CHANGES IN SOLUBLE AMINO ACIDS OF SOME TROPICAL STARCHY ROOTS DURING CHILLING

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SUMMARY

Preliminary qualitative results on the loss of free amino acids during and after chilling storage roots and tubers, and also plantain and banana fruits, throw some light on the changes during chilling injury. Loss of free amino acids is less in the cold resistant potato than in the tropical roots and fruits, and the loss of free amino acids seems to be associated with the degree of browning.

RESUME

Les résultats qualitatifs préliminaires sur la perte en acides aminés libres pendant et après la conservation des racines et tubercules au froid, de même que le plantain et les fruits de banane, jettent la lumière sur les changements subits par l'effect du froid. La perte en acides aminés est moindre dans la patate résistante au froid que dans les racines et fruits tropicaus, et la perte en acides aminés semble être liée au degré de brunissement.

RESUMEN

Resultados preliminares cualitativos, sobre la pérdida de aminoácidos libres, durante y después de la refrigeración de aminoácidos libres, durante y después de la refrigeración de raíces y tubérculos y también de plátano para cocinar y banano, dan alguna luz sobre los cambios que ocurren durante el dano que provoca la refrigeración. La pérdida de aminoácidos libres es menor en la papa resistente al frío que en las raíces y frutos tropicales y parece estar asociada con el grado de coloración café que se observa.

INTRODUCTION

Starchy roots and tubers such as yams are now increasingly being exported from Nigeria to overseas countries, especially Britain, partly as food for immigrant populations, but also because some species contain diosgenin, a steriod drug precursor. Preservation in transit is the most important factor in this marketing.

These foodstuffs have to be transported under refrigeration. It has been found that despite reduced losses from many other factors, they suffer low temperature breakdown. Attention has been focused by most workers on the lipid fraction of foodstuffs to explain the low temperature decay phenomenon. We have begun to investigate changes in soluble amino acids induced by low temperature.

MATERIALS AND METHODS

Samples of yams, cassava, cocoyam, bananas and plantains were collected from the University of Ife farm. Half of each sample was kept in the deep-freeze at 10° C for 2 months.

To determine soluble amino acids, 100g samples were removed from the middle of the fresh tuber. These were cut into very small pieces, mixed with 100 ml. of distilled water ahd homogenized in a stainless steel blender. To prevent foaming, a few drops of amyl alcohol were added. The homogenate was then centrifuged. The supernatant was collected and made up to a roughly 70% alcoholic solution by the addition of ethanol. The deproteinised extract was vacuum-dried. The solution was then chromatographed after being taken up with iso-propanol if it was too viscous.

The same extraction method was applied to corresponding samples taken after chilling for about two months at about 10° C.

Chromatography was carried out using Whatman No. 1 chromatography paper and the one dimensional ascending technique with n-butanol: acetic acid. H_2O [(12:3:5) by volume 3] and Phenol: H_2O (80:20w/v) as solvents, or 2-dimensional chromatography using the first of these solvents in the first dimension and the other in the second. This gave good separation of the amino-acids. The papers were then sprayed with ninhydrin and dried at 80—100° C for two minutes when most of the amino acids show up brightly.

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