

Low cost fruit dryer

Graduate



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Introduction: Fruits are a good of mother nature, which we consume almost every day - for example in dried form. Customers are often interested in fruit varieties, which do not exist in our region. Therefore, a large part of the fruit comes from developing countries, where locally the fruit is dried with outdated technology under poor conditions. For this reason, this bachelor thesis is dedicated to the development of a fruit dryer for use in developing countries. The aim of this thesis is the complete elaboration and development of a fruit dryer. The question is which heat pump is ideally suited for the fruit drying process and whether the technology can be fully adapted into a feasible concept.

Approach: For this purpose, manufacturers of already established fruit dryers in German-speaking countries were subjected to an analysis. This investigation revealed significant information regarding certain decision-making processes, such as the choice of materials, the arrangement of components, the defined temperature ranges and the design. These findings represent an essential building block and form the foundation for the subsequent concept development as well as the basis for the subsequent calculations. On the basis of these evaluations, the theoretical drying times were determined and the necessary dimensions established. Parallel to these calculations, an experimental analysis of the flow behavior at different resistances was carried out. The next step was the careful elaboration of the concept with the aid of CAD software, in which the knowledge and information gained was of decisive importance.

Result: The final assembly process of the fruit dryer was accompanied by a large number of optimizations and adjustments. Since this design is a prototype, extensive tests and measurements were carried out to gain further insights and make any necessary adjustments. After a series of adjustments to ensure that the fruit dryer was ready for operation on both the hardware and software sides, the first drying processes could finally be carried out. In the final test run, both dried apples and mangos showed extremely successful results. The dried fruits were not only visually pleasing, but impressed above all with their outstanding quality, consistency and taste.

Advisor

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Subject Area

Mechanical
Engineering

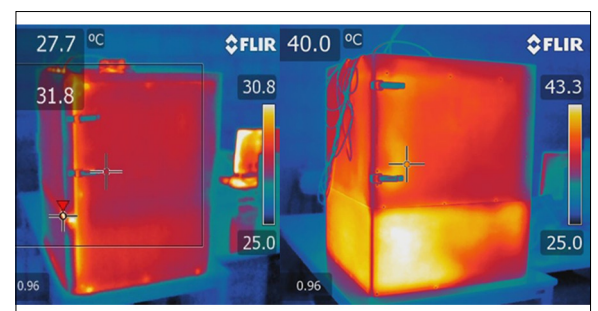
Fruit dehydrator with dried mangoes

Own presentation



Thermal image with insulation (left), without insulation (right)

Own presentation



Flow test with acrylic model

Own presentation

