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**Pollen from argentinian meadows:  
colour characterisation and FTIR analysis**

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**Abstract:**

Research on the properties and benefits of bee pollen has expanded in recent years to add value to this beehive product. The chemical composition (sugars, amino acids, fatty acids, minerals, vitamins, and phenolic compounds) and colour of bee pollen are variable due to differences in the botanical origin. The present study aims to study the spectroscopic and colour properties of several bee pollen samples belonging to different flora and species. The pollen was collected in 2023 from apiaries in Balcarce (Argentina) and kept refrigerated until analysis. The pollen loads were manually separated by colour, obtaining six samples, and coded as follows: opaque reddish P1, cream P2, reddish P3, yellowish P4, opaque green P5, and light yellow P6. The colour coordinates of the pollen grains were determined with a chroma meter. FTIR spectroscopy was performed on the pollen grains to look at their composition and correlate the spectra with the colour of each type of pollen. The values of the colour coordinates ( $L^*$ = 64.49 to 42.42,  $a^*$ = 8.75 to -10.18, and  $b^*$ = 70.74 to 8.79) revealed a wide variation in the colour properties of the different samples. The IR spectra of the pollen samples showed similar characteristic peaks  $1735\text{ cm}^{-1}$ : carbonyl fraction stretch mode,  $1637$  and  $1547\text{ cm}^{-1}$ : bending mode of  $\text{CH}_2$ ,  $1515\text{ cm}^{-1}$ :  $\text{C}=\text{C}$  stretching vibrations,  $1415\text{ cm}^{-1}$ :  $\text{C}-\text{H}$  deformation vibration,  $1373$  and  $1343\text{ cm}^{-1}$ :  $\text{CH}_3$  bending vibrations, however, several peculiarities can be found in the pollen samples due to small differences in chemical compositions. Variations in molecular vibrations in the range of  $1750$  to  $1500\text{ cm}^{-1}$  of the P4 and P5 pollen samples were observed through the spectra. In the region between  $1150$  and  $950\text{ cm}^{-1}$ , variations in peaks and intensities in P2 and P5 were also observed compared to the others. The combination of colour properties and spectroscopic methods is a powerful tool for the discrimination of bee pollen and, therefore, can evaluate the quality and composition of this beekeeping product, providing added value to beekeeping.

**Keywords:** pollen, composition, colour, FTIR-ATR

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