

COMPONENTS OF SLURRIES AND THEIR IMPACTS ON KILISHI QUALITY: A REVIEW

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ABSTRACT

In the review of the impacts of slurries on kilishi quality, kilishi was discovered as a sundried meat that is made from beef, mutton, or chevon. Its preparation involves a careful process that transforms raw meat into a flavourful, shelf-stable snack. The meat is sliced into thin strips, maximising surface area for the infusion of flavours, where the meat undergoes a bath of rich, aromatic marinades known as slurries. Slurries are flavourful mixtures of spices, herbs, seasonings, and other ingredients combined with liquid components to create a marinade that coats the meat slices. Spices such as ginger, garlic, chilli peppers, and cloves infuse the marinade with depth and complexity, while herbs like parsley, cilantro, and scallions contribute freshness and vibrancy to the flavour profile. Seasonings such as salt, soy sauce, and Worcestershire sauce add umami richness and balance, enhancing the overall savoury character of the marinade. Legumes such as groundnut, bambara nut, soybean, melon, etc. serve as thickeners and flavour enhancers. The slurries enhance the nutritional and overall sensory qualities of kilishi, contributing to its unique flavour profile, tenderness, and preservation qualities. Understanding of components of slurries and their impacts on the quality of kilishi will aid the producers to tailor slurries to suit regional preferences, consumer tastes, and market trends, resulting in a diverse range of kilishi variations that cater to a wide audience.

Keyword: Slurries, Kilishi, Sensory, Nutritional quality, Meat

INTRODUCTION

Kilishi is a sundried meat that is made from beef, mutton, or chevon (Abubakar *et al.*, 2011). Its preparation involves a process that transforms raw meat into a flavourful, shelf-stable snack (Sathya, 2018). The meat is sliced into thin strips, maximising surface area for the infusion of flavours, where the meat undergoes a bath of rich, aromatic marinades known as slurries (Behera *et al.*, 2020). Slurries can be defined as flavourful mixtures of spices, herbs, seasonings, and other ingredients combined with liquid components to create a marinade that coats the meat slices (Espinosa-Ramírez, 2022). These marinades serve as the medium through which the desired flavours and aromas are infused into the meat during the processing of kilishi. The components of the slurries impart complex flavours and also tenderise the meat by ensuring a succulent texture upon drying (Stiffman, 2023). In addition, Alamuoye *et al.* (2024) reported that slurries enhance the overall sensory qualities of kilishi, contributing to its unique flavour profile, tenderness, and preservation qualities. Despite the significance of kilishi as a traditional Nigerian dried meat product, there exists no or little literature in scientific understanding regarding the components and impact of slurries on kilishi quality. The knowledge of slurries impacts on the quality of kilishi is paramount to meat processors, kilishi producers, and scientific scholars offering understandings into the interplay of ingredients and techniques that shape the quality of kilishi. Therefore this study seeks to review the components of slurries and their impacts on kilishi quality.

Components of Kilishi's Slurries

Several components of slurries used in the production of kilishi are:

- i. **Spices and Herbs:** Common spices such as ginger, garlic, chilli peppers, cloves, nutmeg, and cinnamon add warmth, pungency, and aromatic notes to the marinade, creating a rich and flavourful base for the kilishi (Dabasso, 2020).
- ii. **Seasonings:** Seasonings such as salt, soy sauce, maggi, knorr, or indigenous seasonings like iru (fermented locust beans) are added to the slurry to improve flavours and add complexity to the marinade (Chellaiah *et al.*, 2020).
- iii. **Acidic Ingredients:** Acidic ingredients such as vinegar, lemon juice, or tamarind paste help to tenderise the meat by breaking down tough muscle fibres and connective tissues, resulting in a more tender and succulent texture (Ikram *et al.*, 2021). Additionally, they contribute to the overall flavour profile, balancing out the richness of the spices and seasonings (Diez-Simon *et al.*, 2019).
- iv. **Oil or Fat:** Common oils such as peanut oil, palm oil, or vegetable oil. Are added to kilishi slurries to coat the meat slices, prevent them from sticking together during drying, and help to seal in moisture and enhance the mouthfeel of the kilishi, giving it a rich and luxurious texture (Nwadi and Okonkwo, 2021)
- v. **Sweeteners:** Sweeteners like honey, molasses, or brown sugar may be added to the slurry to create variety and balance the spiciness and acidity of the marinade (Sharma, 2020).

vi. **Aromatics:** Aromatics such as onions, scallions, and fresh herbs like parsley or cilantro may be incorporated into kilishi slurries to add depth of flavour and contribute freshness and complexity to the marinade, elevating the overall sensory characteristics of the kilishi (Idowu-Adebayo, 2022).

vii. **Leguminous plants:** Leguminous plants such as groundnuts, soybeans, bambaranuts, melon, etc., are added as thickeners and flavour enhancers (Iyiola *et al.*, 2021; Iyola and Bulus, 2024).

