

Natural Radionuclides, Stable Elements Concentration and Study of Bioactive Components of *Peperomia pellucida* (L.) Kunth

Fábio V. Sussa¹, Sandra R. Damatto¹, Joana D'arc Felício², Edlayne Gonzalez², Verônica M. S. Santos², Barbara P. Mazzilli¹, Paulo S. C. Silva¹

¹IPEN - Instituto de Pesquisas Energéticas e Nucleares, Gerência de Metrologia das Radiações (GMR), São Paulo, SP, Brazil.

²Centro de Sanidade Animal do Instituto Biológico, São Paulo, SP, Brazil.

E-mail address: fabiosussa@uol.com.br



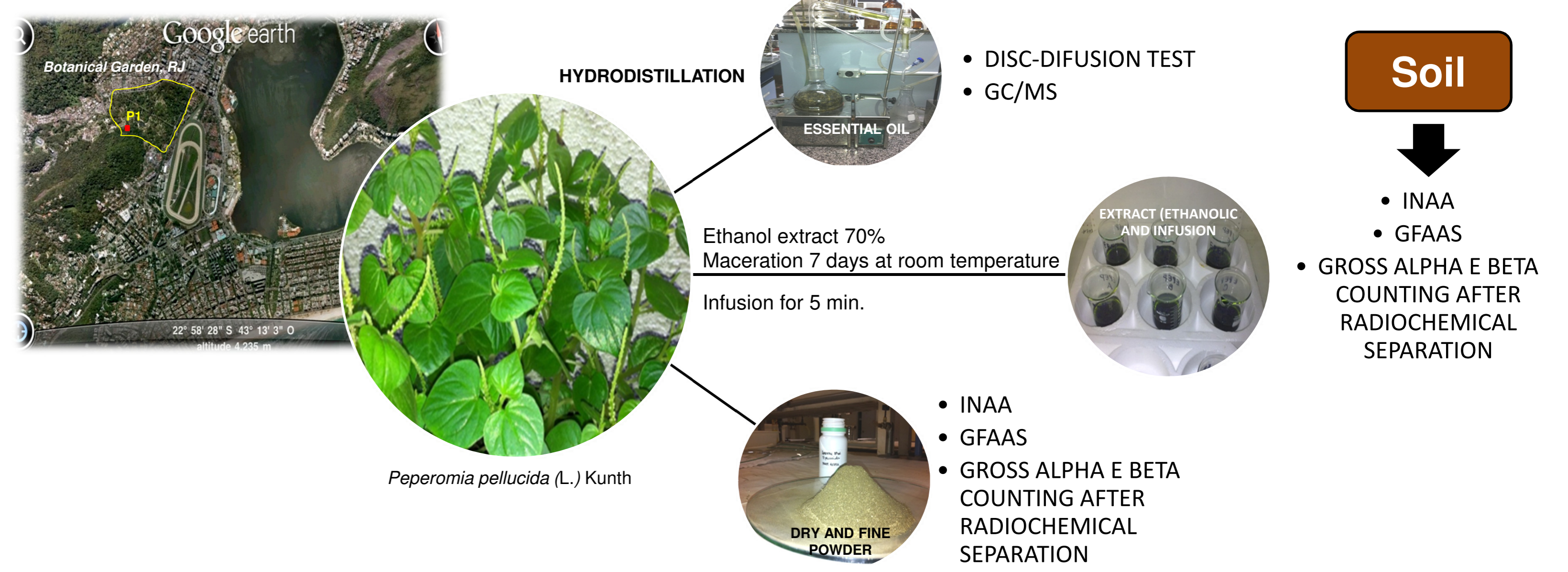
INTRODUCTION

Peperomia pellucida species belongs to Piperaceae family, which is extremely studied on the botanical, chemical and pharmacological viewpoint. The medical properties and effectiveness of medicinal plants depend on environmental conditions. Many minerals play a significant role in the formation of active constituents which are responsible for their curative properties. Moreover, the presence of stable elements and natural radionuclides in such plants constitutes the pathway for their migration to the human. Some of these elements play vital role in many physiological reactions and their excess can affect human health.

