

medicinal plants and medicines. Other variants of pharmacopoeias were written by Persian doctors: the Canon of Medicine ("*al-Qānūn fī at-tibb*" – the Law in medicine) by Avicenna in 1025, the most famous and long lived book of the history of medicine, the works of Ibn Zuhr (Avenzoar) of the 12th century (printed in 1491) and of Ibn Baytar of the 14th century and the work *Shen-nung Pen-tsao Ching* (The Classic of Herbal Medicine) considered the oldest Chinese pharmacopoeia, will model the studies of medicine along the Middle Age (Marculescu et al., 2004).

In Romania, until the appearance of the Romanian Pharmacopoeia (RPh) valid on the entire Romanian territory, the Austrian Pharmacopoeia was used in Transylvania (Besciu et al., 2011; Stancu et al., 2014; Marculescu et al., 2004).

The first edition of the Romanian Pharmacopoeia (RPh I, 790 pages) was considered the most valuable pharmacopoeia of the East of Europe, of a scientific value which equaled the Austrian one or the Belgica Nova Pharmacopoeia (RPh I, 1862; Stancu et al., 2014; Marculescu et al., 2004; Besciu et al., 2011;). It was achieved in Bucharest under the guidance of doctor Carol Davila, supported by Nicolae Krețulescu, ministry state secretary of the Department of Home Affairs, by the „Board of the Pharmacopoeia” composed of 12 doctors and 6 pharmacists, under the editorial work of the pharmacist C.C. Hepites (1804-1890), its edition lasting for three years (1859-1862). RPh I, edited in Latin and Romanian includes three parts: *Materia pharmaceutica*, *Praeparata pharmaceutica* and *Regentia et Tabulae Variiae* and two registers: the polyglot one (of the foreign nomenclator and the vernacular synonyms) and one which offers the Turkish nomenclator of the medicines translated in Latin. Even from its first edition, medicines obtained from native medicinal plants and used in traditional therapy became official, such as: *Artemisia absinthium*, *Arnica montana*, *Acorus calamus*, *Aesculus hippocastanum*, *Angelica archangelica*, *Artium lappa*, *Arnica montana*, *Carum carvi*, *Chelidonium majus*, *Fumaria officinalis*, *Matricaria chamomilla*, *Humulus lupulus*, *Hypericum perforatum*, *Hyssopus officinalis*, *Mentha piperita*, *Salvia officinalis* etc., one being able to notice the abundance of the Romanian medicinal plants, 118 (40.83%), as compared to the imported ones, 62 (21.45%), out of the total of 180 plants which represent 62.28% from all monograph (Fig. 1, Fig. 4, Table 1).

The second edition of the Romanian Pharmacopoeia (RPh II, 160 pages) saw the light of day in 1874, in Bucharest, under the guidance of doctor Ștefan Capșa and having at its basis the following criteria: the tendency to rationalize the therapeutics by using mainly medicinal substances with a

constant value and certain action, as well as the introduction in the medical practice of numerous new products, among which: *Allium sativum*, *Althaea officinalis*, *Anthemis nobilis*, *Euphorbia officinarum*, *Fraxinus ornus*, *Garcinia hanburyi*, *Humulus lupulus*, *Lactuca virosa*, *Olea europea*, *Ononis spinosa*, *Quassia simaruba*, *Raphia farinifera*, *Rheum palmatum*, *Santalum album*, *Tilia species*, *Triticum aestivum*, *Veronica officinalis* (Fig. 1, Fig. 4). This edition also set out a distinct stage in the evolution of the monographs based on medicinal plants, 171 (59.17%), of which 115 indigenous (39.79%) and 56 imported (19.38%); it has brought improvements that specify the organs of medicinal plants that were the richest in the active principles (instead of the whole plant) and by the replacement of the aqueous narcotic extracts with alcoholic extract for a better quality keeping (RPh II, 1874; Stancu et al., 2014; Marculescu et al., 2004).

