Bibliography
of
Pomegranate
Bark and Rind
by
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A Thesis Submitted for the Degree of

BACHELOR OF SCIENCE

(Pharmacy)

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Wildenow, C. L. 1797

Punica Granatum.

Linne's Species Plantarum, 4 ed., v. 2, p. 981. (Disp. U. S. A., 2 ed., p. 336; ibid., 3 ed., p. 326; ibid., 4 ed., p. 337; ibid., 5 ed., p. 358; ibid., 6 ed., p. 357; ibid., 7 ed., p. 357; ibid., 8 ed., p. 357; ibid., 9 ed., p. 368; ibid., 10 ed., p. 372; ibid., 11 ed., p. 389; ibid., 12 ed., (1865-1869) p. 425; ibid., 13 ed., (1870-1871) p. 438; ibid., 14 ed., p. 454; ibid., 15 ed., p. 723; ibid., 16 ed., p. 743; ibid., 17 ed., p. 665; ibid., 18 ed., p. 669; ibid., 19 ed., p. 598; Coxe's Am. Disp., 1 ed., p. 559.)

Gives botanical synonyms, with references, description and habitate.

Coxe, J. R. 1806

Punica Granatum.

Am. Disp., 1 ed., p. 559; ibid., 4 ed., p. 473; ibid., 6 ed., p. 307*; ibid., 7 ed., p. 317; ibid., 8 ed., p. 321; ibid., 9 ed., p. 349.

Gives a description of the plant and the uses of several parts.

*Change in name to Granatum.

Woodville, W. 1810

Punica Granatum.

Medical Botany, 2 ed., v. 3, p. 531, t. 190. (Disp. U. S. A., 2 ed., p. 336; ibid., 3 ed., p. 326; ibid., 4 ed., p. 337; ibid., 5 ed., p. 358; ibid., 6 ed., p. 357; ibid., 7 ed., p. 351; ibid., 8 ed., p. 357; ibid., 9 ed., p. 368; ibid., 10 ed., p. 372; ibid., 11 ed., p. 389; ibid., 12 ed., (1865, 1869) p. 425; ibid., 13 ed., (1870, 1871) p. 438; ibid., 14 ed., p. 454; ibid., 15 ed., p. 723;

ibid., 16 ed., p. 743; ibid., 17 ed., p. 665; ibid., 18 ed., p. 669; ibid., 19 ed., p. 598; Nat. Disp., 1 ed., p. 678; ibid., 2 ed., p. 692; ibid., 3 ed., p. 745.)

Gives synonyms, class, essential general characteristics, special characteristics, description, history, properties and dose of Pomegranate bark, with references and a colored illustration.

Brenton, P. 1821

(On the efficacy of the bark of the pomegranate tree in cases of taenia.)

Med. Chir. Tr., 9, p. 301. (Coxe's Am. Disp., 7 ed., p. 317; ibid., 8 ed., p. 321; ibid., 9 ed., p. 349.)

(Tells of the use of pomegranate bark in the treatment of tapeworm.)

Bigelow, J. 1822

Granatum.

Treatise on the Mat. Med., 1 ed., p. 199.

Gives the habitate, properties of the rind, uses and dose.

Bussey, A. & Boutron-Charlard, A. F. 1829

(Bark of the Pomegranate Root.)

Traité des Moyens de reconnaitre les Falsifications des Drougues Simples et Composées, et d'en constater le Degré de Pureté, 8, p. 506. (Am. Jr. Pharm., 2, p. 246.)

(Give a description of pomegranate bark and a description of the bark of bark of barberry bush which is a common adulterant.)

Latour de Trie, __. 1831

Recherches sur l'ecorce de racine de granadier

emplyie contre le taenia ou ver solitaire, sur sa composition chimique et ses applications medicales.

Jr. de Pharm. et de Chim., 17, pp. 503 & 601. (Am. Jr. Pharm., 4, p. 173.)

Presented a thesis at Paris School of Pharmacy; announcing a new principle extracted from the root and named it gravadine; also gives its physical and chemical properties.

Wood, G. B. & Bache, F. 1834

Granatum.

Disp. U. S. A., 2 ed., p. 336; ibid., 3 ed., p. 326; ibid., 4 ed., p. 336; ibid., 5 ed., p. 357*; ibid., 6 ed., p. 357; ibid., 7 ed., p. 357; ibid., 8 ed., p. 357; ibid., 9 ed., p. 368; ibid., 10 ed., p. 372; ibid., 11 ed., p. 388; ibid., 12 ed., (1865, 1869) p. 425; ibid., 15 ed., p. 723*; ibid., 16 ed., p. 743; ibid., 17 ed., p. 665; ibid., 18 ed., p. 669; ibid., 19 ed., p. 598; ibid., 20 ed., p. 531; ibid., 21 ed., p. 533.)

Gives pharmacoepial names, foreign names, general characteristics of the plant and parts used, medical properties, uses and dose of pomegranate bark.

*Change in name to Granati Fructus Cortex and Granati Radix Cortex.

*Change in name to Granatum.

Righini, G. 1844

Punicine.

Jr. de Pharm. et de Chim., s. 3, v. 5, p. 298. (Disp. U. S. A., 6 ed., p. 358; ibid.,7 ed., p. 358; ibid., 8 ed., p. 358; ibid., 9 ed., p. 369; ibid., 10 ed., p. 373; ibid., 11 ed., p. 390; ibid., 12 ed., (1865, 1869) p. 426; ibid., 13 ed., (1870, 1871) p. 438; ibid., 14 ed., p. 455.)

Discusses the extration of the alkaloid from the root bark of pomegranate.

Carson, J. 1847

(Punica Granatum.)

Illust. of Med. Bot., v. 1, p. 45, pl. 38. (Disp. U. S. A., 8 ed., p. 357; ibid., 9 ed., p. 368; ibid., 10 ed., p. 372; ibid., 11 ed., p. 389; ibid., 12 ed., (1865 & 1869) p. 425; ibid., 13 ed., (1870 & 1871) p. 438; ibid., 14 ed., p. 454; ibid., 15 ed., p. 723; ibid., 16 ed., p. 743; ibid., 17 ed., p. 665; ibid., 18 ed., p. 669; ibid., 19 ed., p. 598.)

Original is not available.

Gassicourt, F. 1850

Note sur des racines de Grenadier.