Impacts of Slurries on the Quality of Kilishi

In kilishi production, the slurries aid in shaping not only the flavour and texture of the final product but also its preservation and overall quality standards (Adeyeye, 2017). Spices such as ginger, garlic, chilli peppers, and cloves infuse the marinade with depth and complexity, while herbs like parsley, cilantro, and scallions contribute freshness and vibrancy to the flavour profile (Bittman, 2019). Seasonings such as salt, soy sauce, and Worcestershire sauce add umami richness and balance, enhancing the overall savoury character of the marinade (Van Wyk, 2014). In addition, acidic ingredients like vinegar, lemon juice, or tamarind paste help to break down tough muscle fibres and connective tissues, resulting in a more tender and palatable texture. The slurries act as a protective barrier, sealing in moisture and preventing the meat from drying out during the drying process, thereby preserving its natural juiciness and tenderness (Arokiyaraj *et al.*, 2023). The oil or fat in the slurry coats the meat slices, preventing them from becoming dry and brittle during the drying process while also adding richness and moisture to the final product (Bhuiyan and Ngadi, 2024).

According to Serna-Saldivar (2022), slurries serve as natural preservatives which protect the meat from microbial spoilage and prolong its shelf life without the need for artificial additives or preservatives. The antimicrobial properties of spices and herbs in the slurry create a hostile environment for bacteria and fungi, inhibiting their growth and ensuring the safety and quality of the kilishi (Rai, 2022). Salt, a common component of slurries, aids in preserving food products by reducing water activity, thereby creating an unfavourable environment for microbial growth on the kilishi (Rhee and Ziprin, 2001). A lot of spices used in kilishi also ward off insects and control the multiplication of microbes. According to Kharb and Ahlawat (2010), the spice mix significantly reduces the thiobarbituric acid value (TBA) in pre-cooked dehydrated meat products. Several studies have shown that spices generally have flavourings, antimicrobial, and antioxidant activity on the kilishi (Holley and Patel, 2005; Jackson *et al.*, 2002). Extracts from herbs and spices enhance sensory characteristics and retard lipid oxidation (Lagouri and Nisteropoulou, 2009) and extend the shelf-life of meat and other food products (Botsoglou *et al.*, 2003). In addition, Alamuoye (2019) reported that garlic powder as an additive up to 8% improved chemical characteristics, organoleptic properties, and delayed lipid oxidation in kilishi.

Slurries add value to the raw meat by increasing the nutritional composition of the product. According to Elizabeth (1995), ash content of any processed meat is the ash content of the muscle tissue and ingredients used. Okorie (2018) reported that ash content of kilishi was higher relative to the raw meat with a difference of 1.94%. The phytochemicals present in garlic powder, condiments, and spices used in kilishi production added to increase the ash content of the product (Alamuoye, 2019; Chukwu and Imodiboh, 2009). Furthermore, Ogunsola and Omojola (2008) reported that high ash content is an indicator of the distinct mineral levels of the spices, which give an aggregate mineral level. Processing meat with slurries into kilishi products improves the protein of the product thus increasing its nutrient composition (Ogunsola and Omojola, 2008). According to Alamuoye (2019), additional ingredients of plant source used during processing of kilishi contributed to the high crude protein and ash content. More so, Olusola *et al.* (2017) reported that a major part of the protein in kilishi is usually from the groundnut paste used. The variation in the fat contents of kilishi is not only attributed to the meat cuts and type of meat but also to the slurry types used. According to Iyiola and Bulus (2024), the highest fat content was found in kilishi made with groundnut slurry (14.90%), while kilishi made with soybean slurry had the lowest fat content (13.44%). The nitrogen-free extract of kilishi is also attributed to slurry. According to Olusola *et al.* (2017), the significant part of the carbohydrate contents found in kilishi was attributed to the ingredients in the slurry which are high in common sugars because they are of plant origin. The use of slurries helps kilishi producers have the flexibility to customise and innovate, allowing them to experiment with different flavour combinations, ingredients, and techniques to create unique and innovative products.

CONCLUSION:

Kilishi, a sundried meat that is made from beef, mutton, or chevon, is prepared by infusing dried raw meat in slurry that transforms the raw meat into a flavourful, shelf-stable snack. Slurries are flavourful mixtures of spices, herbs, seasonings, and other ingredients combined with liquid components to create a marinade that coats the meat slices and serves as the medium through which the desired flavours and aromas are infused into the meat during the processing of kilishi. Slurries aid in enhancing the nutritional and overall sensory qualities of kilishi, contributing to its unique flavour profile, tenderness, and preservation qualities.

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