IntegroPectin: A new citrus pectin with uniquely high biological activity

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First isolated in 219 via hydrodynamic cavitation of waste orange peel (WOP) directly on semi-industrial scale (30 kg of WOP in 120 L water) [1] and subsequently also from waste lemon [2] and grapefruit [3] peel, IntegroPectin is the name we gave to a new citrus pectin series derived from (organically grown) fruit biowaste derived from citrus juice industrial production via hydrodynamic cavitation. Rich in adsorbed citrus terpenes [4] and citrus flavonoids [5] concentrated at the surface of the pectic polysaccharide after freeze drying the aqueous solution after cavitation, these pectins have a different structure in comparison to commercial citrus pectin, and distinctly higher biological activity. For instance, lemon and grapefruit IntegroPectin share a powerful abtibacterial activity against Gram-positive and Gram-negative ubiquitous pathogenic bacteria such as *Staphylococcus aureus* and *Pesudomonas aeruginosa* [3], with grapefruit IntegroPectin being bactericidal (and not only bacteriostatic) for both strains at low concentration. Conventionally extracted citrus pectin has antioxidant activity [6], but the antioxidant activity of lemon IntegroPectin measured by its ORAC (Oxygen Radical Absorbance Capacity) exceeding 122.000 μmol TE/100g [2], amounts to 60% of the most powerful natural antioxidant extract known so far, namely freeze-dried olive mill waste water which has ORAC of 201,100 μmol TE/100g. Lemon IntegroPectin, furthermore, is a powerful mito- and neuroprotective agent [7], whereas grapefruit IntegroPectin is also an antiproliferative and neuroprotective substance [8], properties which are entirely absent in commercial citrus pectin. In this lecture we will present the latest outcomes of an intense research activity carried out in collaboration with researchers based at Palermo's University and Palermo's CNR. The conclusions are of significant relevance to food scientists and food industry practitioners since pectin is now the third most important in terms of market value (and by far the most versatile) hydrocolloid used by the food industry [9].

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