VOLATILE COMPOUNDS AS BOTANICAL MARKERS OF HONEY

G. ARONNE[1], M. GIOVANETTI, V. DE MICCO[1], A. PADUANO[2], R. SACCHI[2]
[1]Laboratory of Botany and Reproductive Ecology, Dept. ARBOPAVE, University of Naples Federico II, via Università 100, I-80055 Portici (Naples), Italy, aronne@unina.it; [2]Department of Food Science, University of Naples Federico II, via Università 100, I-80055 Portici (Naples)

Honey is the synthesis of an important bee-plant interaction. Bees look for the nectar produced by flowers in order to provide energy intake to themselves as well as to the brood. They add to it enzymes that change its original chemical composition. Plants produce nectar to attract insects (and, in some cases, other animals) to allow cross pollination and diversify attraction modes, evolving flowers that change in size, shape, scent, reward.

Honey is then characterised by several elements, that enhanced its appreciation on the market. Since the economy of this product grew and globalization opened up new trade routes, the need of a proof of its authenticity and origin is becoming more compelling. Traditionally, the approach used to verify the botanical origin of honey referred to melissopalynological analysis, i.e. the taxonomical classification of pollen grains by means of microscopic examination. This method is unfortunately time consuming and needs qualified and well trained experts. Similar conditions are required if applying organolectic and physical analysis, including examination of colour, taste, smell and the crystallisation process.

Recently, advances in technology and chemical analyses provide the tools to test variability in honey aromas using SPME-GC/MS (solid phase microextraction – gas chromatography coupled to mass spectrometry). This technique focuses on volatile compounds, isolated and identified to look for discriminating ones. Honeys of different botanical and geographical origins have been already analysed and some possible markers already identified. Nevertheless, so far is frequently missed a somehow obvious link: the possible direct source of the volatile fraction. For this reason, we started a long term project aimed at filling this gap and at providing 1. a better understanding of processes involved in fragrance transfer (from flowers to honeys) and 2. a new effective tool, that could be employed to assess the botanical origin of honeys through a quick and affordable analysis.

We started focusing on some appreciated unifloral honeys (chestnut, orange blossom and acacia), we selected known samples and performed classical analysis (melissopalynological and physical ones) to ascertain their origin. We also collected fresh flowers of each dominant species (*Castanea sativa* Miller, *Citrus* spp., *Robinia pseudoacacia* L.). The following steps involved SPME-GC/MS analysis of honey samples and flowers (whole and single parts): optimisation of volatile extraction protocols and identification of individual compounds. Moreover, we proceeded with the linkage between compounds found in flowers and in honeys, establishing when possible their biogenesis.

Results underline the adequacy of an approach that starts from volatile compounds found in the floral source to detect those actually involved in the aroma characterisation of the corresponding honey. This approach could be used for routine analyses of the botanical origin of honeys, while melissopalynological analyses could be applied for controversial features.

INDICE