Introduction

Turkish coffee is a traditional beverage prepared according to its unique brewing method. Roasted coffee beans are ground to a very fine powder and water is heated in a small coffee pot over a low heat. During heating a froth foam forms on the coffee brew which is important for a good quality Turkish coffee. Once the coffee comes to boil it is removed from the heat and poured into demitasse cups, where it is considered important that the foam on the coffee is distributed equally among all cups.

The growing coffee market and the opening of international chain coffee shops all around the world have enabled consumers to develop an interest for different coffee beverages. Various studies have been done to describe the flavour characteristics of different coffee beverages such as espresso and filter coffee [1-8]. For Turkish coffee to take its place among other coffee beverages it is important to standardize and describe its flavour.

The objective of this study was to describe the characteristic flavour of Turkish coffee using the Flavour Profile Analysis (FPA) technique and to evaluate the effect of roast degree on the flavour of the brew.

Materials and Methods

Materials

Coffee arabica beans (Excellent NY 23/3) from Brazil Rio Minas region were roasted as light, medium and dark (L values 25.81, 23.43, 20.75 respectively), ground very finely (<300µ) and brewed with a Turkish coffee brewing machine (Çaçelik K-3190 Telve). The brew was prepared with a 5g coffee/65 ml water ratio.

Methods

Flavour Profile Analysis

The flavour profile analyses of the Turkish coffee samples were carried out as suggested in Altug Onogur and Elmaci [9] and conducted at the sensory analysis laboratory within the Ege University Food Engineering Department with a panel of 8 assessors aged between 22 to 55 years from the same department.

During the training sessions the descriptive terms for Turkish coffee flavour were generated by the panel (Table 1). The Turkish coffee samples were served at approximately 60 °C in traditional white porcelain demitasse cups. At each session only one sample was assessed and the intensity of each descriptive term was rated by using a 0-50 mm scale.

Statistical analysis

The sensory analyses were carried out in triplicate. The statistical analyses were performed using XLSTAT 2011 trial version. To investigate the effect of the degree of roast on descriptive terms of Turkish coffee, analysis of variance (ANOVA) was applied and Duncan test was performed at 95% confidence level. Cluster Analysis and Principle Component Analysis (PCA) were applied to the sensory ratings to evaluate the difference between the Turkish coffee samples with different roast degrees and the relationship between variables.

Results and Discussion

Roasted/burnt, spicy, bitter, sour, salty, astrigent/dry, woody, fermented, earthy and tobacco-like characters were perceived in all roast degrees whereas sweet character was only detected in light and medium roasted coffee samples (Fig. 1). In all roast degrees roasted/burnt flavour was the most intensely perceived character.

The second most intensely perceived character was sour for light roasted Turkish coffee and bitter for medium and dark roasted Turkish coffee.

The cluster analysis resulted in two main clusters; medium and dark roasted Turkish coffee formed one cluster while light roasted Turkish coffee formed a separate cluster (Fig. 2).

Fig. 1. Flavour profile of light, medium and dark roasted Turkish coffee

The PCA results indicated that; > Sour and salty characters had close correlation with and therefore were descriptive for light roasted Turkish coffee,

> Spicy, roasted/burnt, woody, earthy, tobacco-like, dry/astirgent, sweet and fermented characters were descriptive for medium roasted Turkish coffee,

> Bitter character was descriptive for dark roasted Turkish coffee (Fig. 3).

Fig. 2. Cluster diagram of light, medium and dark roasted Turkish coffee according to their flavour characteristics

To the best of our knowledge, no study has been conducted to describe Turkish coffee flavour, but studies on the flavour of various coffee beverages are available. According to Bicho et al [3], Bhumiratana et al [4] and Akiyama et al [1] as the degree of roast increased the intensity of burnt/sharp/bitter, smoke-like, ash/larke, coffee, roasted, earthy and phenolic characters of coffee increased whereas sweet character decreased.

Likewise in this study on Turkish coffee as the roast degree increased the intensity of roasted/burnt, bitter and earthy characters increased, while the intensity of sweet character decreased. In studies on drip and espresso coffees, during sensory analysis fruity, flowery, butyric characters were identified [1,6], but in this study the mentioned characters were not identified in any of the Turkish coffee samples, which could be a result of evaporation during the preparation of the brew.

Fig. 3. Biplot diagram of light, medium and dark roasted Turkish coffee according to their flavour characteristics

Conclusion

The FPA results suggest that roasted/burnt, spicy, bitter, sour, sweet, salty, astrigent/dry, woody, fermented, earthy, tobacco - like flavour characters are descriptive for Turkish coffee flavour. For all roast degrees the most intensely perceived flavour characteristic was roasted/burnt character. Medium roasted Turkish coffee was found to have a well balanced and rich flavour.

References