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## Sufficiency levels for nutrient management in lemon balm, peppermint and lemon verbena

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### Abstract

The sector of aromatic and medicinal plants has been increasing around the world. In Portugal, the most important crops in terms of acreage are lemon balm (*Melissa officinalis* L.), peppermint (*Mentha x piperita* L.), and lemon verbena (*Aloysia citrodora* Paláu). Despite the economic importance of these crops, until recently there were no standards for interpretation of results of plant analysis, which means that this tool could not be used in the fertilization recommendation programs. We are reporting a study leading to the establishment of sufficiency ranges for these three species, which involved 37 response trials to the application of nitrogen, phosphorus, potassium and boron, 142 vegetation cuts and more than 1,700 tissue analyses. There were carried out field trials and pots experiments in several localities to increase the experimental variability and to confer greater universality to the norms. In this work the procedures leading to the establishment of the sufficiency ranges are described and a proposal of sufficiency ranges for 10 nutrients and for the three species is provided.