The third edition of the Romanian Pharmacopoeia (RPh III, 476 pages) appeared in 1893 under the guidance of professor Alexandru Marcovici and comprises 174 monographs of medicinal plants (60.21%), out of which 96 indigenous (33.22%) and 78 imported (26.99%) and the newly introduced were: *Andira araroba*, *Areca catechu*, *Artemisia absinthium*, *Beta vulgaris* var. *altissima*, *Capsicum annum*, *Citrus bergamia*, *Coffea arabica*, *Cola acuminata*, *C. nitida*, *C. vera*, *Cotinus coggygria*, *Cnicus benedictus*, *Cuminum cyminum*, *Dipterix odorata*, *Duboisia myoporoides*, *Eucalyptus globulus*, *Galium odoratum*, *Gossypium ssp.*, *Hamamelis virginiana*, *Hydrastis canadensis*, *Juniperus oxycedrus*, *Palaquium gutta*, *Petroselinum crispum*, *Pilocarpus pennatifolius*, *Pinus mugo*, *Podophyllum peltatum*, *Polygonum bistorta*, *Prunus laurocerasus*, *Rhamnus purshianus*, *Saccharum officinarum*, *Solanum tuberosum*, *Spartium scoparium*, *Strophanthus hispidus* (Fig. 1, Fig. 4). This edition is also noted by the introduction in therapeutics of the synthesis medicines with experimentally demonstrated pharmacodynamic action as well as the provision of physical and chemical analysis methods for certain natural products: alkaloids dosage, etc. (RPh III, 1893; Stancu et al., 2014; Marculescu et al., 2004).

A special edition of the Romanian Pharmacopoeia (709 pages) was printed in 1915 under the advice of the Romanian Society of Pharmacists, supervised by the pharmacist Kollo, with a view to the updating of the monographs presented by the previous editions (Fig. 1). Monographs of the vegetable products were introduced, as well as descriptions of the macroscopic characters, dosage of the active principles (RPh special edition, 1915; Stancu et al., 2014; Marculescu et al., 2004).

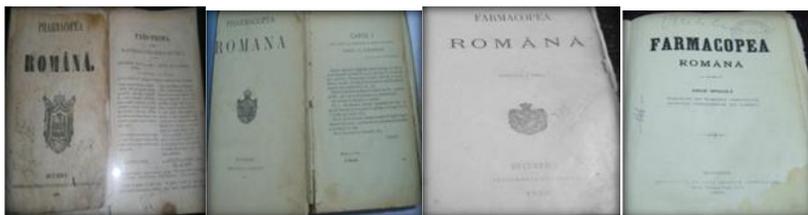


Fig. 1. Romanian Pharmacopoeia: I, II, III, Special edition
 (<http://www.sisteweb.it/eventi/Mihaela%20Badea.pdf>;
<http://www.histpharm.org/ISHPWG%20Romania.pdf>

The fourth edition of the Romanian Pharmacopoeia (RPh IV, 570 pages) appeared in 1926, on the initiative of doctor pharmacist Alexandru Liteanu, president of the General Association of Pharmacists (Fig. 2, Fig. 4). This edition institutionalized important synthesis organic substances, while the list of vegetable original drugs stayed almost unmodified as compared to the previous edition: 133 medicinal plants of which 74 indigenous and 59 imported. The following monographs were introduced: *Flores Crataegi*, *Herba Droserae*, *Folia Coca*, *Herba Grindelliae*, *Cortex Condurango*, *Guarana*, *Folia Boldi*, *Cortex Rhamni Purshianae*, *Cortex Viburni* etc. (RPh IV, 1926; Stancu et al., 2014; Marculescu et al., 2004).

The fifth edition of the Romanian Pharmacopoeia (RPh V, 539 pages) appeared in 1943 on the initiative of a board headed by professor I. Vintilescu, the dean of the Bucharest Faculty of Pharmacy (Fig. 2, Fig. 4). This edition imposed itself by its modern contents and scientific accuracy, both in the field of vegetal products and of the synthesis medicines which became more and more important; the number of vegetal products monographs decreased to a half: 68 plants, of which 38 indigenous and 28 exoti and the following were introduced: *Helianthus annuus*, *Melaleuca leucadendra*, *Viscum album* (RPh V, 1943; Stancu et al., 2014; Marculescu et al., 2004).

