

In Materia Should Be Used Instead of In Materio

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# In Materia Should Be Used Instead of In Materio

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## INTRODUCTION

Scientific writing frequently uses Latin words and phrases. In most cases, the reason is an evident continuity in exploiting the same terms from ancient (and famous) scientists and sources. However, in some cases, such expressions are proposed in contemporary times with an updated meaning.

This short opinion article is intended to shed some light on one such “new” Latin expressions in science: *in materio*.

## ORIGIN OF IN MATERIO

*In materio* was reported for the first time in a preceding paper by Miller and Downing (2002). The expression was not explicitly defined, but it was discussed in a framework where biological evolution is envisioned as a tool to tune the physical properties of electrical devices.

More than 10 years later, Miller recalled and updated the *in materio* expression, as connected to the implementation of computational paradigms on physical systems as black boxes (Miller et al., 2014). Soon after, *in materio* started being associated especially with physical reservoir computing implemented on designless nanonetworks (van Damme et al., 2016; Dale et al., 2017a, 2017b; Przyczyna et al., 2020; Banerjee et al., 2021; Boon et al., 2021; Kotooka et al., 2021; Lilak et al., 2021; Usami et al., 2021). Very recently, the same meaning was attributed to a slightly different Latin expression: *in materia* (Milano et al., 2021). Which one is correct?

## DISCUSSION

We believe the correct form should be “*in materia*.”

Indeed, *in materia* is the literary Latin expression for “in the matter.” In Latin, when the *in* preposition is meant as “inside/within,” the noun should be put in the ablative case. Since *materia-ae* is a feminine noun of the first declension, its ablative case is *materia*, not *materio*. Previous authors using *in materio* were likely misled by similar Latin expressions used in science that finish in *-o*, such as *in vivo* or *in vitro*. But *vivum-i* and *vitrum-i* are neutral nouns of the second declension, so their ablative is correctly *vivo* and *vitro*, respectively.

There is a similar, prior, and more famous example of an incorrect Latin expression used in physics and computer science since the eighties: *in silico*. However, here no clear correct Latin expression really exists as *in silico* refers to computer CPUs made “in silicon,” while silicon was discovered as an element by Berzelius in the early 19th century. Therefore, “silicon” is not a Latin word, even if it may sound like one. The more suitable Latin word would probably be *silex-silicis*, but this referred to generic hard stones like silicates, and its ablative (third declension) would be *in silice*.

On the contrary, *in materio* has a correct Latin expression—*in materia*—that we believe should be recognized and spread.

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