Jr. de Pharm. et de Chim., s. 3, v. 17, p. 438. (Disp. U. S. A., 9 ed., p. 370; ibid., 10 ed., p. 373; ibid., 11 ed., p. 389; ibid., 12 ed., (1865, 1869) p. 426; ibid., 13 ed., (1870, 1871) p. 438; ibid., 14 ed., p. 455; ibid., 15 ed., p. 724; ibid., 16 ed., p. 744.)

Examines the bark of the root of a wild growing pomegrante plant from Algeria.

King, J. & Newton, R. S. 1852

Eclectic Disp., 1 ed., p. 333.

Gives a description of the plant, the fruit rind and the root bark, and their properties and uses.

Siebold, L. 1853

Contribution to the Parmacy of the Pomegranate.

Yrbk. Brit. Pharm. Conf., 20, p. 562. (Am. Jr. Pharm., 56, p. 29; Pr. A. Ph. A., 32, p. 83; Pharm. Jr., 43, p. 396; Drugg. Cir., 28; p. 19.)

Tells how to prepare the root bark so that it can be administered without the astringent taste.

Stenhouse, J. 1862

On Some Varieties of Tannin.

Am. Jr. Pharm., 34, p. 254.

"The tannin of pomegranate rind also gives abundant indications of sugar, but no gallic acid."

Tilton, H. R. 1862

(Bark of Pomegranate Root as a Remedy in Tapeworm.)

Dublin Medical Press, __, p. __;(Phil. Med. & Surg. Rep., 7, p. 472; Drugg. Cir., 7, p. 10.)

(Tells how to prepare an extract of pomegranate root bark for use in the treatment of tapeworm.)

Flückiger, T. A. 1863

(Oxalate of lime crystals in Cortex Granati Radix et Fructus.)

Schweiz. Wochenshr. Zeitung, __, p. __. (Am. Jr. Pharm., 37, p. 32.)

(States that oxalate of lime crystals were found in pomegranate the bark of the root and rind of the fruit.)

King, J. 1864

Punica Granatum.

Am. Disp., 6 ed., p. 769; ibid., 8 ed., p. 684; ibid., 10 ed., p. 684; ibid., 16 ed., p. 684; ibid., 18 ed., p. 952.

Gives a description of the plant, its history, properties

and uses.

Rembold, O. 1867

Gersäure der Granatwurzelrinde.

Ann. der Ch. und Pharm., 143, p. 285. (Disp. U. S. A., 15 ed., p. 724; ibid., 16 ed., p. 744; ibid., 17 ed., p. 666; ibid., 18 ed., p. 670; ibid., 19 ed., p. 599; ibid., 20 ed., p. 532; ibid., 21 ed., p. 535; Jahresb. der Pharm., p. 139; King's Am. Disp., 18 ed., p. 954.)

Discusses the method of preparation of the tannic acid and its properties.

Bowman, H. K. 1869

Quantitative Determination of the Amount of Tannin in Various Vegetable Astringents.

Am. Jr. Pharm. 41, p. 13.

Gives the per cent of tannin in the bark of pomegranate root and the pomegranate rind.

Guibourt, N. & Planchon, G., 1869

Famille des Granaties.

His. des Drougues Simples, 6 ed., v. 3, p. 280. (King's Am. Disp., 18 ed., v. 2, p. 953.)

Gives the habitate, description and illustration of the plant.

Harz, C. 1869

Naturgeschichte und Pharmakognosie
Zur Kenntniss der Granatwurzelrinde
als Erwiederung auf des Herrn Prof.
Dr. Henkel's gefällige Bemerkungen
über meine Notiz.

Zeitsch. d. Oesterr. Apoth. Ver., 7, p. 303. (Am. Jr. Pharm., 42, p. 220; Pr. A. Ph. A., 19, p. 275; Drugg. Cir., 13, p. 170; ibid., 14, p. 126.)

States that the commercial bark of pomegranate is the bark of the trunk, occasionally intermixed with bark of the root; also describes the cells of the root bark. The trunk bark like that of the root possesses anthelmintic properties.

Pocklington, H. 1873

Granati Radicis Cortex.

Pharm. J., 32, p. 703. (Disp. U. S. A., 15 ed., p. 724; ibid., 16 ed., p. 744; ibid., 17 ed., p. 666; ibid., 18 ed., p. 670; ibid., 20 ed., p. 532.)

Gives a description of the microscopic characterisitics of the root bark.

De Vrij, J. E. 1874

Note on Pomegranate Root-Bark.

Yrbk. Brit. Pharm. Conf., 11, p. 504. (Disp. U. S. A., 17 ed., p. 666; ibid., 18 ed., p. 671; ibid., 19 ed., p. 599; ibid., 20 ed., p. 533; ibid., 21 ed., p. 535; Drugg. Cir., 35, p. 251; Chem. Gaz., __, p. 251; Pr. A. Ph. A., 23, p. 207; ibid., 40, p. 659; Pharm. Jr., 34, p. 145; ibid., 50, p. 758.)

Believes that stale pomegranate bark is just as active as fresh bark. The variety with white flowers should be cultivated as a tenifuge, in place of the variety with red flowers.

Maisch, J. M. 1874

Cortex Granati.

Am. Jr. Pharm., 46, p. 49; Pharm. Jr., 33, p. 680.

Gives a description of commercial pomegranate bark.

(Editor.) 1876

Syrupus Matico et Cortex Granati.

New Rem., 5, p. 372.

Tells how to prepare the above syrup.

Watson, R. 1877

Punica Granatum.

Pharm. Jr., 37, p. 341. (Pr. A. Ph. A., 26, p. 167.)

"An infusion of the peel of the root is used as an anthelmintic."

Durand, __. 1878

Etude sur l'écorce de la racine de granadier.

Jr. de Pharm. et de. Chim., 107, p. 168. (New Rem., 7, p. 277; Am. Jr. Pharm., 50, p. 477.)

Tells of the discovery of an alkaloid extracted from the powdered bark of the root, which he calls granatine. Tanret calls his alkaloid pelletierine.

Tanret, C. 1878

Sur la pelletierine, alcaloide de l'ecorce de grenadier.

Comptes Rendus, 86, p. 1270. (Am. Jr. Pharm., 50, p. 389; ibid., 55, p. 583; Yrbk. Brit. Pharm. Conf., 15, p. 43; Pharm. Jr., 37, p. 1023; Disp. U. S. A., 15 ed., p. 724; ibid., 16 ed., p. 744; ibid., 17 ed., p. 666; ibid., 18 ed., p. 670; ibid., 19 ed., p. 599; ibid., 20 ed., p. 533; ibid., 21 ed., p. 534; ibid., 22 ed., p. 516; Report de Pharm., 6, pp. 241 & 389; New Rem., 7, pp. 237 & 340.)

