Organophosphorus pesticides (OPs) constitute nowadays the most widely used class of available pesticides. OPs are not only highly toxic to insects but also to human beings. In fact they are one of the most common causes of poisoning of humans across the world via intoxication through inhalation, ingestion or skin absorption. Optical sensing of OPs using chromogenic probes is particularly appealing because colour modulations can be measured using low-cost systems, or in some cases they can be easily detected by the naked eye. In this field, the design of array-based systems (also known as optoelectronic noses) is becoming increasingly popular due to their capability of multianalyte sensing and versatility and the possibility to be applied in complex systems.

Chemically, OPs can be classified in three main groups, namely organophosphates, which contain a P=O bond (axon pesticides), organothiophosphates, in which the oxygen has been replaced by a sulfur atom, (P=S, thions), and organophosphonates which are closely related to nerve agents such as Sarin, Soman or Tabun.

Inspired by our own experience in the field, a 12-member colorimetric array, based in the use of push-pull chromophores containing reactive sites, has been prepared and used for the detection or classification of different pesticides in water. A clear classification was observed for Malathion, Leptophos, Dichlorvos, Dibrom and Diazinon.

Moreover the chromogenic array was able to detect and predict concentration levels of Diazinon in leaaves from orange trees in the concentration range of $10^{-3}$ M to $10^{-5}$ M.

References