The sixth edition of the Romanian Pharmacopoeia (RPh VI, 660 pages) appeared, after a very short time interval, in 1948, under the guidance of the same professor I. Vintilescu and it represented a revision and modernization of the analysis and control methods of the previous edition and also a completion of it with some new monographs (Fig. 2, Fig. 4). In the field of medicinal plants (59 vegetal species, 31 indigenous and 28 imported) new indigenous plants were added and certain imported vegetal products were reintroduced after a certain absence: *Arachis hypogaea*, *Artemisia maritima*, *Gommae ammoniacque*, *Lactuca virosa*, *Kamala*, *Palaquim gutta*, *Papaver rhoeas*, *Piscidia*, *Rhamnus cathartica*, *Tamarindus indica*, *Vaccinium myrtillus* (RPh VI, 1948; Stancu et al., 2014; Marculescu et al., 2004).



Fig. 2. Romanian Pharmacopoeia: V, VI, VII editions

The seventh edition of the Romanian Pharmacopoeia (RPh VII, 943 pages) appeared in 1956 and was based on the experience and scientific training of numerous specialists led by Professor C.N. Ionescu (Fig. 3-4). What needs to be noticed is the concern for the setup of the contents in active principles of the vegetal products and the replacement in various pharmaceutical of certain imported vegetal products with indigenous medicinal plants: for example, the *Radix Senegae* syrup was replaced with that of *Radix Primulae*. The number of monographs of medicinal plants increased from 68 (FR V) to 84: 59 native and 25 exotic, some of the monographs have been formalized: *Artemisia cina*, *Arnica montana*, *Arctostaphylos uva-ursi*, *Cinchona species*, *Claviceps purpurea*, *Cola species*, *Convulvulus scammonia*, *Crataegus species*, *Croton tiglium*, *Datura stramonium*, *Geum urbanum*, *Saponaria officinalis*. Some other medicinal plants were introduced for the first time: *Hydrocarpus anthelminthica*, *Passiflora incarnata*, *Plantago species*, *Polygonum hydropiper*, *Primula species*, *Tanacetum cinerariaefolium*, *Vaccinium vitis-idaea*, *Zea mays* (RPh VII, 1956; Stancu et al., 2014; Marculescu et al., 2004).

The eighth edition of the Romanian Pharmacopoeia (RPh VIII, 946 pages), appeared in 1965 under the scientific coordination of professor Ionescu-Stoian, accompanied by 3 supplements: I (1968, 130 pages), II (1970, 71 pages) and III (1972, 155 pages), in which certain modern methods of analysis were added (spectrophotometric method). This edition is to be noted by its scientific and methodological accuracy, its outstanding concision tendency, to eliminate useless details and to keep only what was strictly indispensable to define and frame the product in the quality control. In this edition, the monographs related to medicinal plants are reduced to 80: 54 Romanian plants and 26 exotic; some new plants were included in this pharmacopoeia: *Cynara scolymus*, *Equisetum arvense*, *Myroxylon balsamum*, *Prunus avium*, *Sophora japonica* (RPh VIII, 1965; Suplemente I-III; Stancu et al., 2014; Marculescu et al., 2004) (Fig. 3-4).

The ninth edition of the Romanian Pharmacopoeia (RPh IX, 1004 pages), appears in 1976 under the coordination of Professor C. Baloescu. This edition imposes itself by the scientific organization of its contents and by the adoption of the internationally nomenclators (Fig. 3-4). As newly introduced monographs one may notice antibiotics, cardioactive products, hormones and analogies (synthesis or semi-synthesis products). In this pharmacopoeia, vegetal products are found only in 68 monographs (12.26%). Very many monographs of medicinal plants were eliminated: *Crocus sativa*, *Arnica montana*, *Artemisia absinthium*, *Centaurium erythraea*, *Cinnamomum camphora*, *Dryopteris filix-mas*, *Hamamelis virginiana*, *Melissa officinalis*, *Paulinia cupana*, *Peumus boldus*, *Plantago species*, *Podophyllum peltatum*, *Sambucus nigra*, *Thymus serpyllum*, *Urginea maritima* etc., certain monographs of RPh VIII were modified: *Tiliae flos*, *Jalapae resina*. Year 1981 marks the publishing of the first supplement of RPh IX (RPh IX, 1976; Supliment I, 1981; III; Stancu et al., 2014; Marculescu et al., 2004).

