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Determination of Sibutramine in Slimming Supplements Using Gas Chromatography-Mass Spectrometry (GC-MS)

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Abstract

Background: Slimming supplements, often marketed as weight loss aids, have become increasingly popular in response to the global rise in obesity. Many of these products were labelled and advertised as natural or herbal, which creates a perception of safety among consumers. However, numerous studies have revealed the illegal addition of synthetic drugs to improve the efficiency of the products. One of the most commonly detected adulterants is sibutramine, a synthetic appetite suppressant that was banned in 2010 worldwide due to serious cardiovascular adverse effects, such as heart attack, tachycardia, and stroke risk. The use of these banned substances poses a serious health risk to consumers. The goal of this study is to determine sibutramine, which may be utilised as an adulterant in slimming supplements, using Gas Chromatography-Mass Spectrometry (GC-MS).

Methods: A total of ten slimming dietary supplement samples were obtained and processed for analysis. Sample extraction was performed using methanol as the extracting solvent, followed by sonication for 30 minutes, centrifugation, and filtration. In this study, Gas Chromatography–Mass Spectrometry (GC–MS) was applied due to its ability to provide qualitative and confirmatory information. The technique used electron ionization in full scan mode for mass detection, and the compounds were identified by matching the obtained spectra with those in the NIST mass spectra library.

Results: This study demonstrated that sibutramine was effectively extracted and analysed using the GC-MS technique. The results show that two out of ten slimming supplement samples were found to contain sibutramine. The 20% detection rate implies that sibutramine adulteration remains prevalent in slimming supplements. The samples that tested positive for sibutramine revealed the typical ion fragments, including the base peak at m/z 114, which is the primary diagnostic ion for sibutramine.

Conclusion: In conclusion, this study confirms that sibutramine adulteration remains a persistent issue in slimming supplements. The use of GC–MS provides a reliable and accurate method for monitoring prohibited substances in commercial products. Continuous observation and stricter regulatory enforcement are required to prevent the distribution of adulterated supplements and to protect public health.

Keywords: Sibutramine, Slimming supplements, GC-MS, adulteration

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