States that the volatilization of the alkaloid pelletierine is responsible for the loss in vermifuge action of the bark. Gives the method of isolation and the properties of the alkaloid.

Tanret, C. 1878

Sur la pelletierine, alkali de l'ecorce de grenadier.

Comptes Rendus, 87, p. 358; (Pharm. Jr., 37, p. 1023; Yrbk. Brit. Pharm. Conf., 16, p. 38; Am. Jr. Pharm. 86, p. 29; ibid., 55, p. 583; Disp. U. S. A., 15 ed., p. 724; ibid., 16 ed., p. 744; ibid., 17 ed., p. 666; ibid., 18 ed., p. 670; ibid., 19 ed., p. 599; ibid., 20 ed., p. 533.)

Gives the properties of pelletierine.

Berenger, __. & Feraud, __; 1879

(Note sur l'action taenifuge du sulfate de Pelletierine.)

Bull. gen. de therap., 96, p. 297. (Med. Times, __, p. __; Chic. Med. Rev., __, p. __; Am. Jr. Pharm., 54, p. 631; Pr. A. Ph. A., 31, p. 282; Disp. U. S. A., 15 ed., p. 725; ibid., 16 ed., p. 746; ibid., 17 ed., p. 667; ibid., 18 ed., p. 671; ibid., 19 ed., p. 600; ibid., 20 ed., p. 533.)

(Tells how to use pelletierine tannate as a tenifuge.)

(Editor.) 1879

Pelletierine.

New Rem., 8, p. 213.

"The dose of this alkaloid of pomegranate root bark is stated to be at least 50 centigrams (0.50 gm.) for an adult, or about 8 grains."

(Editor.) 1879

Poisoning by False Angustura Bark.

Brit. Med. Jr., 1879, p. 674; (Chem. & Drugg., 21, p. 252; Am. Jr. Pharm., 51, p. 477.)

Reports a case in which False Angustura Bark was dispensed instead of pomegranate root, resulting in the death of the patient.

Falck, A. F. 1879

Ueber das Alkaloid der Granatwurzelrinde.

Archiv. d. Pharm., 214, p. 528. (Am. Jr. Pharm., 51, p. 401.)

(Suggests changing the name of the alkaloid from pelletierine to punicine.)

Holmes, E. M. 1879

Punica Granatum.

Pharm. Jr., 39, p. 262. (Pr. A. Ph. A., 28, p. 176.)

"This is the rind of the fruit dried. From its small size it would appear to be obtained from immature fruits. The pomegranate is stated by Kaempfer to be rare in Japan and to produce an inferior fruit witha rather disagreeable taste, but Thunberg remarks that it is common about Kosedo."

Stephenson, J. & Churchill, J. M. 1879

Punica Granatum.

Med. Bot. v. 1, pl. 57. (Nat. Disp. 1 ed., p. 679; ibid., 2 ed., p. 692; ibid., 3 ed., p. 745.)

Give the general characteristics, special characteristics, synonyms, description, history, qualities and chemical properties, medical properties and uses of pomegranate bark.

Stille, A. & Maisch, J. M. 1879

Granati Fructus Cortex.

Nat. Disp., 1 ed., p. 679; ibid., 2 ed., p. 692; ibid., 3 ed., p. 745*; ibid., 4 ed., p. 745; ibid., 5 ed., p. 792.

Give foreign pharmacopoea titles, botanical origin, description, constituents, medical action, uses and an illustration of pomegranate rind.

*Change in name to Granatum,

Stille, A. & Maisch, J. M. 1879

Granati Radicis Cortex.

Nat. Disp., 1 ed., p. 680; ibid., 2 ed., p. 693.

Gives foreign pharmacopoeial titles, botanical description, constituents, adulterations a nd substitutions, medical actions and uses of pomegranate root bark.

Tanret, C. 1879

Sur les alcalis du grenadier.

Comptes Rendus, 88, p. 716. (Ber. d. Chem. Ges., 12, p. 1212; Am. Jr. Pharm., 51, p. 451; ibid., 52, p. 416; Disp. U. S. A., 15 ed., p. 724; ibid., 16 ed., p. 745; ibid., 17 ed., p. 666; ibid., 18 ed., p. 671; ibid., 19 ed., p. 599; ibid., 22 ed., p. 516; Pr. A. Ph. A., 28, p. 176; Pharm. Jr., 39, p. 829.)

Gives a method of extracting the alkaloids of pomegranate root.

Bentley, R. & Trimen, H. 1880

Punica Granatum.

Med. Plants, 2, p. 113. (Nat. Disp. 1 ed., p. 679; ibid., 2 ed., p. 693; ibid., 3 ed., p. 745; ibid., 4 ed., p. 745; ibid., 5 ed., p. 792; King's Am. Disp., 18 ed., v. 2, p. 952.)

Gives illustration, description, habitate, official parts and names, adulterations and substitutions,and medicinal properties and uses.

Gehe & Co. 1880

(Pelletierine.)

Handelsbericht, Sep., 1880, p. __. (New Rem., 9, p. 335.)

("The tannate of this alkaloid obtained from pomegranate root-bark, is in good demand as an agreeable, and reliable remedy

for tape-worm.")

Merk & Co. 1880

(Tannate of Pelletierine.)

Ann. Report, 1880, p. __. (New Rem., 9, p. 287.)

("This is the only dry salt which can be prepared from one of the alkaloids found by Tanret in the bark of pomegranate root.")

Tanret, C. 1880

Sur les alcalis du grenadier.

Comptes Rendus, 90, p. 695. (Am. Jr. Pharm., 52, p. 416; ibid., 55, p. 583; Yrbk. Brit. Pharm. Conf., 17, p. 64; Pharm. Jr. 39, p. 829; Pr. A. Ph. A., 28, p. 341; Disp. U. S. A., 15 ed., p. 725; ibid., 16 ed., p. 745; ibid., 17 ed., p. 666; ibid., 18 ed., p. 671; ibid., 19 ed., p. 599.)

In 1879 he announced that pelletierine is accompanied by 3 other alkaloids in pomegranate bark. In the present communication he describes the principle properties of these alkaloids and the method of separation.

