

Pre- and post-harvest exposure to stress influence quality-related metabolites in fresh tea leaves (*Camellia sinensis*)

Chenyu Shao, Chenyu Zhang, Zhidong Lv and Chengwen Shen

Scientia Horticulturae 281: 109984. (2021)

Abstract

Environmental stress can greatly influence the accumulation of primary and secondary metabolites in tea leaves, thereby affecting tea quality. Metabonomics technology has enabled a clear understanding of stress-induced changes in plant metabolite profiles. However, few studies have actually brought this knowledge into the tea production process. This review proposes a feasible strategy to link the relationships among stress factors, metabolites, and tea quality. First, we extensively review a number of studies that focused the effects of stress, namely, cold, drought, intense light, and insect herbivory, on soluble sugars, free amino acids, catechins, caffeine, and aroma compounds in tea leaves. These studies included single or multiple artificial stress conditions (e.g., wounding, drying, and low temperature) during pre-harvest plant growth and post-harvest processing, which induced the production of different types of volatile compounds, such as fatty acid derivatives, amino acid derivatives, terpenoid derivatives, phenylpropanoids, and benzenoids. As environmental stress conditions and tea manufacturing have similar effects on leaves, tea manufacturing was considered as an exposure to multiple stress factors during tea production. Finally, our review aims to provide a useful understanding of plant metabolism based on which, tea leaves may be purposely exposed to controlled stress conditions during tea manufacturing as a novel strategy for scientifically improving tea quality.