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Prediction of cheese-making properties of bulk milk according to farming practices

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Final cheese product results from the combination of ripening phase, transformation process and cheese-making properties of initial milk. To better manage these latter properties, it is necessary to understand what farming practices influence them. The aim of this study was thus to predict rennet coagulation time, gel firmness and caseins content from farming practices. Bulk milk samplings and surveys were collected in summer/autumn 2020 in 83 French dairy cow farms. Milk samples were analysed for rennet coagulation time, gel firmness, caseins, urea concentration and somatic cells. Surveys focused on feed management, herd characteristics and conditions of milking and milk storage on day of milk collection. Data used in the models were either quantitative [milk production, % of primiparous, lactation stage, somatic cells (indicator of udder health), urea concentration (indicator of proper ruminal function) and % of concentrates in diet] or qualitative [milking machine type, storage temperature in tank, and a 6-modalities 'Race-Diet' variable combining dominant breed (Prim'holstein PH/Montbéliarde MB) and dominant forage distributed in diet: PH/maize silage, PH/grass silage, PH/pasture, MB/grass silage, MB/pasture and MB/hay]. Linear models were developed for each cheese-making properties by testing all farming practices with a step-by-step approach and a cross-validation was applied (R^2 reported). Only the best models are reported here. Model for gel firmness included milk production and Race-Diet with significant difference between PH- and MB-groups ($n=83$, $R^2=0.58$). Model for caseins contained % of primiparous and Race-Diet ($n=81$, $R^2=0.32$). Model for rennet coagulation time included lactation stage and Race-Diet ($n=83$, $R^2=0.25$). This work led to original models for predicting cheese-making properties of bulk milk from survey data easily accessible in farms. However, the accuracy of prediction is not entirely satisfactory and results deserve to be further developed with the aggregation of these data with others.

The future of the meat industry and of meat substitutes in China

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China has a thousand-year history of producing and eating meat substitutes made with plant materials such as soybean proteins. Plant-based meat substitutes have a large market in China with a high acceptance by Chinese consumers. Nowadays, the population of vegetarian or vegan in China is more than 50 million, equivalent to 4-5% of the total population. Furthermore, China was projected to be the fastest-growing market for vegan products with a growth rate of 18% from 2015 to 2020. In addition, Chinese people are increasingly aware of the negative consequences of consuming extensive animal products. Hence, they are more open to eat plant-based substitutes and probably cell-based meat, which can be grown from live animal stem cells rather than from farm animals. With the increasing worldwide interest about cell-based meat, China is regarded as a potential market by Western private companies to develop cell-based meat. However, the significant role that plant-based substitutes played in the diverse Chinese catering culture might be a potential barrier to the development of cell-based meat. Therefore, this review aims first to introduce the plant-based substitutes in the Chinese context, which will help to better understand the traditional meat substitutes culture and market in China. Second, this review will provide barriers and motives for the future development of any type of meat substitutes including cell-based meat in China.