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The effect of potassium bromate on the vitamin E content of wheat flour and dough

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ABSTRACT

This Study investigated the effect of potassium bromate on the nutritional value of wheat flour preserved with potassium bromate. Superb bakers choice wheat flour was used for the study. The wheat was divided into five equal portions thoroughly mixed with varying doses (0mg, 50mg, 100mg, 200mg and 300mg/kg flour) of potassium bromate respectively. Samples were wrapped in black polythene bags to protect them from light and stored for 4 weeks while the nutrient values of the different rations and dough made from them were determined at the onset and then at the end of the study which was four (4) weeks. Result of the study showed that potassium bromate significantly ($p < 0.05$) reduced the vitamin E content of the treated flour and dough. The results of the study showed that potassium bromate deteriorates the nutritional value of both flour and dough.

KEYWORDS

Vitamin E;
Dough;
Flour and potassium bromate.

INTRODUCTION

Food additives are any substance including any source of radiation, the use of which results or may reasonably be expected to result in that substance or its byproducts becoming a part of or affecting the characteristics of a food[1]. Food additives when used in proper amounts may still pose a health hazard for specific small but vulnerable groups in[2].

Potassium bromate is a food additive classified as an improver[3]. It is an oxidizing agent that is utilized in flour primarily for dough improvement. Under the right proportion, which is 60mg/kg, potassium bromate will prevent the attack of the flour by weevils, microbial agents and mites and so it can act as preservative[3]. It is a food additive used to improve the preservative qualities, flavor, colour, texture, appearance and stability of food most especially flour and dough[4]. Most flour milling companies add bromate to their products to improve the quality of flour produced[5]. Despite a ban on potassium bromate in flour by the World Health Organization, some nations are allowing its use as oxidizer in baked foods at very low levels[6]. It was observed that many bakeries in Nigeria are not NAFDAC compliant in terms of bromate use in bread, exposing the population to the effects of bromate[5]. Bakers associations maintain that potassium bromate is converted to harmless potassium bromide during the baking process[6].

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The improving action does not take place until the flour is made into dough[3].

During storage, flour increases in strength and there is a consequent improvement in the baking qualities. The addition of 'Improvers', however, produce some what similar changes in the properties of the gluten (in the dough) in a matter of hours[3]. The improvement in the baking quality of flour by potassium bromate has endeared bakers to potassium bromate, hence the resistance to desist from using it. The study carried out by[7] on the potassium bromate content of Bread and flour samples in Uyo metropolis showed the presence of potassium bromate in some of the samples. Research findings have shown that potassium bromate decomposes vitamins A, B_1, B_2, and E in bread[1].

Apart from its use in flour, potassium bromate is used in permanent hair wave neutralizing solutions and the dying of textiles using sulfur dyes[8]. It may be formed in water during ozonation when the bromide ion is present[9]. Some natural foods like flour have natural content of bromine. Flour has 2.4-7.7mg/kg of bromine[7].

AIM AND OBJECTIVES

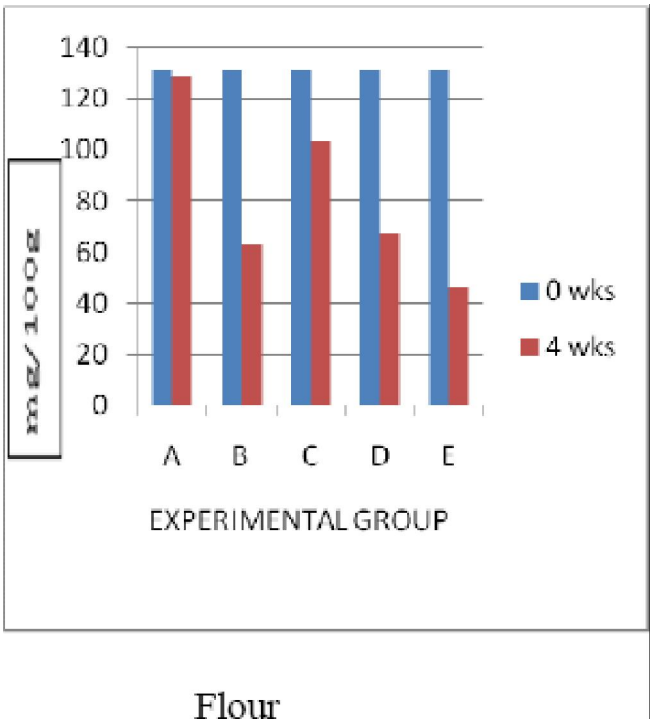
This study aimed at determining the effect of potassium bromate on the vitamin E contents of wheat flour and dough.

