COMPARATIVE STUDY OF CONVENTIONALLY AIR DRIED AND CO2 MODIFIED ATMOSPHERE DRIED "CONFERENCE" PEARS

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Through the years of our planet development there were established a lot of countries of the first, second and third world which economy depend on their agricultural lands. The high quantities of diverse vegetal products are grown every year and then sold throughout the country or exported worldwide. Although plant food is always favored by the costumers, there are periods when the abundant harvest becomes an issue for the growers, as they may not have the opportunity to get rid of the yield before it starts to spoil. A good solution for that problem is drying. Using this method of conservation, the growers not only stop the spoilage of their fruits and vegetables, but also receive other benefits, which allows them to minimize storage spaces, transporting costs as well as they get a whole new product, that can be sold all year long. Through the years there were known a whole lot of different drying methods that brought into the process a large diversity as well as their combination allowed to merge their strong sides to create new, even more efficient drying methods. One of the new and poorly investigated directions is modified atmosphere drying. As such, the goal of the research was to compare the results of experimental dryings performed with air and CO2 modified atmosphere.

"Conference" pears were utilized as experimental object of the study. For the research one used ripe fruits which were washed and sliced in half circles upon installing them inside the drying chamber of an experimental drying installation, which allows to use different methods of heat treatment, such as microwave, air convection and modified atmosphere drying. For the experiment to begin the chamber was heated using hot air/CO2 (drying agent temperature 60 – 100°C) transported via a centrifugal fan (drying agent velocity 1.5 m·s-1). After reaching the needed temperature the drying process begins throughout which the humidity of pears drops down from 86% to 20%.

After experimental dryings were performed, one established for every drying agent and temperatures (60 – 100°C, 13-80% CO2), the drying and drying velocity graphs showing the dependencies between dried product humidity – drying process duration and drying process velocity – dried product humidity. Analyzing the set up diagrams we noticed a small deviance between same drying temperature air and CO2 drying durations (e.g. for 60°C the reduction in drying time for CO2 was 10.5% and 7.7% for 100°C) energy consumption for the two drying methods (e.g. for 60°C the reduction in energy consumption for CO2 was 4.2% and 1.2% for 100°C). To investigate the quality parameters one has determined the total polyphenols content. As a result, there was a notable change of total polyphenol content that are more retained in the dried product as the temperature grows, but as well, there is a distinguishable difference between same drying temperature total polyphenol content for air and CO2 drying methods, as such, at 80°C, there are 35 AG/gl for air and 81 AG/gl for CO2 modified atmosphere drying.

Keywords: drying, drying time, polyphenols, humidity, temperature.

Acknowledgments: The work was carried out within the State Program, ANCD no. 20.80009.5107.09 "Improving food quality and safety through biotechnology and food engineering", held at the Technical University of Moldova.