Study on the in vivo and in vitro links between diet and gut microbial community in Thai

キスセ, ジュマ, ムッサ

出版情報：九州大学, 2020, 博士（農学）, 課程博士
バージョン：
権利関係：

（様式３）Form 3

氏　　名　：　キスセ　ジュマ　ムッサ

論 文 名　：　Study on the in-vivo and in-vitro links between diet and gut microbial community in Thai
（タイ人の食と腸内細菌コミュニティーの関連に関する in vivo および in vitro 研究）

区　　分　：　甲

論　文　内　容　の　要　旨

The human gastrointestinal tract is the home of a microbiota that plays a vital role in enhancing host living conditions. Diet is the key influential factor among the extrinsic factors contributing to the alteration of microbial composition, structure, and diversity. Notably, recent change in dietary life in the developing countries had profound effect on the microbiota of citizens. Since the loss of traditional diets is also serious in Thailand, especially the urban area, the author aims to capture the current status of Thai gut microbiota which may link to alteration of health condition in Thai..

The cross-sectional observational study was conducted on school-aged children of urban (n = 17) and rural (n = 28) in Thailand. Their dietary records indicated that children living in urban Bangkok tended to consume modern high-fat diets, whereas children in rural Buriram tended to consume traditional vegetable-rich diets. Sequencing of 16S rRNA genes amplified from their stool samples showed that children in Bangkok have less *Clostridiales* and more *Bacteroidales* and *Selenomonadales* compared to children in Buriram and that bacterial diversity is significantly less in Bangkok children than in Buriram children. In addition, fecal butyrate and propionate levels decreased in Bangkok children in association with changes in their gut microbial communities.

Then, the author investigated the effect of staple food in Thailand, namely rice, on the gut microbiota by using in vitro culture model. The author focused on glutinous rice that has composed one of Thai traditional dietary culture, notably in north and northeast parts of Thailand. An in vitro mix culture of fecal bacteria community was performed in a single batch fermenter with pH control. Two different types of fecal microbiota were inoculated to media added by rice powders respectively prepared from sticky rice and jasmine rice and were incubated anaerobically for 24 h. The microbiome and short-chain fatty acid (SCFAs) production were monitored.In both media added by jasmine rice powder and sticky rice poweder, lactate sharply increased after 12h with an increase of Bifidobacterium, whereas it was not observed in the control batch without the addition of rice poweder. This result suggests that *Bifidobacterium* grew with lactate fermentation using rice carbohydrate. On the other hand, *Bacteroides* increased in the control batch and sticky rice batch, but not in jasmine rice batch, suggesting that *Bacteroides* prefers sticky rice to jasmine rice. The promotion of *Bifidobacterium* growth is expected to benefit the host health, while the health benefit *Bacteroides* increase requires further study..

This thesis shows an on-going effect of dietary modernization on the human colonic environment.　It is indispensable to evaluate the functionality of each food in respect to the benefit to gut microbiota in addition to direct host benefit. To gain this insight, continue of in vivo and in vitro studies is important.