In vitro methods applied to assess the herbal products toxicological potential

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Introduction: In Brazil, standards for the study of the toxicity of herbal products have been published in the form of Directive 90/2004 (ANVISA, 2004), but the majority of the tests described are in vivo. To exemplify the use of alternative in vitro methods on studies assessing herbal toxicity, our group tested several native Brazilian and Latin American plants, like Dipteryx alata Vogel, Plathymenia reticulata Benth, Minthostachys setosa, Rubus rosaeolius Smith and three different chemotypes of Pimenta pseudocaryophyllus.

Experimental Part: This investigation allowed the estimation of an LD50 value, based on the cytotoxicity test in vitro (IC50), which might then be used as a ‘starting value’ for in vivo toxicological tests, in order to decrease the number of animals used for range finding. According to ICCVAM (NIH, 2006), to determine a LD50 value based on the IC50, the following formula is applied: log LD50 (mg/ml) = 0.372 × log IC50 (µg/ml) + 2.024

Results/Discussion: In order to evaluate the toxic potential of medicinal plants, it is possible to adapt in vitro tests that are recommended for the testing of chemicals substances, thus abiding by Three Rs principles. Some important points should be mentioned, such as the solubility of the plant extracts and subsequent maintenance of their bioactive properties. In addition, the use of solvents, at concentrations that do not have cytotoxic effects, is a major consideration when performing in vitro tests. Another point of concern is the ability to sterilize the sample in a way that does not interfere with its biological activities.

Conclusion: In Brazil it is still not possible to use in vitro methods to evaluate the toxicity of plants used for medicinal purposes, since the legislation requires in vivo tests. With more-focused publications in the use of in vitro methods to aid in toxicity assessments, Brazilian researchers hope to change this current situation.

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