carried out with the use of iron filings in clay body shows viability of the waste material at different levels and different instances such as; speckled dotted effects of iron fillings for decorative ceramics at earthenware temperature (1000^{o}C), reducing shrinkage (opener) rate of stoneware clay and the throwing ability of iron filings in clay body during production on the potter's wheel. It becomes a thing of curiosity to explore the possibility of iron filings in clay body as under-glaze design under a transparent glazes fired under stone ware temperature of 1260^{o}C. An experimental method of research was adopted for this study. Step by step of the process of glazing were adhered to in this study. Iron filings in clay body proved to be reliable in the quest for underglaze designs or effects. This study concludes that iron filings can serve as substitute for the use of colour substances as underglaze effect in ceramics which is the norm.
Keywords: Waste iron filings, Under-glaze, Aesthetic, Stone ware ceramics

INTRODUCTION

Working with clay and iron filings has so far been a worthwhile venture that has revealed vital and divers potentials that lie therein in the combination of the duo. On one occasion, iron filings proved very vital in the reduction of shrinkage in stoneware clay. According to Okewu et al. (2013), from the entire different shrinkage tests between clay with iron filings and clay alone, an average difference in shrinkage of 0.4cm was recorded as compared to the control of 0.7cm high shrinkage of the clay body. This means that iron filings has a meaningful impact in the reduction of shrinkage of the clay body, while on a second occasion, it proved very aesthetic due to its speckled effect on decorative ceramics. Okewu *et al.* (2014) reveals that mixing iron filings with clay proved that decorative ceramics can be produced not only by glazing, burnishing, or over glaze decorations but also in the body decoration. In terms of suitability and convenience in working with, previous experiment carried out showed that at a ratio of 95:5 (clay /iron filings) and with the largest particle size of 1.18mm, one is able to work conveniently with iron filings in clay using the various production methods in ceramics. Okewu *et al.* (2014) affirm that throwing method of production employed was convenient and stress free though with good amount of skill to be able to handle the mixture of clay and iron filings on the wheel.

Having carried out all the foregoing and ascertained their viability, one wonders what the outcome would be like when clay with iron filings is glazed. Under what type of glaze will the effects of iron filings be felt more? These are the issues this article is set out to find out.

Ceramic glaze is an impervious layer or coating of a vitreous substance which has been fused to a ceramic body through firing. Glaze can serve to colour, decorate or waterproof an item. Kiln Art (2016) explain that glazes come in literally thousands of combinations of colours, textures, styles and types that can be applied in many different ways and fired at a range of temperatures. Glazes are sometimes the most exciting part of ceramics. This is partly because the transformation of the piece when it is fired can be quite pronounced.

This is why it is often described as "the magic" in ceramics. The glaze adopted by this study is not coloured but rather transparent to achieve the aim of this research.

Hansen (2015) points out that a fully transparent glaze is simply one that does not have opacity. There are degrees of transparency. For example, if a glaze is matt it will show the colour of underlying body and decoration, but these will be muted. Kiln Art (2016) further reveal that transparent is a description of whether you can see through the glaze to the clay body underneath. All clear transparent glazes darken the colour or the clay or underglaze they are placed upon. Coloured transparent glazes will darken the clay body and will often darken and muddy the colour of an underglaze that is placed underneath them. According to Hamer and Hamer (2004) underglaze is ceramic colours applied usually on a biscuit and covered with a transparent glaze. They further assert that the quality of underglaze is the intensity and wide range of colours. Its advantage over onglaze is its permanence; it is as permanent as the covering glaze. The idea of underglaze as it has to do with this study is not about application of colour on biscuit ware before glazing but to cover with transparent glaze a body that has on it the speckle effect of iron fillings that has been propounded as decorative by Okewu et al. (2014).

MATERIALS AND METHODS

An experimental approach of research was adopted for this study. Materials used for production in this study include; Kankara kaolin, Bomo secondary clay and iron filings. Kankara kaolin and Bomo clay were obtained in the form of fine grain materials with some lumps. The kaolin and clay were soaked in different bins but in the same proportion of 50/50 for some days and this was followed by blunging the secondary clay and kaolin together to form a homogenous mixture which was sieved to improve the clays plasticity resulting in the formation of the clay body. This was an adopted body from the Ceramics Section, Department of Industrial Design, Ahmadu Bello University, Zaria. Iron filings were obtained in the form of semi powder in different particle sizes. It was subjected to analyses by sieving with graduated mesh of three hole sizes of 1.18 millimeter, 600 micron, and 300 micron. aggregate size of 1.18mm Iron Filings became appropriate for this study. Throwing method of production was adopted in producing the decorative wares. Two wares were produced with one serving as the control (without iron filings) while the second contained iron fillings all over the body. Drying was carried out under room atmosphere and was kept at a minimum to avoid crack development. The wares were loaded into the kiln, gradually pre-heated and biscuit fired at 1000^{o}C (see plate 1 and 2) before glaze firing. Two shades of transparent glazes were applied unto the biscuit wares and reintroduced into the kiln for gloss firing of 11200^{o}C. The kiln was allowed to cool down properly before unloading.

DISCUSSION AND FINDINGS

Since the processes and outcome of iron fillings on clay body at biscuit stage had been ascertained and analysed, this study dwells its discussion and findings on the effect of transparent glazes on the clay body with iron fillings.

The result of application and glaze firing of the wares with and without iron filings in transparent glazes shows reasonable difference in their appearances. The glazed ware without iron fillings came out as usual showing shades of plain transparency as applied (see plate 3) while the one with iron fillings reveals more enhanced speckled effect under the transparent glaze (see plate 4). The enhanced speckled effect of iron fillings under the transparent glaze is possibly due to the high temperature of firing of 1260^{o}C (stoneware) as compared to the initial firing of 1000^{o}C (earthenware) of the previous study. In addition, this is a transformation from results of previous studies without application of glaze and this one in question is undoubtedly clear as glazes are meant just to do that.

CONCLUSION

This study has affirmed the assertion by Kiln Art (2016) that ceramic piece when glaze fired can be quite pronounced and that this is why it is often described as "the magic" in ceramics. Iron filings in clay body have proven to be reliable in the quest for underglaze designs or effects. It can serve as substitute to the use of colour substances for underglaze effect in ceramics.

Plate 3: Biscuit ware with iron fillings.

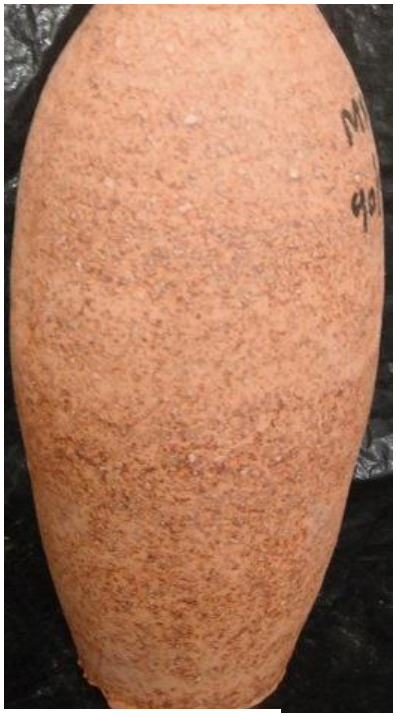

Plate 4: Biscuit ware with iron fillings.

Plate 5: Transparently Glazed without iron filings.

Plate 6: Transparently Underglazed effect of iron filings.

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