Popular Name	Botanical Name	Medicinal Uses	Used part plant
Little heart, toad's tongue, tortoise grass	<i>Peperomia pellucida</i> (L.) KUNT	Healing property, antibacterial, anti-inflammatory, analgesic activities	Aerial part

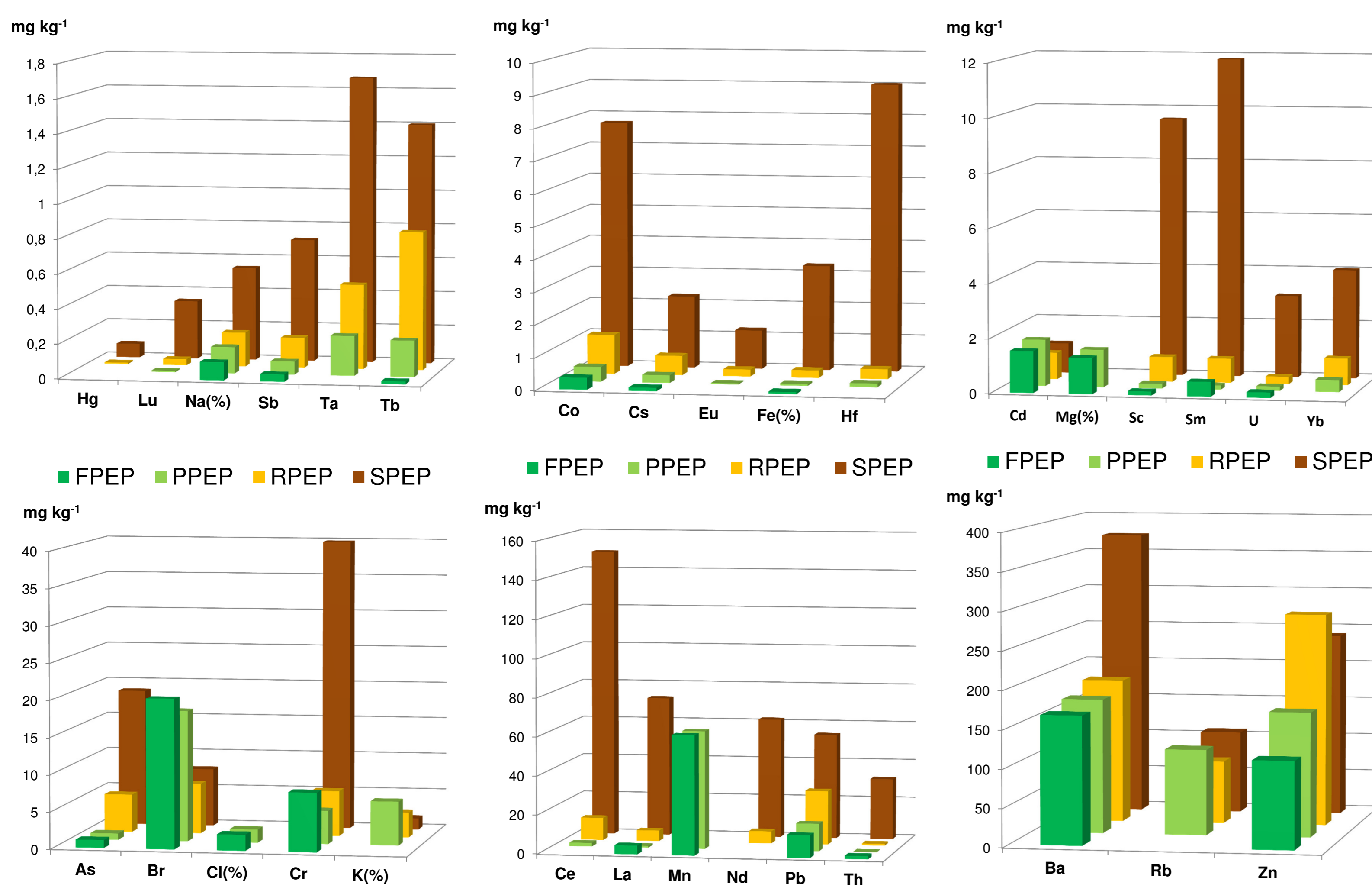
MATERIALS AND METHODS

Peperomia pellucida was collected in the Botanical Garden located in Rio de Janeiro, Brazil.

