

Anthocyanins food innovation: from laboratory bench to healthy dining table

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Abstract

Anthocyanins are naturally occurring polyphenolic compounds that give the intense color to many fruits and vegetables such as berries, red grapes, red rice, purple sweetpotato and red cabbages. There are of great nutritional interest because their intakes have been estimated to be up to 9-fold higher than that of other dietary flavonoids. Thus, we have been working on chemical properties, bioactive functions and molecular mechanisms of anthocyanin-rich foods for almost two decades. In this talk, I will summarize some key results from our laboratory studies and our practices to innovate anthocyanin-rich foods for healthy dining table. First, we found that a clear chemical-bioactivity relationship is presented in kinds of anthocyanins. Thus, we clarified the quantity and quality of anthocyanins from a variety of fruits and vegetables, and provide chemical-bioactivity information to plant breeding scientists to breed fruit or vegetable that contains higher functional anthocyanins. Second, our animal experimental data demonstrated that anthocyanin-rich foods could ameliorate high fat diet-induced obesity, inflammation and dysbiosis of gut microbiome. Molecular analysis further revealed that active anthocyanins could upregulate Nrf2-mediated antioxidant signaling pathways and downregulated NFκB-mediated inflammatory pathways. These data provide the evidence and underlying mechanisms for the health-promoting properties of anthocyanin-rich foods. Third, we also observed that anthocyanins are easily oxidized and become pro-oxidants. The factors including light, pH and metals affect anthocyanin color and functions. Thus, we have notified these factors to keep anthocyanin color and functions in food processing. Our final goal is to make health-promoting properties of anthocyanin-rich foods into our dining table, thus, we are innovating the healthy menu from anthocyanin-rich foods to dining table, defined “KUROZEN”, basing on the scientific knowledges on chemical properties and functions of anthocyanins-rich foods, and nutrition-balance with other nutrients.

Keywords: Anthocyanin; Functions, Mechanisms; Processing, Healthy dining table

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