INFLUENCE OF ULTRASOUND EXTRACTION MANUFACTURING PROCESS ON COFFEE FLAVOR CONCENTRATION

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Abstract

Coffee is an extremely popular leisure drink throughout the world. Coffee has a very distinct aroma that is the result of a variety of constituents. These include proteins, tannic acid, fats, caffeine and so forth. A general survey of reference works indicates that ingesting a small amount of caffeine can be beneficial; it can stimulate the brain and enhance memory, but in excess, caffeine can exacerbate health issues such as heart problems, high blood pressure, kidney and coronary disease. In this research, our focus is the use of ultrasound to extract flavor from coffee. The different operating conditions for extraction experiments are executed and the results are also compared. The results show that coffee flavor is not increased with temperature raised, because the volatile degree of coffee flavor components are fast at high temperatures. Using low vibration frequency is better than high vibration frequency.

1. INTRODUCTION

Ultrasonic extraction is the way of using the powerful energy which is produced by the burst of the bubbles—produced by the change of the pressure when ultrasound is in the liquid—to accelerate the contact speed of the solvent and the extract. The main feature of the approach is that it can rapidly and evenly blend the extract and the solvent; in the process of extracting useful constituents from the natural substances, it can bring the extract from the matrix to the solvent without damaging the structure of the extract [1]. Because this process can be operated at low temperature, it reduces the loss of heat, and avoids losing or destroying volatile substances that have a low boiling point. This technique has become common in contemporary food processing and storage [2].

The ingredients of coffee include caffeine, aroma, protein, tannic acid and fat etc.. It is the most commonly ingested stimulant in the world. When used in moderation, caffeine can stimulate the brain, enhance memory, inspire enthusiasm, clarify thought, and reduce fatigue and sleepiness. However, excessive amounts of caffeine can cause anxiety, feelings of unrest, heart palpitations, headaches, diarrhea and insomnia among other negative effects. Some literature indicates that caffeine can have a detrimental effect on human health. These negative effects include exacerbating coronary artery disease, raising blood pressure, and heightening the risk of heart attack and kidney disease [3,4]. The main ingredients of coffee include some flavor precursors (such as carbohydrates, sugars, amino acids and fats etc.). Today, at least 670 kinds of flavor compounds have been found[5].

In their research regarding the effects of extraction processes on aromatic constituents, Céline Sarrazin et al. [6] compared the resultant aromatic oil extractions of five different extraction methods: including Press Oil Aroma Extraction (oil), Supercritical Fluid Extraction (SFE), Simultaneous Distillation-Extraction (SDE).Vacuum Steam-Stripping with water (VSS water) and Vacuum Steam-Stripping with methylene chloride (VSS CH2Cl2). Sarrazin’s