The tenth edition of the Romanian Pharmacopoeia (RPh X, 1325 pages) was edited in 1993 by a board led by professor D. Dobrescu and it was accompanied by 3 supplements: I (2000, 154 pages), II (2004, 313 pages) and III (2006, 370 pages). For the vegetal products, the monographs, (whose number was considerably reduced: 48 vegetal products, 34 indigenous and 14 imported) contain also the scientific denomination of the species, the used part, and the active principles and for the tannins, the method of quantitative analysis is described. Quite a number of monographs of medicinal plants were eliminated: *Aloe*, *Cephaelis ipecacuanha*, *Cinchona sp.*, *Claviceps purpurea*, *Cola species*, *Convolvulus scammonia*, *Cymbopogon nardus*, *Gypsophilla paniculata*, *Hyoscyamus niger*, *Ipomoea purga*, *Lycopodium clavatum*, *Malva species*, *Prunus avium*, *Rheum palmatum*, *Saponaria officinalis*, *Sophora japonica*, *Strychnos nux-vomica*, *Syzygium aromaticus*, *Vaccinium vitis-idaea*, *Verbascum species*, and the monograph *Calendula officinalis* was introduced (RPh X, 1994; Suplimente I-III; Stancu et al., 2014; Marculescu et al., 2004; Negres et al., 2012; Marculescu et al., 2004;) (Fig. 3-4, Table 1).



Fig. 3. Romanian Pharmacopoeia: VII, VIII, IX, X editions

Table 1

Medicinal plants included in the 2 pharmacopoeias: 1st edition and X edition

Plant monographs in RPh I st edition and RPh X th edition	
1. <i>Acacia senegal</i> - gum arabic tree/ <i>Mimosaceae</i>	16. <i>Juniperus communis</i> - common juniper/ <i>Cupressaceae</i>
2. <i>Achillea millefolium</i> - yarrow/ <i>Asteraceae</i>	17. <i>Krameria triandra</i> - rhatany/ <i>Krameriaceae</i>
3. <i>Aconitum napellus</i> , <i>A. firmum</i> , <i>A.</i> <i>tauricum</i> , <i>A. callibotrion</i> - aconite/ <i>Ranunculaceae</i>	18. <i>Lavandula angustifolia</i> ; <i>L. vera</i> ; <i>L.</i> <i>officinalis</i> - lavender/ <i>Lamiaceae</i>
4. <i>Astragalus tragacantha</i> - astragale de Marseille/ <i>Fabaceae</i>	19. <i>Linum usitatissimum</i> - flax/ <i>Linaceae</i>
5. <i>Atropa belladonna</i> - belladonna/ <i>Solanaceae</i>	20. <i>Matricaria chamomilla</i> - chamomile/ <i>Asteraceae</i>
6. <i>Carum carvi</i> - caraway/ <i>Apiaceae</i>	21. <i>Mentha piperita</i> – mint/ <i>Lamiaceae</i>
7. <i>Chelidonium majus</i> - celandine/ <i>Papaveraceae</i>	22. <i>Myroxilon balsamum</i> - balsam of Peru/ <i>Fabaceae</i>
8. <i>Cinnamomum aromaticum</i> ; <i>C.</i> <i>zeylanicum</i> - cinnamon/ <i>Lauraceae</i>	23. <i>Papaver somniferum</i> - opium poppy/ <i>Papaveraceae</i>
9. <i>Citrus aurantium</i> - orange/ <i>Rutaceae</i>	24. <i>Pimpinella anisum</i> - anise / <i>Apiaceae</i>
10. <i>Citrus limonum</i> - lemon / <i>Rutaceae</i>	25. <i>Ricinus communis</i> -castor-oil- plant/ <i>Euphorbiaceae</i>

