SOLAR ENERGY AND REFRIGERATION BY SORPTION

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ABSTRACT

In hot countries the use of cold is increasing for various applications: housing, food storage, ... In North Africa, the production of many perishable food is seasonal, and these foods are not available, therefore only during part of the year. During this brief period, production exceeds the market absorption capacity. This mismatch causes losses after food grain crops, fruits and vegetables, lack of the necessary precautions during harvesting, handling and transportation. Indeed, after harvest, the fruits and vegetables remain alive because they breathe, carry out gas exchange with the surrounding environment and continue to evolve throughout the marketing chain. These changes result in phenomena that are impacting the visual quality, nutrition and taste.Temperature is the most important factor for preserving fruits and vegetables. Low temperatures slow down the metabolism of the fruit or vegetable to allow the maintenance of product quality. By cons, too low temperatures may cause often irreversible defects.The short-term storage temperature (less than 7 days) fresh fruit and vegetables is between 4 ° C and 8 ° C, corresponding to the range of cold produced by chillers single-stage adsorption.

Compression refrigerating machines, very often used in air conditioning and domestic refrigerators, require the compressor operating a considerable expenditure of electrical energy. These machines use for their operation, most of CFCs deplete the ozone layer. Scientific research must decide for a technology capable of ensuring the future of our planet's environmental and energy saving. In these hot country solar energy is available almost throughout the year.

Alternative systems should use refrigerants healthy for the environment and have high performance to reduce the CO_2 emissions that contribute to the greenhouse effect and consumes the least amount of fossil energy such as solar in our case. Solar refrigeration coupling is of great interest for these countries and it is the object of this work.

The purpose of this paper is to present the work for sorption machines (absorption and adsorption) on their principles, used systems, their performance and the coupling with solar.

This solar sorption coupling requires knowledge or meteorological data is validated simulation models as well as the characteristics of solar collectors. We will present the models that we have developed and used and give good results.