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Original article

Reduction of potassium content of green bean pods and chard by culinary processing. Tools for chronic kidney disease☆

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ABSTRACT

Introduction: In order to prevent a possible hyperkalemia, chronic renal patients, especially in advanced stages, must follow a low potassium diet. So dietary guidelines for chronic kidney disease recommend limiting the consumption of many vegetables, as well as to apply laborious culinary techniques to maximize the reduction of potassium.
Objective: The aim of this work is to analyze potassium content from several vegetable, fresh products, frozen and preserved, as well as check and compare the effectiveness in potassium reduction of different culinary processes, some of them recommended in dietary guidelines such as soaking or double cooking.
Methods: Sample potassium content was analyzed by triplicate using flamephotometry.
Results: The results showed significant reductions in potassium content in all culinary processes studied. The degree of loss varied depending on the type of vegetable and processing applied. Frozen products achieved greater reductions than the fresh ones, obtaining in some cases losses greater than 90%. In addition, it was observed how in many cases the single application of a normal cooking reached potassium reductions to acceptable levels for its inclusion in renal patient diet.
Conclusion: The results shown in this study are very positive because they provide tools for professionals who deal with this kind of patients. They allow them to adapt more easily to the needs and preferences of their patients and increase dietary variety.

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Palabras clave:
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RESUMEN

Introducción: Con el fin de prevenir una posible hiperpotasemia, los enfermos renales crónicos, especialmente en fases avanzadas, deben seguir una dieta baja en potasio. Para ello, las guías alimentarias para la enfermedad renal crónica recomiendan limitar el consumo de muchas verduras, así como aplicar laboriosas técnicas culinarias para reducir al máximo la cantidad de potasio.

Objetivos: El objetivo de este trabajo es analizar el contenido de potasio de varios productos vegetales (frescos, congelados y en conserva), así como comprobar y comparar la efectividad en la reducción de potasio de distintos procesos culinarios, algunos de ellos recomendados en las guías alimentarias, como son el remojo o la doble cocción.

Métodos: Se analizó el contenido de potasio de las muestras por triplicado mediante espectrometría de emisión atómica de llama.

Resultados: Los resultados mostraron reducciones significativas en el contenido de potasio en todos los procesos culinarios estudiados. El grado de disminución varió según el tipo de verdura y el procesado al que fue sometida. En los productos congelados se alcanzaron mayores reducciones que en los frescos, y en algunos casos se lograron pérdidas de potasio superiores al 90%. Además, se observó como en muchos casos la simple aplicación de una cocción normal dio lugar a reducciones de potasio hasta niveles aceptables para la inclusión en la dieta del enfermo renal.

Conclusión: Los resultados mostrados en este estudio son muy positivos, ya que aportan herramientas a los profesionales que tratan con este tipo de pacientes, lo que les permite adaptarse más fácilmente a las necesidades y preferencias de sus pacientes, así como incrementar la variedad en su dieta.

Introduction

Patients with chronic kidney disease (CKD) often have associated complications such as hyperkalemia or an increased risk of cardiovascular disease, which are in turn associated with an increased risk of mortality.[1–4]

As a result, patients with CKD have specific nutritional requirements. Intake of potassium, should be limited to 1500–2000 mg/day,[5,6] according to the stage of the disease and the specific situation of each patient.

To prevent hyperkalemia, patients should follow a diet low in potassium,[3] avoiding foods with a high natural potassium content, or those containing additives with potassium salts. Due to their high mineral, especially potassium, content, CKD patients must reduce the incorporation into their diet of many types of vegetables, among them green beans or green leafy vegetables.

In order to achieve the maximum reduction in the potassium content of these foods, nutritional and dietary guidelines for CKD[7–9] recommend presoaking the vegetables for a period of 12 and 24 h, with at least one exchange of water, and then double cooking with plenty of water. The double cooking technique consists in placing the vegetables in a pot with water at room temperature and then boil them. Once it begins to boil, remove the vegetables and place them in another pot with already boiling water and end the cooking there.

There are also other recommendations such as cutting them into small pieces, as small as possible and discarding the cooking broth. These recommendations are based on the loss of potassium and other soluble minerals in food due to passing it through cooking water.

These recommendations are frequently found in the guides provided to patients with CKD, but there are very few scientific studies that demonstrate the effectiveness of these methods, which are also long and laborious.[10–12]

The primary objective of this work is to analyze the reduction in potassium content of several fresh and processed vegetable products, the consumption of which is limited for patients with CKD, such as green beans, chard, mixed and diced vegetables, after subjecting them to soaking and different types of cooking. Because of the scant scientific evidence on the effectiveness of the recommendations usually provided to patients with CKD, this paper aims to test and compare different cooking techniques in order to optimize them, to try to increase the variety and the number of vegetable servings, and provide tools to professionals who deal with these kinds of patients.