

# Effect of Roasting and Storage on Chemical Component and Sensory Score of Specialty Coffee (スペシャルティコーヒーにおける焙煎と貯蔵が内部物質の化学的变化及び官能評価に与える影響)

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## 1. Background

Coffee is one of the most consumed food products in the world and Specialty coffee consumption is increasing in recent years. Changes in coffee quality after roasting and during storage are the most interesting factors for consumers. Although the expiration date evaluation requires an accurate definition, the degradation of specialty coffee during storage has not yet been elucidated. Chemical and physical changes that occur during storage alter the flavor of coffee as the final beverage. The products resulting from lipid oxidation and acid degradation can directly cause off-flavors.

## 2. Objective

In this experiment, the quality change of coffee due to the change of chemical composition was determined with sensory evaluation. Effect of roasting condition and storage period on lipid oxidation, organic acid composition, and sensory evaluation were determined.

## 3. Material and Method

### Lipid oxidation and sensory evaluation

To determine the lipid oxidation, changes of peroxide value (PV) as conjugated diene and conjugated triene content, and acid value (AV) as a free fatty acid content were analyzed. To evaluate the changes in the flavor of the coffee, cup quality was determined by following the brewing standard of the Specialty Coffee Association (SCA). Sample coffee beans were roasted in 3 different levels: light roast, medium roast, and dark roast, then stored up to 85 days after roasting.

### Organic acid composition and sensory evaluation

To clarify the changes of organic acids, carboxylic acids (citric acid, tartaric acid, malic acid, succinic acid, pyruvic acid, formic acid, and acetic acid), quinic acid, Caffeine and phenolic compounds (chlorogenic acid and caffeic acid) were analyzed by HPLC/UV-VIS. For sensory analysis, cupping was performed by following the standard of SCA. Sample coffee beans were roasted in 3 different levels and stored up to 105 days.

## 4. Result and Discussion

Roasting caused rapid oxidation of lipids, and most organic acids in coffee beans were reduced, but monocarboxylic acids such as pyruvic acid, formic acid, and acetic acids were produced during roasting. Chlorogenic acid was thermally decomposed and produced quinic acid and caffeic acid. Storage had a greater effect on lipid oxidation, the results suggest that lipid oxidation after roasting progressed rapidly during the first 40 to 50 days and slowed down. The composition of the organic acid was relatively stable during storage. In all sensory experiments, the rating score decreased as storage proceeded.

## 5. Conclusion

In this study, although changes in coffee flavor require consideration of various factors, changes in the organic acid composition during roasting and lipid oxidation during storage were suggested to affect flavor formation. Therefore, this study concluded that lipid oxidation and organic acid composition could be one indicator to determine the shelf life of specialty coffee.