SUMMARY

Special requirements of the buildings are demanded by the humid environment and the low temperatures in a potato store and chosen materials must endure the humidity. A diffusion barrier must be applied in a wooden wall while a stone wall can function without. Potatoes can be bulk stored or stored in boxes usually containing about 600 kg. Wounds because of the pressure can occur on the potatoes in bulk storing if the store height is too big. The storing height is usually less than 4 m.

Among the climatic factors in storing, the air temperature is of most importance, but humidity and air movements are also very important. After the storage filling and the wound healing at 10-15 °C, ware and table potatoes are stored at 3-5 °C. Potatoes for other purposes are stored at slightly different temperatures. The temperature affects the conversion of sugar and starch.

A potato with good turgor endures pressure and handling better and therefore, storing of potatoes with a minimum of water loss is important. This is of great importance, not only during the storing, store emptying and assortment but also when the potatoes have left the store for packaging and distribution. High humidity in the store demands humidification.

Experiments were made in an air conditioned chamber in order to investigate climatization of potatoes stored in boxes. In the air conditioned chamber measurements were made for a pile of boxes containing about 60 kg each. Cooling with natural infiltration, exhaust fan and supply air fan were investigated. The fastest and most effective cooling was achieved with the exhaust fan and plastic covered box sides. Conditioning of separate parts, for example potatoes wetted during harvesting, can preferably be done with this method. For freely placed boxes, natural infiltration can work well but when the room between the boxes is limited, systems with supply air under the boxes are to be preferred.

Experiments with cooling of potatoes with outdoor air and with artificial cooling were made in chambers. A well functioning plant for environmental control can mean a lot for the storing and the controlling systems built for the experiments worked to satisfaction. Outdoor air cooling worked well until the outdoor air temperature exceeded the storing temperature during longer periods. The usage of room placed air cooling units with refrigerants, direct-expansion and fans showed disadvantages considering freezing and defrosting. Potatoes are usually stored in buildings cooled with outdoor air. Storing to late spring or early summer demands artificial cooling. Humidification of the supply air with an evaporative humidifier seems to function well.

Calculations made for an air flow through stored potatoes interpret, that an air flow of 16 m³/(ton h) is suitable during the storing period considering aspects of weight losses. According to the calculations, it is just positive with higher flow rates when the air is saturated, for example when higher refrigerating capacities are needed during cooling to desired storing or when there’s a lack of longer periods with cool outdoor air. The calculations indicate that a lower air flow can be better at low humidity levels. Saturated air minimises the weight losses.