

## PDF - SORPTION ISOTHERMS OF COMMERCIAL KILISHI OBTAINED FROM ABUJA NIGERIA - researchcub.infoABSTRACT

This work investigated the moisture sorption isotherm characteristics of commercial Kilishi. The adsorption and desorption of the Kilishi were determined at 30 °C and 40 °C temperatures. The sorption Models of Guggenheim Anderson-De Boer (GAB), Brunauer Emmett and Teller (BET), Oswin, and Henderson were each used to describe the sorption isotherm of the meat at 30 °C and 40 °C temperatures and the percentage root mean square (%RMS) of the various models used were determined in comparison with the data generated in each model. The result revealed that the adsorption and desorption isotherm of kilishi products were sigmoidal in shape ranging from the monolayer region of bound absorbed and immobile water through the concave region that represents the least strongly bound which is relatively mobile. There was an effect of temperature on the equilibrium moisture contents at 30 °C and 40 °C, which decreased with increase in temperature at constant water activity, hence increase in temperature increases the water activity at constant moisture content for BET, GAB and Oswin Models, Monolayer moisture content ( $M_0$ ) decreased with increase in temperature for both adsorption and desorption while the % RMS decreased in adsorption but increased in desorption. Henderson % RMS increased for adsorption and decreased for desorption. Of all the sorption models chosen GAB model gave the best description of the equilibrium moisture data for desorption.

### CHAPTER ONE

#### 1.0 INTRODUCTION

Meat is the flesh of animals consumed for food (Aberle et al., 2012). In the tropics, the bulk of the meat consumed is derived from sheep, cattle, goats, pigs, deer, antelope, rabbit, squirrel, rat, elephant, camel and other mammalian animals domesticated or wild; poultry, including chicken, turkey, ducks, guinea fowls, geese and meat from other avian and reptilian animals; fish, crayfish, crabs, lobster and other sea foods; snails and other molluscs; and insects (Ihekoronye and Ngoddy, 1985). The bulk of the dietary protein in the Nation is obtained through crops. The level of animal protein intake is only about 17 percent of the total consumed by the average Nigerian, which is inadequate from the minimum recommended. This situation could be improved by developing the food processing sector especially meat and meat products (Igene et al., 1997).

Meat drying is the oldest method of meat preservation. It consists of a gradual dehydration of pieces of meat cut to a specific uniform shape that permits the equal and simultaneous drying of whole batches of meat. Kilishi is an example of Nigerian traditional dried meat, which is obtained from sliced lean muscles of beef, goat or lamb. It is made on a large scale under the hot and dry weather conditions prevailing from February to May. It is produced by sun drying thin slices of meat infused with spices and slurry of defatted groundnut paste. Kilishi is mainly produced by Hausa's and Fulani's. The product appears to have developed as a means of preserving meat using a simple means when it is in surplus supply by the early Fulani's and Hausa's in the absence of facilities for refrigerated storage.

The quality of most foods preserved by drying depends to a greater extent upon their physical, chemical and microbiological stability. This stability is mainly a consequence of the relationship between the equilibrium moisture content (EMC) of the food material and its corresponding water activity ( $a_w$ ) at a given temperature. These water sorption Isotherms are unique for individual food materials and can be used directly to solve food processing design problems, predict energy requirements, and determine the proper storage conditions

(Myara et al., 1996). Moisture sorption is the relationship between the equilibrium moisture content of a material (expressed as mass of water per unit mass of dry matter) and water activity at a given temperature. Moisture sorption can be used to investigate structural features of a food product such as surface area, pore volume, size distribution and crystallinity. An Isotherm obtained by exposing material to air of increasing humidity is termed the adsorption Isotherm while that obtained by exposing the material to air of decreasing humidity is known as the desorption Isotherms. Moisture sorption Isotherm equations can be used to predict moisture sorption properties of foods. Many empirical and semi-empirical equations describing the sorption characteristics of foods have been proposed. These include the Mono BET Models, GAB Models, Henderson and Halsey Models, Smith, Oswin Models and others. Labuza (1975b) attributed this to the fact that the water is associated with the food matrix by different mechanisms in different water activity regions. Models available in the literature to describe moisture sorption Isotherm can be divided into several categories. These include the Kinetic models based on a monolayer (Mod BET Model). Kinetic models based on a multi-layer and condensed film (GAB model) semi-empirical (Henderson and Halsey models) and empirical models (Smith and Oswin models).

## 1.1 JUSTIFICATION

The traditionally processed Kilishi delicacy is highly cherished by consumers because of its diverse use and unique taste. However, it poses a serious health hazard because of the handling and processing and storage methods by the local manufacturers as well as the hawking system. All of these expose the pre and post-processed product to microbial contaminations. Therefore, there is need to improve the processing, storage, packaging and overall quality of Nigerian traditional food products.

The average Nigerian diet lacks animal protein. Although the animal resources are available; the inadequate supply of meat products is due to poor processing. The resulting product has questionable qualities of short life and a large proportion is lost due to spoilage.

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