

Taste Active Components in Plants Identified by Data-Mining of Chinese Historical Manuscripts

Johannes Kiefl¹, Lena Springer², Joachim Prackwieser², Yijun Zhou⁴, Henning Otte², Joachim Hans¹, Kai Lamottke³, Jakob Ley¹, Paul U. Unschuld²

1Symrise AG, Muehlenfeldstrasse 1, 37603 Holzminden, Germany; 2 Institute for Chinese Life Sciences (ICL), Charité - Universitätsmedizin Berlin, Charitépl. 1, 10117 Berlin, Germany; 3 Bicolll GmbH, Am Klopferspitz 19, 82152 Planegg/Martinsried, Germany; 4 Bicolll Biotechnology (Shanghai) Co. Ltd. Research Laboratory Bibo Road 518A, Zhangjiang Hi-Tech Park, Pudong, 201203 Shanghai, PR China.

The development of ingredients to improve taste perception of low caloric food is important to meet the consumer demand for healthier products. Manuscripts on Chinese historical medicine provide access to such ingredients and substances used in China's history until today with largely unknown taste activity. The digitalization of the Unschuld Collection containing over forty thousand historical recipes facilitates the identification of plant materials by combining both chemical and linguistic identification procedures. In the Chinese text genre of materia medica only a limited set of Chinese terms expresses flavors, yet the active function of substances in multi-compound recipes has additional connotations regarding taste activities of combined substances. Furthermore, different language conventions including modern scientific terminology, historical Chinese illness terminology, historical Chinese naming of substances as well as modern flavor and cutting-edge sensory terminology have to be combined. Therefore, revealing combinatorial patterns of substance usage requires accurate Chinese-English translations and modern search strategies based on a specific methodology of data mining. Results show that plant materials with sweet or bitter-masking activity are identified. Sensory guided fractionation combined with high-resolution mass spectrometry confirm the presence of sweet and bitter-masking secondary metabolites as active principles of respective materials. The relevance of the chemical findings of this study breaks new ground in terms of both the rather well known Chinese drugs and the numerous less standardized substances of medicines used in China.