

## 学位論文の要旨

フリガナ 氏 名	ナガハマ キヨコ 永 濱 清 子
専 攻 入学年度	宮崎大学大学院農学工学総合研究科博士後期課程 生物機能応用科学専攻 平成 24 年度 ( 4月) 入学
学位論文 題 目	Development of food functionality evaluation system and its applications (食品機能性評価法の開発とその応用)
<p><b>【論文の要旨】</b></p> <p>Food functionalities have recently attracted the attention of researchers because foods have the potential to prevent disease and promote health. However, the evaluation of the numerous food functionalities consumes much time because it is necessary to conduct many individual experiments. To achieve this rapidly and cost effectively, the author has attempted to develop a new food functionality evaluation system that allows for simultaneous estimation of the multiple food functionalities from expression data of intracellular marker proteins using informatics.</p> <p>To estimate three food functionalities, namely cancer cell growth suppression activity, antiviral activity, and antioxidative stress activity, each model was constructed using expression data of marker proteins as input data, and food functionalities as the output value. When prediction performances of three types of mathematical models constructed by simple, multiple regressions, or artificial neural network (ANN) were compared, the most adequate model was the one constructed using an ANN. There were no statistically significant differences between the actual data and estimated values calculated by the ANN models. Moreover, the author attempted to build the new ANN models for two food functionalities including human T-cell lymphotropic virus type 1 (HTLV-1)-infected cell growth suppression activity, and natural killer (NK) cell activation activity. As a result, there was no significant evidence to conclude that the actual data and the data from the ANN models differ. The ANN models could also estimate HTLV-1-infected cell growth suppression activity and NK cell activation activity with reasonable accuracy. Next, the author evaluated various natural products using our system as a first screening. Blueberry leaf (BBL) was found to have two food functionalities such as antiviral activity and HTLV-1-infected cell growth suppression activity by the system at same time. In addition, the pericarp extracts of three citruses, such as bitter orange, hyuganatsu, and kumquat, were estimated to have NK cell activation activity. Among them, kumquat pericarp (KP) extracts had a strong NK cell activation activity. As applied examples, this study further focused on HTLV-1-infected cell growth suppression activity by BBL and NK cell activation activity by KP.</p>	