

日本薬局方における生薬等の成分定量用試薬を利用した 定量 NMR (qNMR) のバリデーション試験

細江 潤子*¹, 杉本 直樹*¹, 末松 孝子*², 山田 裕子*³, 早川 昌子*⁴,
勝原 孝雄*⁵, 西村 浩昭*⁵, 合田 幸広*^{1, #}

(受付: 平成 23 年 8 月 18 日, 受理: 平成 23 年 11 月 28 日)

Validation Studies of qNMR for Chemical Reagents Used as Reference Standards for Quantitative Analyses of Crude Drugs in the Japanese Pharmacopoeia

Junko HOSOE*¹, Naoki SUGIMOTO*¹, Takako SUEMATSU*²,
Yuko YAMADA*³, Masako HAYAKAWA*⁴, Takao KATSUHARA*⁵,
Hiroaki NISHIMURA*⁵ and Yukihiko GODA*^{1, #}

Summary

Quantitative NMR (qNMR) qualifies as an absolute quantification method and is theoretically able to determine the purity of any compound with SI-traceability. Therefore, we are trying to introduce qNMR to the Japanese Pharmacopoeia for the specification of reagents, using marker compounds for the quantitative analyses of crude drugs. In this study, we performed validation studies of qNMR by using two chemical reagents (magnolol: Mw 266.34; and geniposide: Mw 388.37) in five independent laboratories. The weighed amount of each sample was $5 \text{ mg} \pm 10\%$ and each participant prepared three sample solutions. The absolute purity of each sample was measured by qNMR three times. The total averages (the averages of the participant averages) \pm SD of absolute quantification results for magnolol and geniposide were $98.97 \pm 0.19\%$ and $96.09 \pm 0.28\%$, respectively. These data suggested that the variabilities in each NMR measurement (the average of all the SD of each sample average) and each sample liquid preparation (the average of all the SD of each participant average) were about 0.08% and 0.07% (magnolol), and 0.17% and 0.14% (geniposide), respectively. These data indicate that the purity of these compounds can be determined by qNMR with an accuracy of two significant digits when the molecular weight of the target reagent is around 300 with a weighed amount of about 10 mg.

Key words

Quantitative NMR, Validation study, the Japanese Pharmacopoeia, Chemical reagents, Magnolol, Geniposide, Marker compounds, Crude drugs