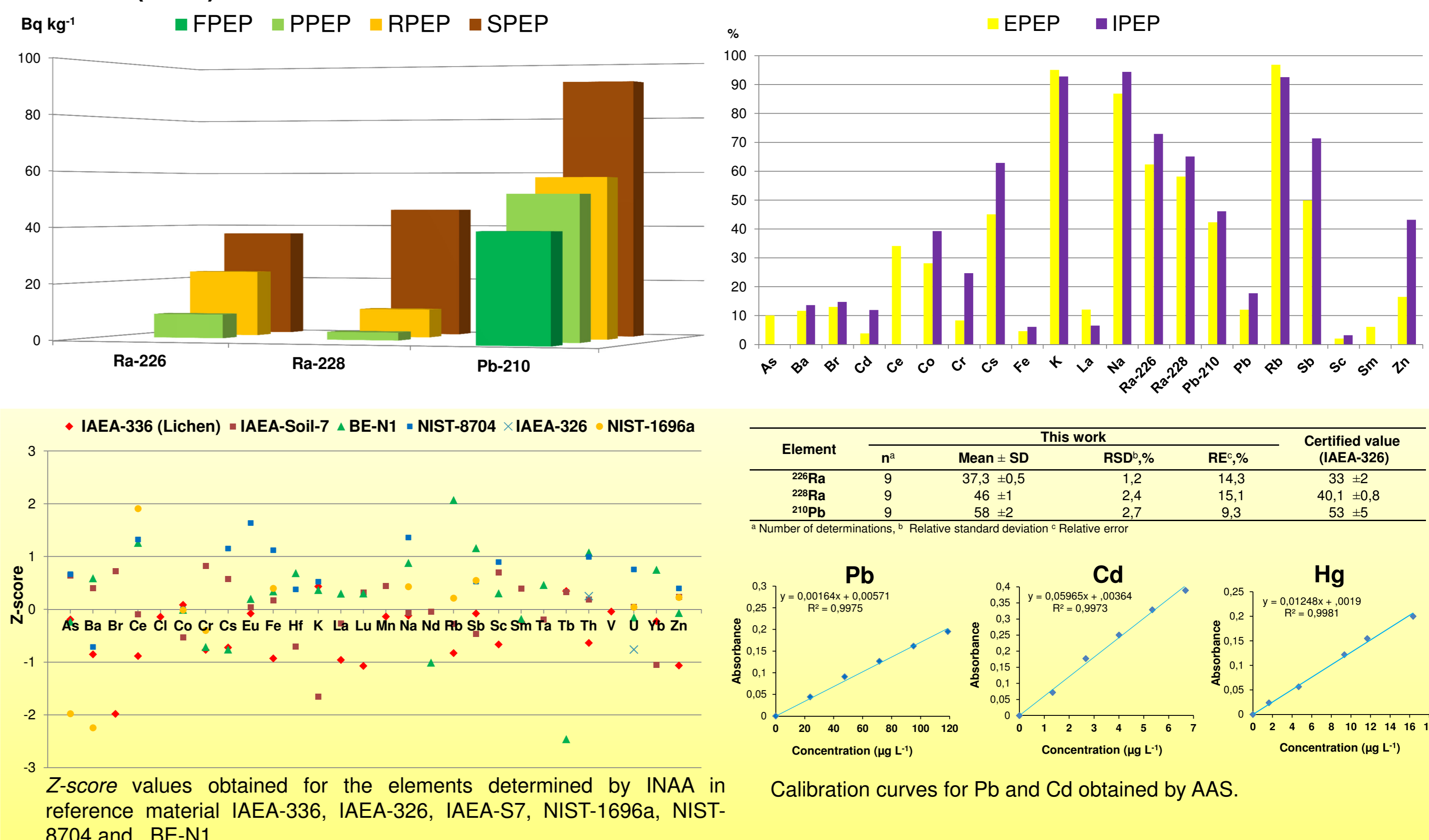


RESULTS

Elemental concentration (mg kg⁻¹), or otherwise indicated (%) in leaves (FPEP), aerial part (PPEP), root (RPEP) of *Peperomia pellucida* and surrounding soil (SPEP).



