

Use of the Metabolomic Profile of Pine Nut Species to Recognize Pine Nuts Responsible for the Pine Nut Syndrome (PNS)

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In 2001 the incidence of a long lasting bitter and metallic taste after the consumption of pine nuts was described first. This phenomenon is called as Pine Nut Syndrome (PNS) or Pine Nut Mouth. The bitter taste can arise within 1 to 3 days after consumption of pine nuts and can last up to 14 days, in some cases for months. Especially *Pinus armandii* came into the focus of interest, because for this species a causal connection to the appearance of PNS seems to exist. The Food and Agriculture Organisation (FAO) of the World Health Organization (WHO) describes 29 different species of edible pine nuts, which belong to the genus *Pinus*. The aim of the present work is to differentiate species *Pinus armandii* which is suspected to play a central role for the appearance of PNS from other species published in the list of FAO/WHO. For producer and consumer of pine nuts it is important to ensure that only species which are not responsible for PNS come into the market. Therefore the profiling of a number of different pine nut species is necessary to create a database of the appropriate information. The work shows the possibilities and limits of the profiling of ingredients of different species of the genus *Pinus* for the differentiation and identification of unknown samples. In a first step pure seed material from individual species of the genus *Pinus* were collected from different botanical gardens and other sources. For the generation of a wide data basis the secured identity of the seed material is absolutely critical. In a second step the composition of fatty acids, tocopherols, sterols, metals and amino acids of the seed material was investigated by HPLC or GLC techniques to create a large database. On basis of these data and using multivariate statistical methods a model was developed to achieve the classification of unknown *Pinus* species.