A Research of Cooling Characteristics of Liquid in Different Containers

Rosendahl, Ville (School: Rantakylan Yhtenaiskoulu)

The objective of the research was to find out which factors influence to the cooling characteristics of a liquid in different containers for example a cooling time of hot drinks in different cups. Additionally, I researched the amount of the evaporated liquid during the cooling. The variables were the material (steel, ceramic and glass) and the shape of the container, the thermos-functionality and an aimed air flow. The measuring instruments were a Raspberry Pi minicomputer, a kitchen scale and a digital thermometer. In the measurements each container was placed on the scale with a thermal probe and 200 grams of boiling water was poured in it. The computer measured temperatures until it reached 30 degrees Celsius and saved the values in a table. The mass of the remained water was weighted. To analyze the results, the data was put in to graphs. The results show that the material had only a slight effect to the cooling characteristics. Whereas the thermos-functionality doubled and the wide shape as well as the air flow nearly halved the cooling time. The evaporated mass was close to 5 % in every container except the thermos cup which nearly prohibited the evaporation. The results clarify how the basics of thermodynamics influence in an everyday situation. The results can be applied when choosing a proper cup for every user. Practically, a different cup for people who want to enjoy and drink their coffee slowly, and for people who want to have just a short coffee break.

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