11. <i>Digitalis purpurea</i> - purple/ foxglove/ <i>Scrophulariaceae</i>	26. <i>Sinapis nigra</i> - black mustard/ <i>Brassicaceae</i>
12. <i>Foeniculum vulgare</i> - fennel/ <i>Apiaceae</i>	27. <i>Theobroma cacao</i> - cocoa tree/ <i>Sterculiaceae</i>
13. <i>Gentiana lutea</i> - yellow gentian/ <i>Gentianaceae</i>	28. <i>Thymus vulgaris</i> - thyme/ <i>Lamiaceae</i>
14. <i>Glycyrrhiza glabra</i> - licorice/ <i>Fabaceae</i>	29. <i>Valeriana officinalis</i> - valerian/ <i>Valerianaceae</i>
15. <i>Hypericum perforatum</i> - St John's wort/ <i>Hypericaceae</i>	

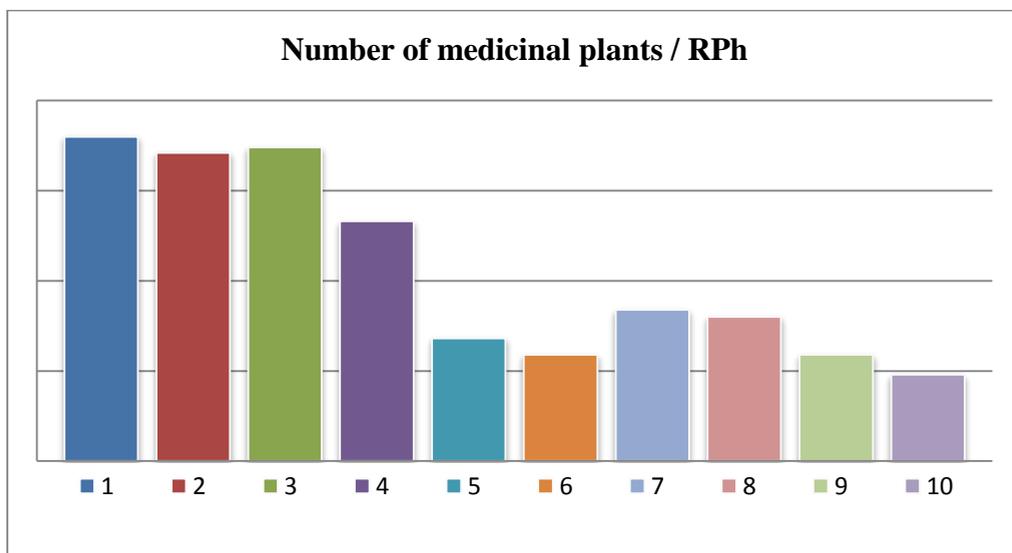


Fig. 4. The medicinal plants in Romanian Pharmacopoeias

Conclusions

Along time, as of the year 1862 (RPh I) and until 1993 (RPh X), 289 medicinal plants were included in the Romanian Pharmacopoeia, most of them coming from the culture of our country (176, i.e. 60.9%). Also, the number of medicinal plants included in various editions decreased constantly, from 180 (62.28% out of the total, RPh I), to 48 species (16.61%, RPh X). The tendency to gradually give up was owed to the development of the pharmaceutical industry as well as to man's backing-off nature. Currently,

numerous phytotherapeutical preparations are more and more present in medical prescriptions and may include: *Hippophae rhamnoides*, *Humulus lupulus*, *Geranium macrorrhizum*, *Chrysanthemum balsamita*, *tanacetum vulgare*, *Alchemilla vulgaris*, *Hedera helix*, *Ocimum basilicum*, *Echinacea species*, *Arnica chamissonis* etc. Some of them are found in the European Pharmacopoeia, but there are plenty of important herbs for phytotherapy, which are not covered in this official guideline pharmaceutical.

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