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**Kuzmin O.V.**, Doctor of Engineering Sciences, **Popyk O.O.**,  
**Stukalska N.M.**, Ph.D., **Polovyk V.V.**, Ph.D.

*National University of Food Technologies (NUFT), Kyiv, Ukraine*

### **DETERMINATION OF FACTORS INFLUENCING THE QUALITY OF A HOT COFFEE DRINK**

In the modern market, the demand for a high-quality hot drink – coffee, which is distinguished by excellent organoleptic indicators [1-8] (appearance, color, aroma, taste), due to the influence of many factors (factors): (a) botanical species; trade names; quality of raw materials [1, 2, 5]; varieties; (b) conditions of heat treatment of green coffee [3, 4] – roasting degree [2, 4, 6] (roasting time [3, 4]; roasting temperature [3, 4]); (c) grinding size of natural roasted coffee [5]; (d) water quality, water type [2]; (e) extraction/brewing conditions [1, 2, 5, 6] (coffee/water ratio [5, 6]; extraction temperature [5]; extraction time [5]; espresso water pressure [7]).

(a) Depending on the botanical species, trade names and quality of the raw materials used, natural roasted coffee is produced: in grains of the highest and first grade; ground coffee of the highest, first and second grades; "Turkish" ground coffee of the highest grade; ground coffee with chicory of the highest, first and second grades. Natural roasted coffee beans of the highest grade are produced from natural coffee beans of the highest grade botanical species Arabica of one of the trade names of green coffee: Indian Plantation, Colombian, Mexican, Nicaraguan, Ethiopian and others equivalent to them. Natural roasted coffee beans of the first grade are produced from natural coffee beans of the first grade of botanical species Arabica or Robusta of one of the trade names of green coffee: Brazilian Santos, Vietnamese Arabica, Indian Arabica Cherry, Indian Robusta Cherry and others equal to them. Natural roasted ground coffee of the highest grade is produced from natural coffee beans of the highest grade of the botanical species Arabica of one of the trade names of green coffee: Indian Plantation, Colombian, Mexican, Nicaraguan, Peruvian, Ethiopian and others equivalent to them, or their mixtures. Natural roasted ground coffee of the first grade is produced from natural coffee beans of the first grade of botanical species Arabica or Robusta of one of the trade names of green coffee: Brazilian Santos, Vietnamese Arabica, Indian Arabica Cherry, Indian Robusta Cherry and others equivalent to them or their mixtures. Natural roasted ground coffee of the second grade is produced from natural coffee beans of the second grade of the botanical species Robusta of one of the trade names of green coffee: Angolan, Vietnamese, Madagascar, Indian, Indonesian, Laotian, Tanzanian and others equivalent to them or their mixture. Natural roasted ground coffee "Turkish" is produced from natural coffee beans of the highest grade of the botanical species Arabica of one of the trade names of green coffee: Indian Plantation, Colombian, Mexican, Nicaraguan, Peruvian, Ethiopian and others equivalent to them, or their mixtures. Natural roasted ground coffee with chicory of the highest grade is produced from natural roasted ground coffee of the highest grade – no less than 60 %, natural roasted ground coffee of the first grade – no more than 20 % and chicory no more than 20 %. Natural roasted ground coffee with chicory of the first grade is produced from natural roasted ground coffee of the first grade – not less than 80% and chicory – not more than 20 %. Natural roasted ground coffee with chicory of the second grade is produced from natural roasted ground coffee of the second grade – not less than 80% and chicory – not more than 20 %.

(b) Heat treatment of green coffee (roasting) is a key step in coffee processing that changes the chemical, physical, structural [4, 8] and sensory properties of green beans [4, 5, 8] through heat-induced reactions: Maillard reactions, degradation Strecker, caramelization, pyrolysis [4]. Due to this, more than 1000 aromatic compounds [5] are formed, which form a certain taste profile, due to the change in color and the characteristic aroma and taste of the coffee, while there is a change in the texture, density and size of the beans, which depend on the time and temperature of roasting [4]. Long-term (dark) roasting of green beans leads to more bitter coffee flavors [6, 8] than medium-long roasting of green beans [6].

(c) The fineness of coffee beans determines the ability to extract soluble solids, acids and aromatic compounds in the coffee, and this ultimately contributes to the formation of the beverage

[5]. Grinding increases the degree of interaction between water and coffee particles due to an increase in the surface area of coffee particles [5]. The optimal degree of coffee grinding ensures contact of the maximum surface area of the coffee with hot water to obtain high-quality coffee [5]. The processing conditions of coffee beans, in particular roasting of green coffee, grinding and brewing/extraction of natural roasted coffee, affect the majority (60 %) of quality characteristics of coffee [5].

(d) Water quality is an important ingredient in the formation of consumer parameters of a hot coffee drink [1, 2]. Three types of prepared water are the most used for the production of hot coffee drink: drinking water; water softened by *Na*-cationization; water is demineralized by reverse osmosis. This allows you to control the level of water mineralization and reduce excess salt concentrations, which affects the sensory properties of a hot coffee drink, and also prevents scale formation in expensive professional coffee machines [1]. According to our research, drinking water has a total hardness of 8.04 mmol/dm<sup>3</sup>, which is reduced by softening with *Na*-cationization to the level of 0.05 mmol/dm<sup>3</sup> followed by reverse osmosis demineralization to the level of 0.02 mmol/dm<sup>3</sup>. The total hardness of water depends on the mass concentration of calcium and magnesium. A decrease in the mass concentration of calcium (104 mg/dm<sup>3</sup>) and magnesium (23 mg/dm<sup>3</sup>) in drinking water occurs due to *Na*-cationization to the level of 0.0 mg/dm<sup>3</sup> and demineralization by reverse osmosis to the level of 0.0 mg/dm<sup>3</sup>. At the same time, the mass concentration of sodium changes from 92 mg/dm<sup>3</sup> in drinking water to the level of 266 mg/dm<sup>3</sup> due to *Na*-cationization and decreases to 12 mg/dm<sup>3</sup> for water demineralized by reverse osmosis. This has a positive effect on the sensory properties of a hot coffee drink and increases the uptime of coffee machines due to the increase in the service life of tubular electric heaters.

(e) Extraction/brewing conditions. Water pressure is one of the most important factors that affects the final quality of espresso coffee and affects the main characteristics – the consistency of the foam, the taste and smell of the hot coffee drink [7]. Extraction conditions can affect the bitter taste of a hot coffee drink [8]. Hot coffee brewed with a higher coffee-to-water ratio was generally more bitter than hot coffee with a lower coffee-to-water ratio [6].

**Conclusion.** The specified influence factors have methodological importance of the problem that is under consideration and requires multifaceted research in the practice of restaurant service technologies in the aspect of making hot coffee drinks.

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