

# The Illegal Use of Synthetic Pharmaceuticals in Herbal Formulations: An Overview of Adulteration Practices and Analytical Investigations

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**REFERENCE:** de Carvalho LM, Moreira AP, Martini M, Falcão T: The illegal use of synthetic pharmaceuticals in herbal formulations: An overview of adulteration practices and analytical investigations; *Forensic Sci Rev* 23:73; 2011.

**ABSTRACT:** Alternative medicine has historically been very popular in developing countries. In this context, self-medication with herbal formulations has increased in both developing and developed nations in recent years. The adulteration of such formulations violates the laws of many countries because it can lead to unpredictable effects in the human body, either due to the isolated effects of an added pharmaceutical or to its interaction with other substances present in the formulation. The development of methodologies for the screening and quantification of adulterated samples should be of great interest for analytical, clinical, and forensic scientists. This review aims to provide a comprehensive approach to this topic and to discuss adulteration cases related to herbal formulations reported in the literature over the last few decades. Furthermore, a classification of the most commonly found synthetic adulterants that are linked to the active principle of herbal formulations was proposed according to their pharmacological action. The available analytical methodologies for the identification of adulteration practices are presented in a systematic and comprehensive way.

**KEY WORDS:** Adulteration, analytical methods, forensic analysis, herbal formulations, pharmaceuticals.

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