EXPERIMENTAL

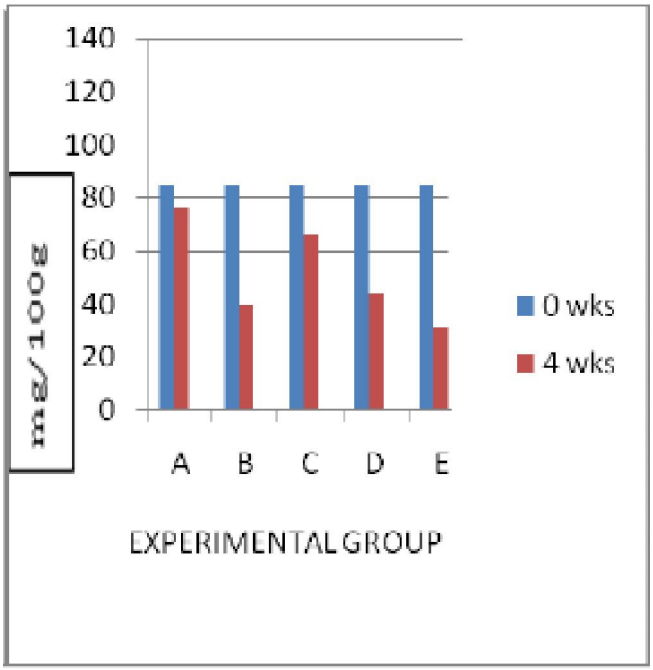
Reagents. All reagents used were of analytical grade. The potassium bromate used was produced by BDH, England.

Sample collection. The wheat flour brand, Superb Bakers Choice flour used for the study was bought from flour market Ogbunike, Anambra State, Nigeria.

Sample treatment. One kilogramme of the flour sample, Superb bakers choice wheat flour used for the study was thoroughly mixed with a large spatula and then divided into 5 groups; group A (control), group B, group C, group D, and group E(treatment groups). The different groups except group A were treated with the following concentrations of potassium bromate; 50mg/kg, 100mg/kg, 200mg/kg and 300mg/kg flour. All the



Flour



Dough

Figure 1 : Vitamin E content of flour and dough preserved with different doses potassium bromate

different groups were wrapped in a black polythene bag (to prevent the micronutrients from oxidation by light) and were stored in a cool place for a total study period of 4 weeks. and vitamin E content of the wheat

flour was analyzed at the onset of the experiment before preserving with potassium bromate and then subsequently at the end of the storage period, which was 4 weeks.

Dough made from each group was similarly analyzed along at each point in time. The method of[10] was used for the dough preparation

Vitamin E determination. The vitamin E content determination was done using the method[3].

RESULTS

Vitamin E content

Figure 1 is the result of the Vitamin E content of flour and dough preserved with different doses of potassium bromate.

DISCUSSION

There was significant reduction ($p<0.05$) in vitamin E content of the treated flour and dough groups. Vitamin E content of preserved flour significantly deteriorates in the presence of potassium bromate. Figure 1 reveals that while there is very little or no loss of vitamin E in flour sample preserved without potassium bromate, there is significant loss of vitamin E ($p< 0.05$) in samples preserved with potassium bromate after 4 weeks of shelf life. It is easily oxidized by oxidizing agents[2]. Oxygen is captured in dough during mixing[11]. This may be the reason the level of vitamin E was lower in dough than in flour. Vitamin E is an antioxidant. It thus protects cells and other nutrients against lipid peroxidation[2]. The tocotrienol forms of natural vitamin E possesses powerful hypocholesterolemic, anti-cancer and neuroprotective properties that are often not exhibited by tocopherols[12]. Oral tocotrienol protects against stroke-associated brain damage *in vivo*[12].

ABBREVIATIONS

NAFDAC, National Agency for Food, Drug Administration and Control.

CONCLUSION

The results of the study showed that potassium bromate deteriorates the nutritional value of both flour and dough. vitamin E is important micronutrient that enhances good health. Undermining its level in food especially flour products will impact negatively on the health of the consumers of these foods. So regulatory agencies should strictly enforce the ban on the use of potassium bromate in flour and its products.

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