Gehe & Co. 1881

(Pelletierine Tannate.)

Handelsberichte, Sept., 1881, p. __. (New Rem., 10, p. 333.)

("Pelletierine tannate is constatly increasing in favor as a sure remedy for tape-worm.")

Gehe & Co. 1881

(Pelletierine Tannate.)

Handelsbericht, April, 1881, p. __. (New Rem., 10, p. 179.)

("Pelletierine tannate is quite extensively used and evidently has a promising future before it.")

Stebbins, E. S. 1881

On the Use of Tannate of Pelletierine as a Taenicide.

New Rem., 10, p. 145.

Tells how to use pelletierine tannate.

Kramer, C. F. 1882

Astringent Drugs.

Am. Jr. Pharm., 54, p. 388.

Gives the percentage of tannin in the bark and rind of the root and fruit of pomegranate.

(Editor.) 1883

Tannate of Pelletieria.

Drugg. Cir., 27, p. 26.

Answers the question as to the best method for the administration of the alkaloidal salt.

Gehe & Co. 1883

Pomegranate Bark.

Handelsbericht, April, 1883, p. __. (New Rem., 12, p. 174.)

Tells ofthe use of the bark of the branches of pomegranate as well as of the roots.

Jungkunz, W. F. 1884

On Pomegranate Bark.

Am. Jr. Pharm., 56, p. 137. (Disp. U. S. A., 16 ed., p. 745; ibid., 17 ed., p. 666; ibid., 18 ed., p. 671; ibid., 19 ed., p. 599; ibid., 20 ed., p. 533; ibid., 21 ed., p. 535.)

Discusses the constituents and tests for them in the bark.

Kamnitzer, J. V., 1884

Uber die Wirkungsweise der Granatwurzelrinde.

Pharm. Cent., 25, p. 401, ibid., 26, p. 53.

Gives a history of the drug, its constituents expecially those that cause the activity.

Schroeder, W. V. 1884

Uber das Pelletierin.

Arch. f. exp. Pathol. und Pharmak., 18, p. 381. (Disp. U. S. A., 22 ed., p. 816; Pharm. Zeit., 31, p. 556; Pharm. Jr., 46, p. 266.)

Gives procedure to make an extract free from tannic acid but containing all the alkaloid of the bark.

Bender, C. J. 1885

Ueber ein krystallisirtes Alkaloid aus der Wurzelrinde von Punica Granatum.

Pharm. Centrahl., 26, p. 53. (Am. Jr. Pharm., 57, p. 172; Disp. U. S. A., 16 ed., p. 745; ibid., 17 ed., p. 666; ibid., 18 ed., p. 671; ibid., 19 ed., p. 599; ibid., 20 ed., p. 533; ibid., 21 ed., p. 535; Pr. A. Ph. A., 33, p. 177; Arch. d. Pharm., 237; p. 49; Am. Drugg., 14, p. 95.)

Pomegranate bark contains but 1 crystalline alkaloid and 2 amorphous bases. "He discards the name Pelletierine in favor of "Punicine". He also gives a process for the preparation of a stable crystalline sulfate."

(Editor.) 1885

Dose of Pelletierine Tannate.

Drugg. Cir., 29, p. 13.

In answer to a question as to the dose of pelletierine tannate gives the desired information.

1885

Wilfert, H.

The Efficacy of Pelletierine in the Treatment of Tape-worm, with the Report of Seven Cases.

Drugg. Cir., 29, p. 109.

Discusses the use of pelletierine as a safe and reliable remedy for the removal of tape-worm.

1886

__, __.

(Granatwurzelrinde.)

Jr. de. Pharm. d'Alsace-lor., 6, p. 75; Rundsch. Wein, 12, p. 514; Pharm. Zeit. f. Russl., 25, p. 707.

(Tells how to prepare pomegranate root-bark devoid of astringency and disagreeable taste.)

1886

(Editor.)

Pelletierine.

Drugg. Cir., 30, p. 109.

In answer to a question the alkaloids are present in the bark, they are active and give their dose as a tenifuge.

1886

(Editor.)

Pelletierine as a Taenifuge.

Drugg. Cir., 30, p. 81.

"Prof. DaCosta considers pelletierine the active principle of pomegranate bark, the best taenifuge we possess."

1886

Galezowski, __.

(Hydrochlorate of Pelletierine.)

Med. Chron. Mag., __. p. 170. (Pr. A. Ph. A., 34, 631; Am. Drugg., 15, 200.)

(Pelletierine was used in the treatment of paralysis of the muscles of the eye.)

(Germ. Pharm. Commission.) 1886

Pelletierinum Tannicum.

Arch. d. Pharm., 224, p. 167. (Pharm. Jr., 46, p. 266.)

Gives characteristics and properties of pelletierine tannate.

Siebold, L. 1886

(Ecorce de grenadier.)

L'Orosi, __, p. __. (Jr. d. Pharm. d'Alsace-lor., 13, p. 90; Pharm. Zeit. für Russl., 25, p. 707; Am. Jr. Pharm., 59, p. 72.)

(Tells how to prepare a liquid from the bark free from the astringent taste.)

(Editor.) 1887

New Local Anesthetic.

Am. Drugg., 16, p. 114.

A crystalline substance was obtained from pomegranate rind which acts as a local anesthetic.

(Editor.) 1887

Sulfate of Pelletierine.

Drugg. Cir., 33, p. 182.

In answer to a question says, "This salt seems to have fallen into disuse, being apparently superceded by the tannate."

Aweng, E. 1890

Ueber wirksame Granatwurzelrinde.

Pharm. Zeit., 35, p. 447. (Pr. A. Ph. A., 39, p. 441; Pharm. Jr., 50, p. 82.)

Tells of the results obtained from the examination of 3 different samples of pomegranate bark, in order to explain the different results obtained from their use.

(Editor.) 1890

Dose of Pelletierine Tannate.

Drugg. Cir., 34, p. 207; ibid., 230.

Answer to the question as to the dose of pelletierine tannate.

Landis, E. B. 1890

Poisoning by Pelletierine.

Drugg. Cir., 34, p. 12.

Describes the case of poisoning by Pelletierine.

Stoeder, W. 1890

Alkaloide-gehalte von Indische Granaatwortelbasten.

