

TITLE: "NEW FAMILY OF DYES".

DESCRIPTION OF THE TECHNOLOGY

The research group has developed a highly efficient synthetic route to obtain a **new type of molecules** (belonging to the indolizine family). They are characterized by its dye properties and whose preparation involves a single starting material, a simpler indolizine. Therefore, it is a very selective self-transformation reaction that occurs under mild conditions (at room temperature and atmospheric pressure).

Moreover, these new molecules are characterized by exhibiting **solvatochromic** properties (it means that its color varies depending on the

solution solvent used), and they have potential applications that can be developed in the future.

Alternatively, the starting indolizine can be synthesized (from commercial materials) without the need of its isolation and purification, and transformed into the dye with **yields above 70%**, but with a decrease in the cost and in the production time compared to current methods to obtain indolizine dyes.

The process is **very simple** (the product can be obtained in a single reactor).

MARKET APPLICATION

- Staining and dyeing materials (plastics, textiles, tanning, paints, cosmetics, etc.).
- Laser recording and reading devices.
- Thermography.
- Photothermography.
- Electrochromic devices.
- Optical filters.
- Photoelectric converters (solar cells), etc.

In addition, it is possible to insert functional groups "on demand" in the molecule in order to **adapt it to the industrial sector of interest**, being able to develop **new applications**.

MAIN ADVANTAGES AND INNOVATIVE ASPECTS

- Indolizine dyes are obtained in **one step** from commercially available materials, unlike current procedures involving multiple steps. This is an advantage in the production process, because **reduces costs, increases the final yield and generates less waste**.
- The procedure is based on a **very simple** treatment that gets **yields above 70%**.
- **It does not need an inert atmosphere, dry solvents or physical activation** (heat or radiation) to obtain the final product.
- Unlike other methodologies (which require temperatures around 100 °C), this procedure (from a simpler indolizine) is carried out at **room temperature and atmospheric pressure**, which **simplifies** the procedure and **reduces production costs**.
- It is an **environmentally friendly technology** because it does not involve solvents such as dioxane, pyridine, chloroform or benzene (they are highly toxic).
- The **selectivity** of the reaction is **very high** (it is obtained with absolute control).

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CURRENT STATE OF DEVELOPMENT

The procedure has been carried out successfully and reproducibly at **laboratory level** with yields above 70% in all molecules that have been synthesized.

The research group has a **pilot plant** that is certified to work under GMPs (*Good Manufacturing Practices*), where it is possible to **scale up to industrial level** in order to provide **multi-kilogram quantities**.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected through **patent application**: "*Indolizinas con propiedades de tinte y procedimiento de síntesis de dichas indolizinas*".

- Application number: P201301191. Application date: 23rd December, 2013.
- PCT application: PCT/ES2014/070921.

COLLABORATION SOUGHT

Search for companies interested in acquiring this technology for **commercial exploitation** through:

- Patent license agreement.
- Manufacturing agreement
- Research cooperation agreement for:
 - ✓ Developing new applications.
 - ✓ Optimizing the synthetic process for a specific sector of interest.

RELATED IMAGES



Dye in the solid and in solution, solvatochromic effect and pilot plant, respectively.

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