ABSTRACT

Potassium bromate is an additive widely employed bybread makers to improve bread quality. On account of its deleterious effect andcarcinogenicity in humans, certain levels of potassium bromate are not allowedin bread. Use of potassium bromate in bread is banned in many countriesincluding Nigeria.

The present evaluation was carried out in easternpart of Nigeria where consumption of bread is high. Twenty-three differentbrands of breads were sampled. Quality assessment shows that, all the brandscontained potassium bromate in a quantity that exceeded the minimum allowed bythe FDA. In addition, all the sampled breads contained trace amount of lead, asubstance which is harmful to health. On the basis of these, all twenty threebread brands sampled were considered unsafe for human consumption and breadmakers should be discouraged from using potassium bromate as bread improver.

CHAPTERONE

1.1BACKGROUND OF THE STUDY

Breadis an important source of food in Nigeria. It is consumed extensively in homes,restaurants and hotels. Bread is made from low protein wheat. It usuallycontains several ingredients that would help improve the quality ofthe bread.Some of the basic identified ingredients, apart from flour are table salt,sugars, flavors and at least a flour improver such as potassium bromate (Vicki,1997).

Themajor challenge in both flour milling industry and bakeries is the bakingquality of flour, which is determined by the capacity of the dough preparedfrom it to retain gas. As a result of wide variations in the composition offlour, various treatments and supplements conditioning agents (flour/breadimprovers) are added for strength during mixing, extensibility for molding andalso to increase loaf volume and texture. Over the years, several improvershave been used but studies have shown some to be deleterious to health, therebynecessitating their ban. The use of potassium bromate has been a common choiceamong flour miller and bakers throughout the world because it is cheap andprobably the most efficient oxidizing agent. It acts as a slow oxidizing agentthroughout the fermentation proofing and bakingprocess affecting the structure and the rheological properties of the dough. Asa result,

many bakeries use potassium bromate as an additive to assist in theraising process and to produce a texture in the finished product that isappealing to the public.

Potassiumbromate has adverse effect on health and its health effects are divided intotwo categories. The first category deals with effects related to non cancereffect.

Thisincludes its effect on the nutritional quality of bread. It degrades vitaminsA2, B1, B2, E and niacin which are the main vitamins available in bread (IARC,1999).

Studies(IARC, 1999) have shown significant differences in essential fatty acid contentof flour treated with bromate or in bread made from flour containing bromate.

Inhumans, potassium bromate can cause cough and sore throat when inhaled (Atkins,1993). Abdominal pain, diarrhea, nausea, vomiting, kidney failure, hearingloss, bronchial and ocular problems, are some of the other non cancer healthproblems associated with ingestion of potassium bromate (Atkins, 1993). In thesecond category, numerous studies have revealed the potential of potassiumbromate to cause cancer in experimental animals and in humans (CSPI, 1999;Watson, 2000). In bromate as bread improver has been banned (Ekop et al., 2008;http://www.compassnews.net). In Nigeria however, some bread makers/bakerieshave continued to include potassium bromate in their bread.

Furthermore,a preliminary survey revealed that some other materials employed in breadmaking (e.g. water) and the environments where these bakeries are located arenot free from contamination by heavy metals such as lead. It is against thisbackground that this investigation was undertaken in eastern part of Nigeriawhere bread consumption is very high and where many of the bakeries are locatedin the midst of slums and squartments. This study therefore is aimed atassessing the safety of bread being marketed in the Nigerian market.

1.2 STATEMENT OF THE PROBLEM

Followingthe harmful effects potassium bromated posses on consumers, the harmfulsubstance was banned in 1993 by the Federal Ministry of Health. Potassiumbromate ($KBrO_3$) is an oxidizing agent that has been used as a food additive,mainly in the bread-making process. It has been demonstrated that potassiumbromate induces renal cell tumors, mesotheliomas of the peritoneum, andfollicular cell tumors of the thyroid. In addition, experiments aimed atelucidating the mode of carcinogenic action have revealed that

potassiumbromate is a complete carcinogen, possessing both initiating and promotingactivities for rat renal tumorigenesis.

1.3 OBJECTIVES OF THE STUDY

Themain aim of this study is to investigate into the harmful effects of potassiumbromated in bread. Specific objectives of the study are:

1. Toanalyze the effect of potassium-bromate in bread.
2. Toexamine the toxicity of potassium bromated in bread bakery.

1.4 RESEARCH QUESTIONS

In-orderto achieve the stated objectives above, the researcher formulate the followingresearch questions:

1. Whatare the effects of potassium bromated on bread?
2. Whatis the level of toxicity potassium bromated posses in the production of bread?

1.6 SIGNIFICANCE OF STUDY

Thisstudy will help enlighten the masses as well as bread consumers on the harmfuleffects of potassium bromated. The study will sensitize readers on why theyused help fight against bakery owners that still use potassium bromated as aningredient in the production of bread.

1.7 SCOPE OF THE STUDY

Thestudy covers the effects of potassium bromated and its harmful effects on humanhealth using samples of bread from Enugu state in Eastern Nigeria. Theresearcher could not cover a wider area due to financial and time constraints.

1.8 LIMITATION OF THE STUDY

However,there were some constraints that impinged on the research, these are;

1. **Financial constraint:** The cost of sourcinginformation and collecting samples of bread was quite on the high side, whichincluded visiting various small businesses in the various towns that made upthe local government.
2. **Time Constraint:**The limited time frame given to achieve the research was also a constraint tothe study.

1.9 DEFINITION OF TERMS

Bread is a staple food prepared by baking a dough of flour and water. It is popular around the world and is one of the world's oldest foods.

Flouris a powder which is made by grinding cerealgrains,or other seedsor roots(like Cassava).It is the main ingredient of bread,which is a staple food for many cultures, making theavailability of adequate supplies of flour a major economic and politicalissue at various times throughout history

A tumoras a synonym for a neoplasm(a solid or fluid-filled [cystic] lesionthat may or may not be formed by an abnormal growth of neoplastic cells) thatappears enlarged in size.

Potassium bromate is produced by passing bromine into a solution of potassium hydroxide . An industrial electrolytic processis used for large scale production.

AN INVESTIGATION INTO THE HEALTH DANGERS OF POTASSIUM BROMATE IN BREAD