Jahresb. der Pharm., 50, p. 114.(King's Am. Disp., 18 ed., v. 1, p. 954; Nederl. Tjd. Pharm., 28, p. 299; Disp. U. S. A., 17 ed., p. 666; ibid., 18 ed., p. 670; ibid., 19 ed., p. 599; ibid., 20 ed., p. 532; ibid., 21 ed., p. 535; Am. Jr. Pharm., 62, p. 578; Pr. A. Ph. A. 39, p. 442; Drugg. Cir., 34, p. 33; Pharm. Jr., 47, p. 822; ibid., 50, 379; Pharm. Zeit., 33, p. 136; Arch. d. Pharm., 237, p. 49; Pharm. Zeit., 46, p. 451; Pharm. Jr. 67, p. 221.)

Tells of the use of pomegranate bark by the natives of Java; also gives the per cent of alkaloids present in 3 different varieties.

Simmonds, P. L. 1891

Punica Granatum.

Am. Jr. Pharm., 63, p. 12.

Discusses the parts of the plant used and the quantity of bark exported from Algeria.

Simmonds, P. L. 1891

The Medicinal Uses of Flowers.

Am. Jr. Pharm., 63, p. 201.

"The balausta flowers of pomegranate are rich in tannin and gallic acid, and can be used as an astringent."

Aweng, E. 1892

Siripus Granati Corticis.

Jr. d. Pharm. d'Alsace-lor., 20, p. 209. (Am. Jr. Pharm. 64, p. 563; Pr. A. Ph. A., 41, p. 453.)

Gives a method for the preparation of a syrup of pomegranate.

Helbing, H. 1892

Pelletierine.

Pharm. Rec., 13, p. 248.

Gives the properties; physical, chemical and medicinal.

Ciamician, __. & Silber, P. 1893

Uber die Alkaloide der Granatwurzelrinde.

Ber. d. Chem. Ges., 1, p. 2738. (Jahresb. der Pharm., 53, p. 532; ibid., 54, p. 526; King's Am. Disp., 18 ed., p. 954; Pr. A. Ph. A., 42, p. 1127; Apoth. Zeit., 8, 625; Am. Jr. Pharm., 66, p. 142.)

Find that the pseudo-pelletierine of Tanret is a tertiary base and propose to change its name to "granatonine".

Culley, J. 1894

The Tannin of Punica Granatum.

Am. Jr. Pharm., 66, p. 280. (Pr. A. Ph. A., 42, p. 891.)

Gives the method of extraction and purification of the tannin from the ground bark.

(Editor.) 1894

(Pomegranate.)

Am. Jr. Pharm., 66, p. 553.

Pomegranates from California are inferior to imported ones in appearance and flavor.

Stoeder, W. 1894

Die Bestimmung der Alkaloide in Cortex Granati.

Apoth. Zeit., 9, p. 163. (Drugg. Cir., 38, p. 202; ibid., 45, p. 212.)

Describes a process for the volumetric determination of pomegranate bark.

__, __. 1895

(Pomegranine.)

Am. Medico-Surg. Bull., __, p. __. (Am. Drugg. & Pharm. Rec., 26, p. 76.)

("Alleged alkaloid from the rind of pomegranate fruit.-- Local anesthetic.")

Prospero, __. 1895

(Pelletierine for Tapeworm.)

Brit. Med. Jour. Epit., __, p. 88. (Pharm. Jr., 56, p. 178.)

(Tells of the value of the alkaloid in the treatment of 2 larger varieties of taenia.)

Lloyd, J. U. 1897

Punica Granatum.

West. Drugg., 19, p. 202. (Disp. U. S. A., 19 ed., p. 598; ibid., 20 ed., p. 531; ibid., 21 ed., p. 534; Pr. A. Ph. A., 45,

p. 548.)

Gives the botanical characters, history, constituents, and uses of pomegranate bark accompanied by an illustration.

Trimble, H. 1897

Pomegranate Rind.

Am. Jr. Pharm., 69, p. 634. (Disp. U. S. A., 18 ed., p. 670; ibid., 19 ed., p. 699; ibid., 20 ed., p. 532; ibid., 21 ed., p. 535; ibid., 22 ed., p. 516; Pr. A. Ph. A., 46, p. 846.)

Gives the constituents of pomegranate rind as a result of his work on it.

Ewers, E. 1899

Zur Bestimmung des Alkaloidgehaltes in der Granatrinde.

Arch. d. Pharm., 237, p. 49. (Oest. Zeit. für Pharm., 37, p. 182; Pharm., Jr., 63, p. 10; Drugg. Cir., 44, p. 122.)

Gives the method for the assay of pomegrante bark.

(Editor.) 1900

Granati Cortex.

Pharm. Jr., 64, p. 662.

Describes the plant, the bark and gives the chief constituents of the bark.

Piccinni, __. 1900

Ein flussinges Alkaloid der Granatwurzelrinde.

Chem. Centralbe., 1900, 2, p. 879; (Pharm. Jr., 64, p. 249; Disp. U. S. A., 19 ed., p. 579; ibid., 20 ed., p. 533; Pro. A. Ph. A., 48, p. 639; Pharm. Zeit., 44, p. 870.)

Isolated a new alkaloid, which is liquid, from pomegranate root bark.

Caesar, __. & Loretz, __. 1901

Cortex Granti.

Geschaefts Bericht, 1901, p. 13, (Pr. A. Ph. A., 50, p. 872.)

Report the per cent of alkaloids present in different lots of pomegranate bark.

Dohme, A. R. L. 1901

Pomegranate Bark.

Am. Drugg. & Pharm. Rec., 39, p. 107.

Reviews the work done on pomegranate bark.

Greenish, H. G. & Collin, E. 1903

Pomegranate Root Bark.

Pharm. Jr., 70, p. 871.

Describe the structure of the bark and point out diagnostic characters of the powdered root bark.

Jackson, J. R. 1903

Ornamental Medicinal Plants.

Pharm. Jr. 71, p. 454.

Gives a description of the plant and tells about its use.

Leger, E. 1904

Determination of total alkaloids in pomegranate bark.

Pharm. Jr., 72, p. 581. (Disp. U. S. A., 19 ed., p. 599; ibid., 20 ed., p. 533; ibid., 21 ed., p. 535; ibid., 22 ed., p. 516; Pr. A. Ph. A., 52, p. 716; Jr. d. Pharm. d. Chim., s. 6, v. 19, p. 329.)

Gives a method for the determination of total alkaloids in pomegranate bark.

