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3.2 = *Punica granatum* leaves as a potential source of bioactive molecules

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Plants used in traditional medicine are an important source of secondary bioactive compounds responsible for their biological properties. *Punica granatum* L. (Lythraceae family), commonly known as pomegranate is a domesticated tree used from ancient times for its numerous health benefits. All parts of this tree are used in folk medicine. The major class of secondary metabolites of pomegranate tree is polyphenols, including ellagic acid, flavonoids, hydrolysable and condensed tannins. Recent studies have reported several hydrolysable tannins in pomegranate leaves, bark and fruits, in particular gallotannins and ellagitannins, as punicalagins which are pomegranate most powerful antioxidants. The main biological properties of pomegranate are focused on fruit juice and directed towards different cardiovascular risk factors, hypertension, inflammations, hyperlipidemia, diabetes, ageing, Alzheimer's disease, etc. In addition, extracts from different parts of the plant are reported to have antibacterial, antifungal, antiviral, anthelmintic properties.¹ Several studies found that ellagic acid and larger hydrolyzable tannins, such as punicalins and punicalagins, show the highest antimicrobial activities.² Literature reports few phytochemical information about pomegranate leaves (PGL) and any studies concerning their antiviral properties. This work aimed i) at obtaining a phytochemical quali-quantitative characterization of the main compounds in PGL from a Sardinian pomegranate cultivar; ii) at evaluating the antiviral activity against Human Immunodeficiency Virus-1 (HIV-1) of PGL ethanolic extract and its enriched fractions. The active fractions were identified via bioassay-guided fractionation procedure and tested on *in vitro* assays to evaluate the HIV-1 reverse transcriptase-associated RNase H activity and integrase (IN) inhibitions. The PGL ethanolic extract and the resulting active fractions were analyzed and characterized using HPLC/DAD/ESI-MS. The main components were quantified through the external calibration methods. The results showed that ellagic acid is one of the main components in PGL. The fact that both PGL and the flavonoids enriched fractions are able to inhibit HIV-1 RNase H and IN activities, demonstrates that the PGL biological activity is not only correlated to the presence of ellagitannins such as ellagic acid but could also be attributed to flavonoids.

1) Jyotsana Sharma, Ashis Maity. Pomegranate Phytochemicals: Nutraceutical and Therapeutic Values Fruit, Vegetable and Cereal Science and Biotechnology (2010) 4:56-76

2) Amy B. Howell, Doris H. D'Souza. The Pomegranate: Effects on Bacteria and Viruses That Influence Human Health. Evidence-Based Complementary and Alternative Medicine (2013) Article ID 606212, 11 pages <http://dx.doi.org/10.1155/2013/606212>