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Mass Spectrometry & Purification Techniques

Short Communication

The Utility of Analytical Techniques in the Manufacturing of Alcoholic Beverages

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DESCRIPTION

The rapid and precise differentiation of heterogeneous biological samples is a major challenge for analytical chemists and biologists alike. A Protein-Based Assay (PSA) was recently proved to be useful for identifying wine varietals, cellular stress, and urine. The test employs serum albumin (SA), a relatively abundant protein in mammalian blood, as a sensor that functions by binding a fraction of the small molecules present in a sample [1-3]. When compared to direct LC-MS analysis, examination of selectively bound molecules by Liquid Chromatography Mass Spectrometry (LC-MS) enhances the capacity to discriminate and categorize samples. The test capitalizes on SA's biological activity as a transport protein in blood, taking up and delivering a payload of fatty acids, medicines, metal ions, and other substances. The PSA operates as an analytical instrument by selective concentration, lowering sample complexity and analysis time [4,5]. Its selective concentration results in improved sample differentiation and clustering in terms of biological therapy. The efficacy of the PSA as an analytical instrument for tracking the manufacture and ageing process of whisky was investigated in studies [6].

The fermentation of cereal grains into ethanol, and thereafter alcoholic drinks, has a long and distinguished history. The earliest alcoholic beverage made by fermentation is considered to have occurred around 9,000 years ago in China [7,8]. The prehistoric Egyptians, and subsequently the Greeks, perfected the procedure and came to comprehend the advantages of drinking alcoholic beverages. Nevertheless, it wasn't until the 1500s that distillation of fermented cereal grains became popular in England, Ireland, and Scotland, and the manufacturing of whisky began. Since then, whisky has become a global commodity, with production throughout North America, Europe, and Asia. As demand for whisky increased, so did production, which led to a rise in adulteration. To address this, governments implemented initiatives to standardize manufacturing and quality. In the last decade, the growth of artisan distilleries has altered the face of the whisky business, resurrecting old questions. A way for hastening the ageing process of whisky has generated a boom in approaches and businesses focusing on ageing whisky [9,10]. This has increased the demand for analytical technologies capable of providing parameters that enable distilleries to follow the ageing process and identify adulterated or substandard product.

Before, there was a significant schism between distillers and scientists, with each desiring nothing to do with the other. In general, the industry has been sluggish to accept new procedures, and only recently has there been a push to use analytical techniques such as mass spectrometry to help in decision-making. The majority of whisky taste profiles have been determined using headspace or Solid Phase Micro Extraction (SPME) linked to Gas Chromatography based Mass Spectrometry (GC-MS). These methods are designed specifically for volatile substances. More thorough LC-MS studies are already being produced [11]. The major purpose of the GC and LCMS-based investigations was to find components common to certain whiskies (such as Scotch) that might be used to validate origin and purity, as well as characterize taste profiles from various distilleries. The time and effort required for sample preparation and analysis is a barrier to broad usage of these procedures. Each sample might take up to 90 minutes to complete. An approach that lowered sample preparation and collection time while improving information relevant to the analysis would be incredibly valuable.

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