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Analysis of Constituents and Histone Modification Profiles in Salt-Roasted Coffee Beans using Amino Acid Hybridized Salt

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Summary

In Japan, where an estimated 40 million people, including potential patients, are affected by hypertension, there is a growing trend toward reducing dietary salt intake. This tendency stems from the established link between excessive sodium consumption and elevated blood pressure. Against this backdrop, we have developed an amino acid hybrid salt with 25% less NaCl compared to ordinary table salt. Previous reports suggest that substituting NaCl with KCl in mixed salts may help prevent hypertension, strokes, and cardiovascular diseases. Thus, the intake of amino acid hybrid salt is expected to offer potential health benefits.

Coffee, a widely enjoyed beverage, is valued not only for its caffeine content but also for other functional ingredients that may contribute to health promotion. Our laboratory has focused on a unique salt-roasted coffee, wherein green coffee beans are pre-soaked in submarine spring water—the basis of the amino acid hybrid salt—before roasting. This study aims to explore the potential of amino acid hybrid salt for new applications, such as flavor modulation and the development of functional beverages from familiar sources like coffee.

We examined how varying the soaking time, roasting conditions, and extraction parameters influence the coffee bean's composition and bioactivity. Component profiling using analytical instruments revealed changes in both organic and inorganic constituents, suggesting the potential of brine soaking to modulate bean chemistry. To assess functional attributes, we conducted histone modification profiling (24 types), which serves as an indicator of gene expression regulation, using fractionated extracts.

In summary, our results suggest that pre-soaking green coffee beans in in submarine spring water —the source of amino acid hybrid salt—may influence the beans' chemical and bioactive profiles. Future efforts will expand our compound database for coffee analysis, enabling further investigation into the compositional and functional changes caused by salt roasting.