

# **Microbiome for Shelf life**

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# Microbiome for Shelf life

As previously described, Creme Global has deep expertise in exploring the microbiome. In the case of extending the shelf life of food, NGS is used to describe the dynamics of bacterial growth during storage under defined conditions can be conducted. Culturable bacterial growth can also be following using classical bacteriological approaches, such as the use of aerobic plate counts (APC). The latter provides for the enumeration of culturable aerobic bacteria in a food sample over time. In contrast, NGS-based approaches can provide additional higher resolution of this process, close to real-time, and define particular bacterial genera contributing to the deterioration/spoilage of the food matrix.

Using 16S rRNA-based amplicon sequencing, samples can be taken from the food matrix, maintained under defined atmospheric conditions and sampled. Primers designed to target the variable region of the 16S rRNA-encoding gene are used to amplify polymorphic region that is subsequently sequenced and compared against a database of similar sequences. Based on hits obtained, the bacterial genus composition within the sample at a fixed time point can be determined. When analysed over a time course, the nature of the shifting bacterial composition, as the food matrix spoils can be determined. Knowing the key bacterial genera concerned offers the opportunity to develop mitigating strategies, that have the potential to extend shelf-life safety.

Relevant papers in this space:

1. **Zhang et al.** A case of 'blown pack' spoilage of vacuum-packaged pork likely associated with *Clostridium estertheticum* in Canada.
2. **Odeyemi et al.** Spoilage microbial community profiling by 16S rRNA amplicon sequencing of modified atmosphere packaged live mussels at cold storage temperature.
3. **Keshri et al.** Dynamics of bacterial communities in alfalfa and mung bean sprouts during refrigerated conditions.

Much of the techniques used to develop these data analytics and predictive modelling tools, were developed as part of a three-year study working with partners in the food industry, in collaboration with Professor Shea Fanning, of University College Dublin's Centre for Food Safety. <https://www.ucd.ie/cfs/>



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