

Pushing the limits in cheese manufacture and ripening; minimising the risks through the use of bio-protective cultures

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Project manager: Fergal P. Rattray
Institution: FOOD, KU
Collaborators: Lene Jespersen and Finn Vogensen, FOOD, KU
Sirina Gezer, Arla Foods amba

Aim

- (i) to map using advanced genotypic and phenotypic analysis methods the microflora of normal cheese (control), elevated temperature ripened cheese and reduced salt cheese.
- (ii) to characterize and quantify the quality and safety risks (i.e. defects such as offflavours, slit/crack formation, biogenic amines, blowing) associated with elevated temperature ripening and salt reduction in cheese.
- (iii) to experimentally determine through the use of cheese trials the "no defect" limit in cheese ripening
- (iv) to screen, select and apply bio-protective cultures in order to extend the "no defect" limit in cheese ripening.

Description

This project addresses the challenges facing the dairy industry in terms of an ever increasing demand for production efficiencies and healthy products while at the same time maintaining high product quality and safety. Such challenges include, (i) the use of elevated temperature ripening in order to accelerate the ripening process (for cost reduction) and (ii) the reduction of salt levels (healthier product). Both of these measures lead to an increased incidence of cheese defects such as off-flavour, slit/crack formation, biogenic amine formation and blowing. These defects are caused by a disturbance in the normal cheese microflora and through the evolution of an unfavorable detrimental microflora during ripening. Therefore, elevation of the ripening temperature and/or reducing the salt levels can push the cheese ripening in a direction in which serious and costly defects can readily develop. The focus of this project is to experimentally map the detrimental microflora using genotypic (Whole Genome Sequencing) and phenotypic analysis methods, and to use this critical information to select the most suitable bioprotective cultures for pushing the "no defect" limit beyond what is normally possible. Is it only through the application of bio-protective cultures that elevated temperature ripening and reduced salt cheese can be safely achieved. Pilot plant and subsequent industrial cheese trials (Havarti and Cheddar) will be performed in order to translate and apply the laboratory experiments into a "real-life" dairy manufacturing environment.