

Profile of primary metabolic components of edible crickets fed with vegetable powders

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Cricket is recommended for alternative protein source because of high production efficiency and low environmental impact. However, relationships between breeding condition of crickets and their quality as a food stuff are unclear. In addition, feeding crickets with food waste is discussed because they are omnivorous. This study explored the possibility of increase in the quality, especially for the nutritional value, through effective food selection. Young house crickets (*Acheta domestica*) were used for the experiments. The crickets were bred with enough amounts of water and commercial feed for 2 weeks as a control group. Additionally, 3 groups were set up in which 10% of the feed was replaced with carrot, yuzu citrus and purple sweet potato powders, respectively. After the breeding, all the crickets were freeze-dried and powdered. Then, hydrophilic metabolites were extracted from each powder, and conducted metabolome analysis by using a GCMS-TQ8040NX. This analysis was based on Smart Metabolites Database made by Shimadzu, and primary metabolites such as amino acid, fatty acid and sugar were targeted. As a result, more than 95 kinds of components were successfully detected. Feeding purple sweet potato powder during the growth significantly increased essential amino acids such as leucine, isoleucine, lysine, phenylalanine, tryptophan as well as malic acid and sucrose. Some concentrations of them were not higher in powder than in other vegetable powders and the commercial feed (ex. leucine, malic acid). It was suggested that the powder highly affected biosynthesis and metabolome relating such metabolites. On the other hand, some components like phenylalanine and sucrose seemed to be enhanced by accumulation with intake. The potato powder contained much amount of them, and the crickets grown with the powder indicated high concentration of the components. In conclusion, high nutrition crickets would be produced by choosing feed effectively.