



Evaluation of the Argentinean garlic germplasm in relation to its aptitude for the freeze drying process

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INTRODUCTION

Currently the consumers tendency is toward to foods with beneficial attributes for health and good organoleptic characteristics. Therefore is important to establish a scientific support for the food consumption with bioactive compounds.

Diets that includes garlic and other vegetables from the genus *Allium* have been associated with decreased risks of several chronic diseases, such as coronary heart diseases and some cancers (Block *et al.*, 1992). Due to the medicinal properties is that in the last years had been prepared different garlic products with therapeutic purposes.

The responsible for these effects are organosulfur compounds, *e.g.*, alliin (principal thiosulfinate of garlic). When the bulb is cut or crushed alliin is produced enzymatically from an aminoacid called alliin [(+)-S-(2-propenyl)-L-cysteine sulfoxide]. This compound is also the main responsible for the characteristic garlic "flavour" (Lancaster and Boland, 1990).

The quantity of these compounds (thiosulfates) show a natural variability owing to the cultivar, fertilization, water management, physiological state and storage conditions (Brewster, 1990).

On the other hand, during the enzymatic reaction of alliin synthesis, ammonium and pyruvic acid are also formed. The quantification of pyruvic acid is used as a pungency indicator and in an indirect way, this is a measure of thiosulfates content (*e.g.*, alliin). Therefore, in the present work, we have chosen the quantification of pyruvic acid as quality indicator.

Consequently the aim of this work is the characterization of the argentinean garlic cultivars by their aptitude for the freeze drying process. The information obtained will contribute with the quality improvement of the garlic supplements

METHODOLOGY

Plant material. Nine garlic cultivars, to arise of the germplasm bank from INTA La Consulta (Argentina): Fuego INTA, Sureño INTA, Norteño INTA, Perla INTA, Licán INTA, Gostoso INTA, Castaño INTA, Nieve INTA and Unión, were used. The experiment design was complete blocks at random with 3 replications.

Sample treatment. Representative samples were taken from each cultivar, and each one was subjected to two treatments: 1. Conservation in order to measure pyruvic acid in fresh garlic, and 2. Freeze drying (each cultivar was homogenized in a blender, frozen and subjected to the freeze drying process at -50°C for 24 h).

Estimators of sensorial and phytotherapeutic quality. Pyruvic acid was quantified by spectrophotometric measurement of the colored compound formed when pyruvic acid reacts with 2,4-dinitrophenylhydrazine (Schwimmer and Weston, 1961). Industrial yield was obtained from the percent rate of powder weight / fresh weight.

RESULTS AND DISCUSSION

Yields in weight obtained during the freeze drying process are showed in Fig. 1. The average value was 29.17 %. Norteño INTA and Licán INTA arised the highest yield in weight (33%), and



Castaño INTA had the less yield. The losses of pyruvic acid during the freeze drying process (Fig. 2) were in average 66.84%. Castaño INTA (51.72%) and Licán INTA (56.1%) were those which lost less pyruvic acid during the process, whereas Perla INTA evidenced the highest loss of pyruvic acid content (83.4%).

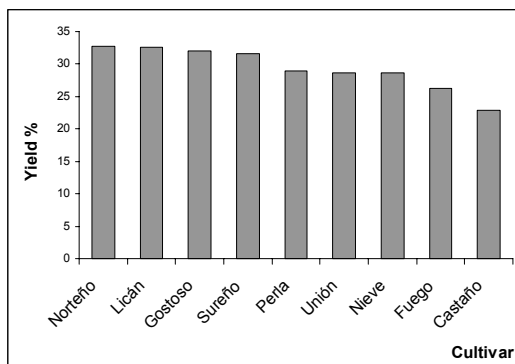


Figure 1. Percent yield of the freeze drying process.

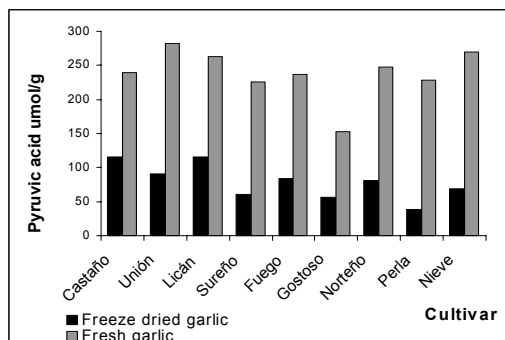


Figure 2. Comparison of the amounts of pyruvic acid before and after the freeze drying process.

CONCLUSION

According to the results, the different cultivars show a differential behavior in the freeze drying process. We conclude that the most adequate cultivar for this process is Licán INTA, which has provided the best yields in weight, and less pyruvic acid losses. Consequently, the powder obtained by this process keeps a advantageous pungency for use as ingredient for the elaboration of functional food.

Note: This study was presented at the 'I Reunión de Biotecnología Aplicada a Plantas Medicinales y Aromáticas' (First Biotechnology Meeting on

Medicinal and Aromatic Plants), Córdoba, Argentina, 2006.

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