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POLYPYRROLE POLYMERS USED FOR 2,4,6-TRICHLOROANISOLE DISCRIMINATION IN CORK STOPPERS BY LIBRA NOSE

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INTRODUCTION

Cork, by means of its chemical and physical properties, is a material important to guarantee wine's good conservation and quality. Sometimes, unfortunately, the use of cork can damage wine fragrance making it undrinkable, by masking its aroma and giving the classical "taste of cork" [1]. This awful smell is mainly due to 2,4,6-Trichloroanisole (TCA), a molecule deriving from moulds like Armillaria mellea. TCA can be revealed by the human olfaction starting from very low level (around 6 ppm).

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A polypirrole-derivates nano-gravimetric sensors for Electronic-nose application, with high affinity for many classes of volatile organic and inorganic compounds (VOC), have been developed in order to discriminate the presence of 2,4,6-trichloroanisole in cork stoppers

MATERIAL AND METHODS

Seven different patent-pending polypyrrole-derivative polymers have been obtained at Technobiochip, as shown in Table 1. Polymers were deposited onto 20 MHz AT-cut quartzes crystals with gold surface (Nova Mistral,IT). The modified quartzes were applied in an electronic nose system (Libra NOSE 2.1), based on QCM technology, for the determination of gas compounds [2,3]. Samples were collected from polluted and clean corks and stored at room temperature for about 18 months to remove any trace of alcohol and tainting compounds. They have been analyzed in a random manner in three different days.

All the acquisitions were performed using alternately not polluted and polluted stoppers in order to minimize the drift sensor.

Measurements were performed using atmospheric air for both sample and reference channel to minimize environmental effects. Data analysis was performed with Principal Component Analysis (PCA) using the "NasoStat" software developed by SIGEDA (Milan, IT).

Sensor #	Aldehydes	Polymers
1	Phenanthre-9-aldehyde	Poly [2-(-9 phenanthrylmethyl)]-1H-pyrrole
2	Trans-cinnamaldehyee	Poly (2-[2-(2E)-3-phenylpro-2-enyl]-1H-pyrrole
3	Ferrocene carboxaldehye	Poly [ferrocene]-1H-pyrrole
4	Benzaldehyde	Poly 2- (benzyl)-1H-pyrrole
5	Anisaldehyde	Poly [2-4 (methoxybenzyl)]-1H-pyrrole
6	3-Hydroxy 4-Methoxybenzal-dehyde	Poly [2etoxy-5-(1H-pyrrol-2-ylmethyl)] phenol
7	Thiophene-2-carboxyaldehde	Poly [2-[thien-2-ylmethyl)]-1H-pyrrole

Table 1: ACTIVE MATRIX USED

RESULTS

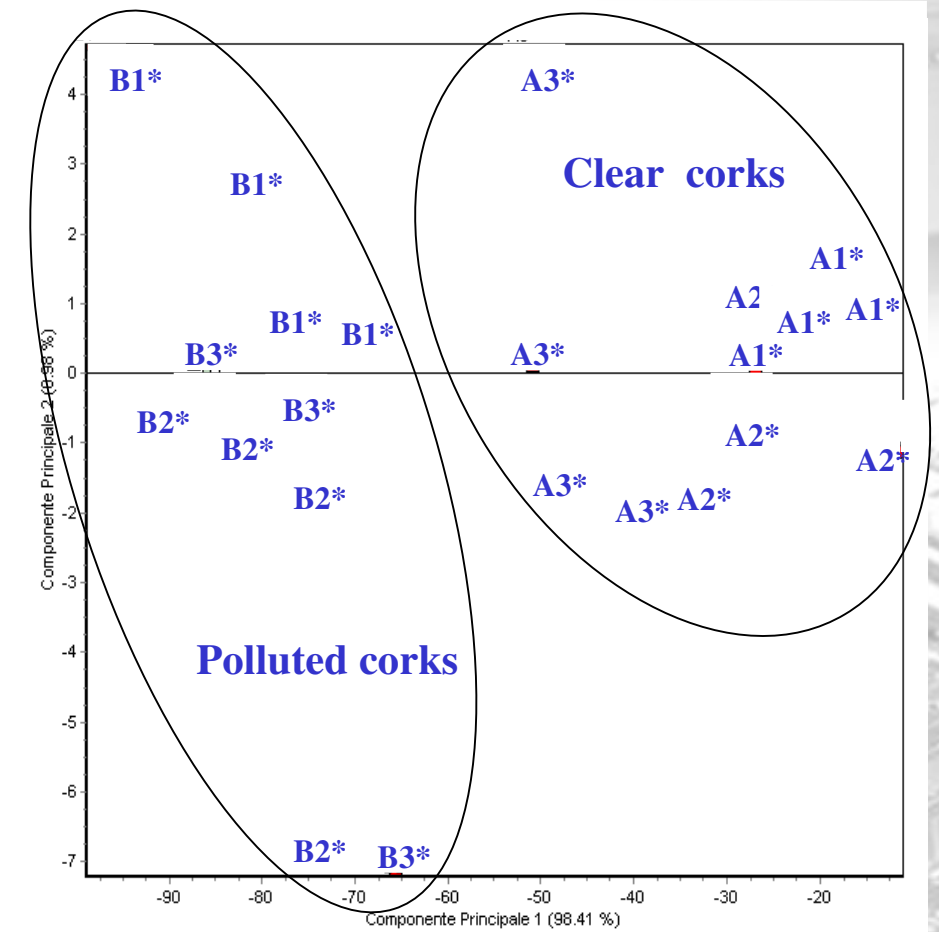

Figure 1: Principal Component Analysis (PCA)

As shown in Fig. 1, PCA data space is clearly divided into two areas, showing all the signals of both tainted (B1-B3) or not tainted (A1-A3) cork stoppers plotted on left or right side, respectively.

CONCLUSION

LibraNOSE, thanks to the high affinity of polypyrrole polymers for volatile organic and inorganic compounds (VOC), appears to be a suitable and convenient sensor system to evaluate the presence of TCA in cork stoppers.

REFERENCES

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