**Formation and characterization of pectin and carrageenan edible films in the presence of lemon balm infusion**

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Plastic-based packaging has a significant negative impact on the environment, increasing the need for the development of sustainable solutions. Edible films are receiving great attention as alternatives of plastic packaging due to their biodegradability. In addition, they can improve the product’s life, quality and safety by acting as moisture, oxygen, flavour, aroma, and/or oil protective barriers between the food and the environment as well as providing mechanical protection. Their fortification with antioxidants is of great significance as it imparts antioxidant properties to the films. The vast majority of literature reports findings for films with plants’ essential oils whereas, to the best of our knowledge, reports on biopolymer-herbal infusion films are scarce. Thus, the present work, studied the formation of films with a herb extract (lemon balm) in the presence of high and low methoxyl pectins and ι-carrageenan, on their own or in mixtures. For comparison reasons, films with the biopolymers dissolved in water were also formed and studied. Films were evaluated for their weight, thickness, density, moisture, opacity, colour, mechanical properties, total phenolics content (TPC) and antioxidant activity (AA). Weight varied from 0.74-0.81 g, thickness from 71-90 μm, density from 1.29-1.56 g/cm3 whereas moisture content from 71-84%. Maximum force and modulus values ranged from ~7- ~17 N and ~186- ~397 kPa, respectively. According to the statistics, for the same formulation, the presence of the infusion was not statistically important for weight, thickness, density and moisture content. Regarding opacity and colour, all infusion films were more opaque and less bright than water films and exhibited positive [b\*] values indicative of their yellowish colour. Moreover, as expected, infusion films showed significantly greater TPC and AA values compared to water films. The type of biopolymer was important for all measured properties. The presence of carrageenan led to films with greater moisture content, that were more opaque, less bright, stronger and stiffer than the remaining films. The films with carrageenan had the lowest TPC and AA values among the films. More or less, the behaviour of the mixtures departed from that of their constituents.

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