

**Cheese manufacturing and bioactive substance separation: separation and preliminary purification of cAMP from whey**

Manshun Liu<sup>†</sup>, Xiaowei Zhao<sup>†</sup>, Yongfeng Liu\*, Lu Zhao, Ting Ku, Yan Zhang

College of Food Engineering and Nutritional Science, Shaanxi Normal University, Xi'an 710062, China

Short title: **cAMP separation from cheese whey**

<sup>†</sup> These authors contributed equally to this study.

\*Correspondence: Y.F. Liu

Food Engineering and Nutritional Science

Associate professor

Shaanxi Normal University

Xi'an city

Shaanxi province

China

Phone +86-29-8531 0517

Fax +86-29-8531 0517

E-mail: [yongfeng200@126.com](mailto:yongfeng200@126.com)

**Summary**

This study aimed to develop a more suitable cheese manufacturing for Chinese and try to prove the feasibility of separation and purification of cAMP from cheese whey. Based on sensory evaluation, Box-Behnken Design (BBD) was performed in the present study to optimize the cheese processing which was more suitable for Chinese. The optimal parameter settings were as follows: rennet 0.052g/L, start culture 0.025g/L and CaCl<sub>2</sub> 0.1g/L. The Composition analysis indicated that there was significant different between fresh bovine milk and whey, especially for the concentration of protein and non-protein nitrogen, which also prove that the study of cheese whey was value to be

developed further. With the investigation by HPLC, the performance of three types of macro-porous resin was investigated for their separation and purification of cAMP. And the results showed that the macro-porous resin (MAR) D290 was the best one and which could increase the concentration of cAMP from 0.058 $\mu$ mol/ml to 0.095 $\mu$ mol/ml under optimum conditions.

In conclusion, the proposed study developed a cheese manufacturing which were more suitable for the performance of Chinese. What's more, as there were no studies focused on the separation of cAMP from milk, our study firstly proved that cheese whey was a novel and promising source of cAMP, which could also promote the development of whole cheese industry.