Caesar, __. & Loretz, __. 1905

Cortex Granati.

Pharm. Zeit., 73, p. 771. (Pr. A. Ph. A., 54, p. 784; Pharm., Jr., 75, p. 580.)

Recommend several methods for the assay of pomegranate bark and give the procedure.

Beringer, G. M. 1908

Fluidglycerate of Pomegranate.

Drugg. Cir., 52, p. 556.

Tells how to prepare the fluidglycerate.

Hirano, G. 1909

(On the Japanese pomegrante barks.)

Jr. Pharm. Soc. Japan, 1909, p. 473. (Pharm. Zeit., 55, p. 538; Pr. A. Ph. A., 58, p. 207.)

(Determined the alkaloidal content of the stem, root and branch barks of the Japanese pomegranate.)

Lloyd, J. U. 1911

Granatum (Pomegranate.)

Am. Jr. Pharm., 83, p. 211; Yrbk. Brit. Pharm. Conf., 59, p. 240.

Gives a historical sketch of the pomegranate.

(Board of Trustees of the U. S. P. Convention.) 1913

Pelletierinae Tannas

Jr. A. Ph. A., 2, p. 1399.

Give proposed changes, omissions and additions to the proposed monograph of the U.S.P.IX revision.

Smith, C. E. 1913

Pelletierinae Tannas.

Jr. A. Ph. A., 2, p. 70.

"The products of the market differ more or less from the preparation described in the U. S. P.."

Dichgans, H. 1914

Cortex Granati.

Pharm. Zeit., 59, p. 852. (Yrbk., 3, p. 226; Disp.,U. S. A., 20 ed., p. 533; ibid., 21. ed., p. 535; ibid., 22, ed., p. 816.)

Criticises the official assay methods.

Hess, K. & Eichel, A. 1917

Uber die Alkaloide des Granatapfel-Baumes.
III Die Constitution des Pelletierins.

Ber. d. Chem. Ges., 50, p. 1192. (Disp., U. S. A., 21 ed., p. 535; ibid., 22 ed., p. 816; Yrbk. A. Ph. A., 6, p. 437.)

Tells about the work done on the constitution of the alkaloids of pomegranate.

Hess, K. 1919

Uber das natürliche Vorkommen des Isopelletierins.
(VII. Mitteilung über die Alkaloide des Granatapfelbaumes.)

Ber. d. Chem. Ges., 52, p. 1005. (Disp. U. S. A., 21 ed., p. 535; ibid., 22 ed., p. 816; Jr. Soc. Chem. Ind., 38, p. 477 A; Yrbk. A. Ph. A., 8, p. 528.)

Establishes the presence of three alkaloids of pomegranate

bark. Tells of the discovery of a new substance which he proves to be not a new alkaloid but one of the original three.

Stone, W. H. 1920

Fluidextractum Granati.

Jr. A. Ph. A., 9, p. 307.

"It is recommended that this fluidextract be deleted as there is very little demand for it."

(Netherland Pharm. Commission.) 1925

Extractum Granati.

Pharm. Weekbl., 62, p. 216. (Yrbk. A. Ph. A., 14, p. 416.)

Recommend an assay to be adopted as the official one in the new Netherland Pharmacopoeia.

Maurin, E. 1929

Variations de la richesse alcaloideque du Grenadier sous l'influence de certains agents chimiques.

Bull. d. Soc. Bot., 75, p. 280. (Chem. Abst., 23, p. 465; Pharm. Jr., 122, p. 471.)

Comments on the variation in alkaloidal content of bark obtained by the addition of certain chemicals to the soil.

Wood, H. C. & La Wall, C. H. 1937

Pelletierine Tannate.

Disp. U. S. A., 22 ed., p. 815.

Gives pharmacoepial names, foreign names, general characteristics of the plant, habitat, structure, alkaloids, description and physical properties of Pomegranate.

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Bentley, R., & Trimen, H., Med(icinal) Plants, 2 ed., 1880.

Bigelow, J., Treatise on Mat(eria) Med(ica), 1 ed., 1822.

Coxe, J. R., (The) Am(erican) Disp(ensatory), (1 ed.) 1806; 4 ed., 1818; 6 ed., 1825; 7 ed., 1827; 8 ed., 1830; 9 ed., 1831.

King, J., Am(erican) Disp(ensatory), 6 ed., 1864; 8 ed., 1872; 10 ed., 1875; 16 ed., 1889; 18 ed., 1900.

King, J. & Newton, R. S., (The) Eclectic Disp(ensatory), 1 ed., 1852.

Stephenson, J., & Churchill, J. M., Med(ical) Bot(any), v. 1, 1879.

Stille, A., & Maisch, J. M., (The) Nat(ional) Disp(ensatory), (1ed.) 1879; 2 ed., 1879;1880; 3 ed., 1884; 4 ed., 1886, 1887; 5 ed., 1894; 6 ed., 1896.

Wildenow, C. L., Linne's Species Plantarum, 4 ed., v. 2, 1797.

Wood, G. B., & Bache, F., (The) Disp(ensatory) (of the) U(nited) S(tates) (of) A(merica), 2 ed., 1834; 3 ed., 1836; 4 ed., 1839; 5 ed., 1843; 6 ed., 1845; 7 ed., 1847; 8 ed., 1849; 9 ed., 1851; 10 ed., 1854; 11 ed., 1858; 12 ed., 1869; 13 ed., 1871; 14 ed., 1879; 15 ed., 1883; 16 ed., 1892; 17 ed., 1894; 18 ed., 1899; 19 ed., 1907; 20 ed., 1918; 21 ed., 1926; 22 ed., 1937.

Woodville, W., Medical Botany, 2 ed., v. 3, 1810.

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Am(erican) Drugg(ist), v. 13-20; 1884; v. 73-100; 1925-1935

Am(erican) Drugg(ist),and Pharm(aceutical) Rec(ord),
v. 13-94; 1884-1936

Am(erican) J(ou)r(nal) (of) Pharm(acy), v. 1-108; 1825-1941

Drugg(ist) Cir(cular), v. 1-84; 1857-1940

J(ou)r(nal) A(merican) Ph(armaceutical) A(ssociation),
v. 1-28; 1912-1939

New Rem(edies), v. 1, 1872; v. 4-12; 1875-1883

Pharm(aceutical) Abstracts, v. 1-5; 1935-1941

Pharm(aceutical) J(ou)r(nal) (and Transactions),
v. 1-143; 1841-1939

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Pr(oceedings) (of the) A(merican) Ph(armaceutical) A(ssociation),
v. 1-59; 1851-1911

Y(ea)rb(oo)k (of the) A(merican) Ph(armaceutical) A(ssociation),
v. 1-28; 1912-1938

The Pharmacopoeia of the
United States of America
(0-XI) (1820-1930)

and

The National Formulary
(1-VI) (1888-1935)

History
of
Pomegranate Bark
and
Pomegranate Rind

U. S. P. 1830 (N.Y.) p. 37

Granati Cortex Punica Granatum

Pomegranate Bark.