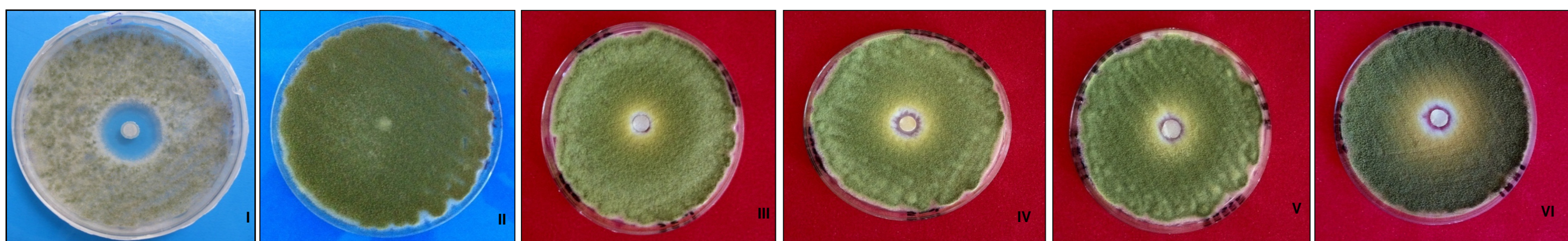
Radionuclides activity (Bq kg⁻¹) in leaves (FPEP), aerial part (PPEP), root (RPEP) of *Peperomia pellucida*, surrounding soil (SPEP) and elemental percentages from dry plant to ethanolic extract (EPEP) and infusion (IPEP).



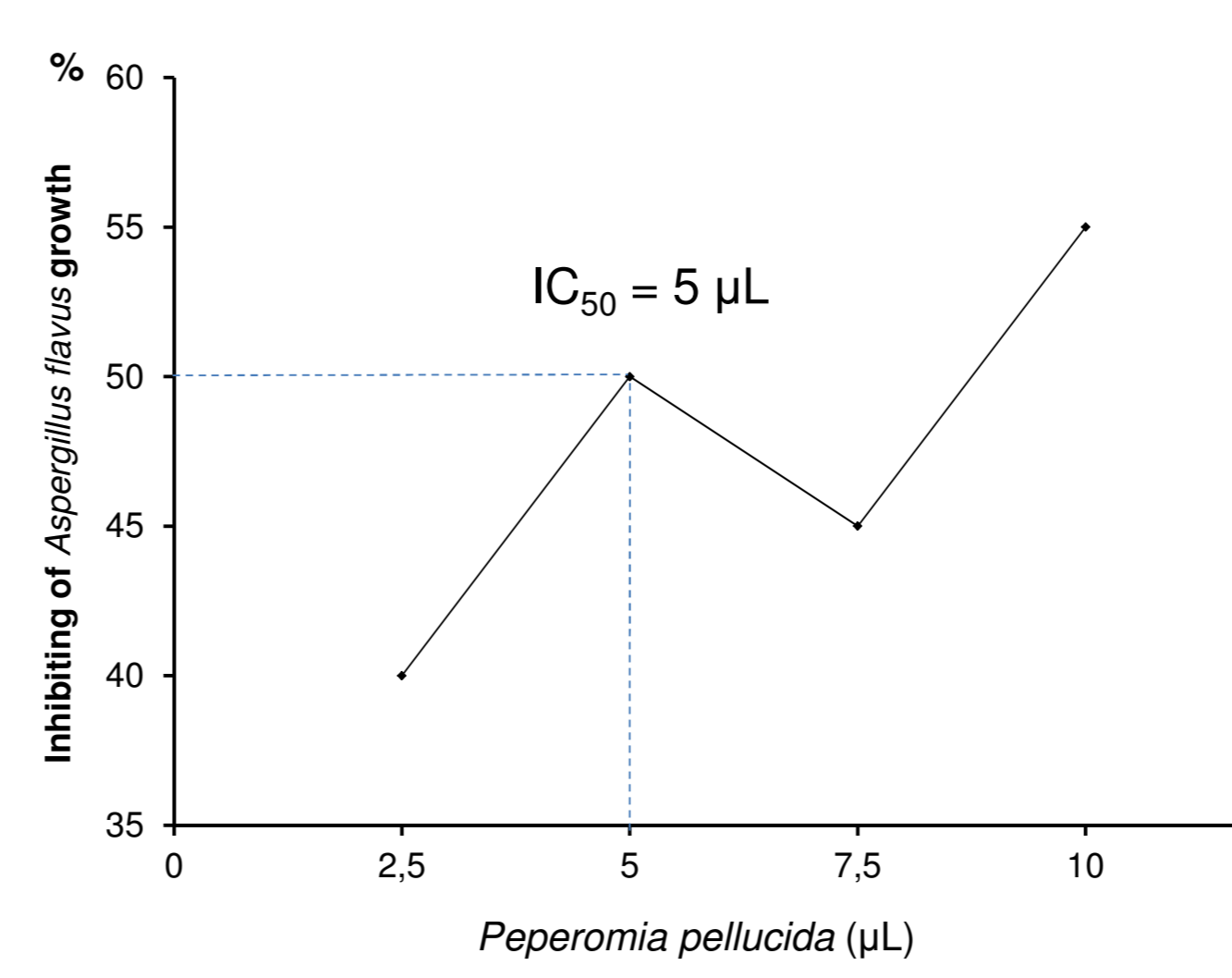
Antifungal activity of *Peperomia pellucida* essential oil against *Aspergillus flavus*.

