A MSc-study on microbial development in vegan RTE-products

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Carolin Müller, who is a German exchange student from Technische Hochschule Ostwestfalen-Lippe in Lemgo, already wrote a summary on some experiences. This was published in week 4 (2022) and written in German language. The practical work of this MSc-thesis was carried out at Seinäjoki University of Applied Sciences (SeAMK) in Seinäjoki (Finland). Carolin stayed in Seinäjoki for 4 months, from June 2021 to early October 2021. She worked on her thesis doing both literature research and experiments in the laboratories. The days in the laboratory were long leading to an excellent MSc-thesis with the title “Development of certain spoilage bacteria in oat drink and plant-based snacks”. In this article, we will first tell something about the MSc-study Carolin performed in both the analysis (Fig. 1) and the processing facilities in Frami Food Lab (FFL). Gun Wirtanen and Jarmo Alarinta were the supervisors of this study. At the end there will be experiences about her stay in Finland.





Fig. 1. The experiments were carried out in FFL at SeAMK, which in summer time offered space for comprehensive test series. (Pictures: Carolin Müller)

Carolin worked on shelf-life studies of vegan ready-to-eat (RTE) foods, oat drink and snacks. It is to be stated that there is microbial growth of both spoilage microbes and pathogens in vegan products. This can happen especially, when the products are produced and/or stored under improper conditions. These contaminated RTE vegan products may lead to severe health risks. In this study, a non-pathogenic *Escherichia coli* as hygiene indicator and the surrogate *Listeria innocua* for the pathogenic *L. monocytogenes* were used. The food safety criteria required by regulation (EC) no. 2073/2005 (on microbiological criteria for foodstuffs) must be fulfilled and growth of *E. coli* and *Listeria* spp. should not be higher than the defined level for this type of food products. This is especially important for snacks and drinks, which are consumed without preheating. The reason for this is that the storage in a refrigerator can rapidly increase the level of certain microbes, e.g. *Listeria* spp., decreasing the food safety. In this study, we found that the cell count of *E. coli* was lowered in the vegan snacks and oat drinks, when stored at refrigerated temperatures. The storage in cold is however not a safety guarantee, because also low levels of these microbes can cause food poisoning. The reasons for lowering the microbial levels might be ingredients in the products e.g. the acidity or the carbon dioxide content. As an outcome based on this study, the behaviour of microbes in the products should be extensively studied at various temperatures.Fig. 1. The experiments were carried out in FFL at SeAMK, which in summer time offered space for comprehensive test series. (Pictures: Carolin Müller)

SeAMK is an awesome institution and all staff members are very friendly, kind and helpful. Students have many opportunities for their studies, including many comfortable and quiet places for learning in the library, which of course also provides lots of appropriate literature. There is a very pleasant atmosphere on campus

that motivates you to study. The laboratories are also very well equipped. They offer plenty of space in which a variety of experiments can be performed. Before starting your studies, you will get a very detailed introduction about available options. That allows you to be able to use all your opportunities from the first day onwards. Another great thing is, that each exchange student gets a tutor, which you can talk to at any time. The tutor helps you with any type of challenges you meet, regardless it is concerning the university or not. This is especially helpful in the days before your travel and even more, when you arrive in Seinäjoki and you are not very familiar with the city, the Finnish culture and the life in Finland.

The accommodation was rented through Sevas, an agency offering student accommodation. These apartments are nearby the campus. It takes only 5-10 minutes of walking from the apartment to the SeAMK campus. You can choose from several types of accommodation. Carolin chose a flat for two persons, which she applied for online. The application went very easy, quick and convenient. At arrival, you will find no other furnishings in the flat than a bed, a desk, a chair, a wardrobe and a chest of drawers. There are no kitchen utensils. Anyhow, the use of the washing machines with dryers are shared by all residents and are included in the rent. The internet connection is also include in the rent. In case you want you can use of the sauna.



Carolin travelled by car and ferry from Travemünde. The ferry goes to Helsinki. The ferry connection Travemünde-Helsinki takes about 29 hours and is very good, since you do not need to drive long distances through Denmark and Sweden. Carolin recommend this way of traveling to everyone. There are several reasons for it. The first reason is, as mentioned above, that there are no kitchen utensils in the apartment. Since prices in Finland are quite high, it is worthwhile to bring equipment and furnishings by car for your stay from Germany. Furthermore, distances between different cities are very long and by car, you can visit different places easily, when you want.
In Seinäjoki you do not need the car, because most places can be reached walking or with bike. On cite, you can borrow or buy a second-hand bike. About the sceneries in and close to Seinäjoki and free time events:

there are public barbecue areas in the Finnish nature, which are great for a barbecue with friends at the open fire for a nice summertime evening. One place is in front of the library close to the river, where some wooden benches are placed in a theatre seating. There you can meet many people, listen to music or carry out some studies.

In summertime, there are also other outdoor opportunities e.g. stand-up paddling and frisbee golf. Another worthwhile place to visit in Seinäjoki is the lake Kyrkösjärvi (Fig. 2) and the surrounding forest area, which brings balance to city life. Furthermore, foreign films, broadcasted and in the cinema, are shown in the original tongue. Thus, you have the opportunity to watch movies in languages you understand.

Fig. 2. The view to Kyrkösjärvi. (Picture: Carolin Müller)

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