Prop. Inodorous; taste bitter, astringent; virtues taken up by water/

Med. Oper., Astringent. Dose, dr. $\overline{ss}$ to dr. i

U. S. P. 1840 p. 22

Granati Radicis Cortex. Bark of Pomegra/nate Root.

U. S. P. 1850 P.p. 26

Granati Radicis Cortex. Bark of Pomegra/nate Root.

U. S. P. 1860 p. 31

Granati Radicis Cortex. Bark of Pomegranate Root./

The bark of the root of Punica Granatum./

U. S. P. 1870 P.p. 32

Granati Radicis Cortex. Bark of Pomegranate/ Root./

The bark of the root of Punica Granatum./

U. S. P. 1880 p. 173

Granatum.

Pomegranate.

The bark of the root of Punica Granatum Linne (Nat. Ord., Granataceae)./

In thin quills or fragments, from two to four inches (5 to 10 centimeters) long,/ little over one twenty-fifth of an inch (1 milimeter) thick; outer surface, yellow-/ish-gray, free from lichens; somewhat warty, or longitudinally and reticulately/ ridged; inner surface smooth, finely striate, grayish-yellow; fracture short, gran/ular, greenish-yellow, indistinctly radiate; inodrous; taste astringent, very slightly/ bitter.

U. S. P. 1890 p. 203

Granatum

Pomegranate

The bark of the stem and root of Punica Granatum Linne (nat. ord./ Lythraricae)./

In thin quills or fragments, from 5 to 10 cm. long, and from 1 to 3 mm./ thick; outer surface yellowish-gray somewhat warty, or longitudinally and/ reticulately ridged; the stem-bark often partly covered with blackish lichens;/ the thicker pieces of the root-bark more or less scaly externally; inner surface/ smooth, finely striate, grayish-yellow; fracture short, granular, greenish-yellow;/ indistinctly radiate; inodorous; taste astringent, very slightly bitter./

U. S. P. 1900 p. 228

Granatum

Pomegranate

The bark of the stem and root of Punica Granatum Linne (Fam./ Punicaceae)./

Stem Bark.- In single quills or traversely curved pieces, mostly 2 to 10/ cm. long, 5 to 20 Mm. in diameter; bark 0.5 to 3 Mm. thick; outer surface/ yellowish- to brownish-gray, with brownish-black fruit-heads of lichen and/ small lenticels; inner surface grayish-yellow to brownish, finely striate;/ fracture short, smooth, the phelloderm layer dark green, the inner bark dull/ greenish-yellow; odor distinct; taste astringent, somewhat bitter./

Root-Bark.- Dark brown, with more or less longitudinal patches and scales/ of cork; green phelloderm layer absent; medullary

rays extending nearly to/ the periderm./

Average dose.-- 2 Gm. (30 grains).

U. S. P. 1910 p. 208

Granatum

Pomegranate

Granat.-- Pomegranate Bark

The dried bark of the stems and roots of Punica Granatum Linne/ (Fam. Punicaceae), without the presence or admixture of more than 2 per cent/ of wood or other foreign organic matter. Preserve it in tightly-closed/ containers./

U. S. P. 1920 p. 184

Granatum

Pomegranate

Granat.-- Pomegrante Bark

Pomegranate is the dried bark of the stem or root of Punica Granatum/ Linne (Fam. Granataceae)./

Pomegranate contains not more than 2 per cent of wood or other/ foreign organic matter./

Description and Physical properties./

Underground Pomegranate.-- Stem bark in pieces from 2 to 8 cm. in length; bark from 0.5 to 3.5 mm. in thickness; outer surface yellowish to grayish-brown, with/ patches of grayish lichens, broadly elliptical lenticels and yellow brown fur/rows of abraded patches of cork; longitudinally wrinkled; inner surface light/ yellow or yellowish-brown, finely striate; fracture short; phelloderm dark/ green; inner bark yellowish-green/

Root bark tansversely curved pieces; externally brownish-yellow with/ conchoidal depressions and dark yellow, the medullary rays extending nearly to the outer/

surface./

In either root or stem bark, odor slight, taste astringent, somewhat bitter and nauseous.

Structure.-- Cork thin, of alternating rows of thin-walled suberized cells and ligni-/fied cells with greatly thickened inner walls; cortex of parenchyma with a few/ large stone cells isolated or in small groups; medullary rays mostly 1-cell/ wide; rosette aggregates of calcium oxalate very numerous in the parenchyma./

Powdered Pomegranate.-- Yellowish-brown to dark brown; calcium oxalate crystals/ in rosette aggregates or monoclinic prisms from 0.006 to 0.018 mm. in diameter; / starch grains numerous, spherical, ellipsoidal, biconvex or irregular and single/ or compound, from 0.002 to 0.010 mm. in diameter; fragments of whitish/ cork with prominent, thickened, lignified walls; stone cells from 0.050 to / 0.300 mm. length, the walls being very thick and strongly lamellated; occa/sional wood fibers from 0.015 to 0.020 mm. in thickness and associated/ with tracheae possessing simple and bordered pores.

Tests for identity.-- Mix 1 gm. of powdered Pomegranate with 100 cc. of distilled/ water, macerate it with occasional agitation from about one hour, and filter: a/ light yellow filtrate is obtained. Upon the addition of a drop of ferric chloride/ T. S. to 10 cc. of this filtrate a bluish-black precipitate is produced. Upon the/ addition of from 40 to 50 cc. of calcium hydroxide T. S., to another 10 cc./ portion of the filtrate, an orange-

brown, flocculent precipitate is produced./

Preserve in tightly-closed containers./

Preparation.--Fluidextractum Granati/

Average Dose.--Metric, 2 gm. -- Apothecaries, 30 gr./

Summary of U.S.P. and N.F. Data of
Pomegranate Bark

Where and when official:-

U.S.P. 1830 (N.Y.); '40; '50; '60; '70; '80; '90; 1900 '10; '20.