Controls		Essential oil of <i>Peperomia pellucida</i> Treatments			
Positive (fungicide)	Negative (water)	2,5 µL	5,0 µL	7,5 µL	10,0 µL
Diameter (mm) inhibition halo ^a ± SD ^b					
21±1	0,0±0,0	8,4±0,5	10,5±0,4	9,5±0,6	12,3±0,3

^a Mean value (n=5) ^b Standard deviation and experiments were repeated twice.



Growth inhibition halo of *A. flavus* in paper disc by fungicide (I), negative control (II), aliquots 2,5 µL (III), 5,0 µL (IV), 7,5 µL (V) and 10,0 µL (VI) of *P. pellucida*.



Effects of different aliquots of essential oil extracted from *Peperomia pellucida*.

Volatile compounds identified in the Essential oil of *Peperomia pellucida*.

Constituents	%	RI ^a	RI ^{lit.b}
n-Dodecane	0,48	1199	1199
n-Tetradecane	1,72	1394	1399
Trans-Caryophyllene	2,62	1413	1418
Dehydroaromadendrene	0,83	1456	1462
γ-Murolene	0,99	1474	1477
Bicyclogermacrene	1,01	1490	1494
n-Pentadecane	0,70	1493	1500
(E,E)-α-Farnesene	0,57	1501	1508
Germacrene B	20,86	1555	1556
Trans-Nerolidol	1,60	1557	1564
Spathulenol	0,77	1576	1576
Caryophyllene oxide	10,83	1590	1583
Dillapiole	53,35	1618	1620
Apiole	2,02	1673	1678

^a RI = sample retention indices. ^b RI^{lit} = retention indices published.

CONCLUSION

INAA, AAS and gross alpha and beta counting after radiochemical separation have proved to be an efficient analytical techniques to determine a variety of elements in a wide range of concentrations. The elements present in the species *Peperomia pellucida* (Co, Cr, Fe and Zn) are essential for various metabolic activities in humans. The elements Zn and Cr are involved in various metabolic processes among them is the potential property of healing, promoting the healing of burns and wounds. Therefore, the healing property of *Peperomia pellucida* may be related to the presence of Zn and Cr in its constitution. Considering the method (maceration) used for extracting of active compounds from medicinal plants for the production of phytotherapies and the way the herbs are consumed by the population, the study of stable elements and radionuclides activity in such plants have great significance. This study showed that *P. pellucida* oil has antifungal activity against *A. flavus* and among their constituents, the dillapiole has been described for fungicidal properties.

ACKNOWLEDGMENTS—The authors acknowledge CAPES from Brazil for financial support. The authors are grateful to Mrs. Elsie F. Guimarães of Botanical Garden Institute, for the identification of *Peperomia pellucida* and to Mr. João for your help in collecting plant.