Official Latin title:-

Granati Cortex, U.S.P. 1830 (N.Y.)

Granati Radicis Cortex, U.S.P. 1840; '50; '60; '70.

Granatum, U.S.P. 1880; '90; 1900; '10; '20.

Official English title:-

Pomegranate Bark, U.S.P. 1830 (N.Y.)

Bark of Pomegranate Root, U.S.P. 1840; '50; '60; '70.

Pomegranate, U.S.P. 1880; '90; 1900; '10; '20.

Official abreviation:-

Granat., 1910; '20.

Official synonyms:-

Pomegranate Bark, 1910; '20.

Scientific name:-

Punica Granatum, 1830 (N.Y.); 1860; '70; '80; '90; 1900; '10; '20.

Family:-

Punicaceae, 1900; '10.

Granataceae, 1920.

Part used:-

Pomegranate Bark, 1830 (N.Y.)

Bark of Pomegranate Root, 1840; '50.

The bark of the root of Punica Granatum, 1860; '70; '80.

The bark of the stem and root of Punica Granatum, 1890; 1900.

The dried bark of the roots and stems of Punica Granatum, 1910

Part used:-

the dried bark of the stem or root of Punica Granatum, 1920

Official description:-

Inodorous; taste, bitter, astringent; U.S.P. 1830 (N.Y.).

1880; '90; 1900; 1920.

Preservation:-

1910; '20.

Official preparation:-

Fluidextractum Granati, 1920.

Official dose:-

dr. ~~ss~~ to dr. 1 U.S.P. 1830 (N.Y.)

2 Gm. (30 grains) 1900

Metric, 2 Gm. Apothecaries, 30 gr. U.S.P. 1920.

U. S. P. 1820 S. p. 54

Granatum. Punica Granatum W. II 981./

Pomegranate Cortex fructus. The rind of the fruit./

U. S. P. 1830 (Phil.) P. p. 13

Granatum Punica granatum. W. II 981./

Pomegranate Fructus Cortex

The rind of the fruit./

U. S. P. 1840 p. 22

Granati Fructus Cortex Pomegranate rind./

The rind or the fruit of Punica Granatum./

U. S. P. 1850 P. p. 26

Granati Fructus Cortex Pomegranate rind./

The rind of the fruit of Punica Granatum./

U. S. P. 1860 p. 31

Granati Fructus Cortex. Pomegranate Rind./

The rind of the fruit of Punica Granatum./

U. S. P. 1870 P. p. 32

Granati Fructus Cortex. Pomegranate Rind./

The rind of the fruit of Punica Granatum./

Summary of U.S.P. and N.F. Data of

Pomegranate Rind

When and Where official:-

U.S.P. 1820; '30 (Phil.); '40; '50; '60; '70.

Official Latin title:-

Granatum, U.S.P. 1820; '30 (Phil.)

Granati Fructus Cortex, U.S.P. 1840; '50; '60; '70.

Official English title:-

Pomegranate, U.S.P. 1820; '30 (Phil.)

Pomegranate rind, U.S.P. 1840; '50; '60; '70.

Official abreviation:-

Official synonym:--

Scientific name:-

Punica Granatum, U.S.P. 1820; '30 (Phil.); '40; '50; '60; '70.

Family:-

Part used:-

The rind of the fruit. U.S.P. 1820; '30 (Phil.)

The rind of the fruit of Punica Granatum. U.S.P. 1840; '50; '60; '70.

Official description:-

Preservation:-

Official preparation:-

Official dose:-

U. S. P. 1930 p. 278

Pelletierinae Tannas

Pelletierine Tannate

Pellet. Tann.

A mixture of the tannates of the several alkaloids obtained from/pomegranate, Punica Granatum Linne (Fam. Granataceae). /

Description and physical properties--A light yellow, odorless amorphous powder,/ having an astringent taste./

One Gm. of Pelletierine Tannate is soluble in about 250 cc. of water at/ 25° C. It is soluble in alcohol, slightly soluble in ether, and insoluble/ in chloroform. It is dissolved by warm dilute acids./

Tests for identity--A saturated, aqueous solution of Pelletierine Tannate is acid/to litmus paper, and is colored blue-black by ferric chloride T. S./

Tests for purity--The ash from 0.2 Gm. is negligible, p. 439/

Platinic chloride T. S. produces no precipitate in a cold solution of about/0.1 Gm. of Pelletierine Tannate in a mixture of 4 cc. of distilled water and/ 1 cc. of diluted hydrochloric acid (many foreign alkaloids)./

Dissolve about 0.5 Gm. of Pelletierine Tannate, accurately weighed, in/ 5 cc. of sodium hydroxide T. S., and shakethe solution with four successive/ portions of 10, 5, 5, and 5 cc. of chloroform. Acidulate the combined chloro-/formic solutions with 0.1 cc. of hydrochloric acid, and evaporate to apparent/ dryness on a water bath. Dissolve the residue in 5 cc. of alcohol, again/evaporate and dry for one hour at 60° C.: the weight of the residue

is not less than 20 per cent of the weight of Pelletierine Tannate taken for the test./

Stir about 0.001 Gm. of the residue obtained in the preceding test on a/white, porcelain surface with 2 drops of sulfuric ar nitric acid: the mixture develops no color other than a light yellow or a light brown./

Storage--Preserve Pelletierine Tannate in well-closed containers and protected/ from light./

Average Dose--Metric, 0.25 Gm.--Apothecaries, 4 grains.

Summary of U.S.P. and N.F. Data of Pelletierine Tannate

When and where official:--

U.S.P. 1930

Official Latin title:--

Pelletierinae Tannas, U.S.P. 1930

Official English title:--

Pelletierine Tannate, U.S.P. 1930

Official abbreviation:--

Pellet. Tann., U.S.P. 1930

Official synonym:--

Scientific name:--

Punica Granatum, U.S.P. 1930

Family:--

Granataceae, U.S.P. 1930

Part used:--

A mixture of the tannates of the several alkaloids obtained from pomegranate, U.S.P. 1930

Official description:--

U.S.P. 1930

Preservation:--

U.S.P. 1930

Official Preparation:--

Official dose:--

Average dose--Metric, 0.25 Gm.--Apothecaries, 4 grains.

Approved W O Richtmann.
Prof. of Pharmaceutics

Date May 14, 1942