

## 1 OBJECTIVES

1. To evaluate the genus *Talaromyces* as an alternative to *Monascus* for industrial production of Azaphilones.
2. To check that the genera *Monascus* and *Talaromyces* produce the same type of pigments.
3. To know how the production methods of Azaphilone pigments in the *Monascus* and *Talaromyces* species are.
4. To know the culture materials and optimal conditions to obtain the maximum yield of azaphilones in both fungal genera.
5. To determine the extraction and purification process of the pigments produced by *Talaromyces* species.

## 3 AZAPHILONE PRODUCTION PROCESSES

### a. Solid-State fermentation (SSF)

In *Monascus* species, higher yields are obtained in SSF than in SmF.



**Figure 2.** Effect of culture conditions on the profile of pigments obtained (Morales-Oyervides et al. 2020)

### b. Submerged fermentation (SmF)

In *Talaromyces* species, pigment production studies have focused on SmF.

Yields and profile of the pigments obtained are affected by culture conditions

**Table 2.** Culture conditions and yields of *T. albobiverticillius* pigments

Year of publication	Temperature (°C)	pH	Agitation (rpm)	Carbon source	Pigment Yield
2016	24	6,5	170	PDB <sup>a</sup>	47,34mg/L (OD <sub>470nm</sub> ) and 192,86mg/L (OD <sub>500nm</sub> )
2019	24	4	200	PDB	1,46g/L
2020	24	6,4	164	PDB	1,92g/L

<sup>a</sup> PDB= Potato Dextrose Broth

## 2 AZAPHILONE PIGMENTS

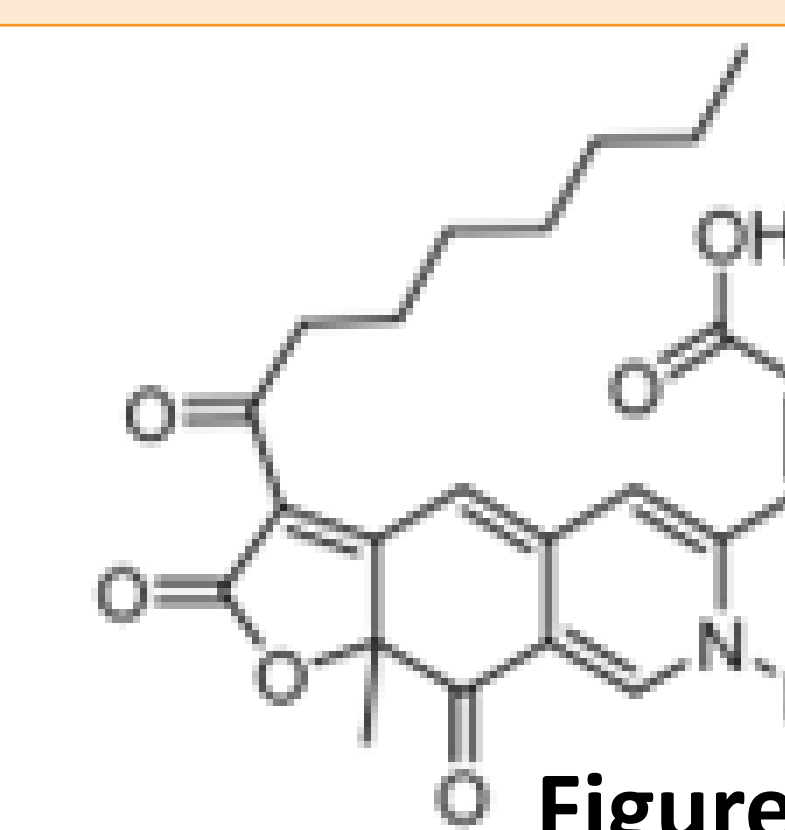
Azaphilones are a family of polyketides characterized by having a bicyclic pyraquinone backbone.

**Table 1.** Structure of the six basic Azaphilone pigments of *Monascus*

YELLOW	ORANGE	RED
Monascin (R=C <sub>5</sub> H <sub>11</sub> )	Rubropunctatin (R=C <sub>5</sub> H <sub>11</sub> )	Rubropunctamine (R=C <sub>5</sub> H <sub>11</sub> )
Ankaflavin (R=C <sub>7</sub> H <sub>15</sub> )	Monascorubrin (R=C <sub>7</sub> H <sub>15</sub> )	Monascorubramine (R=C <sub>7</sub> H <sub>15</sub> )

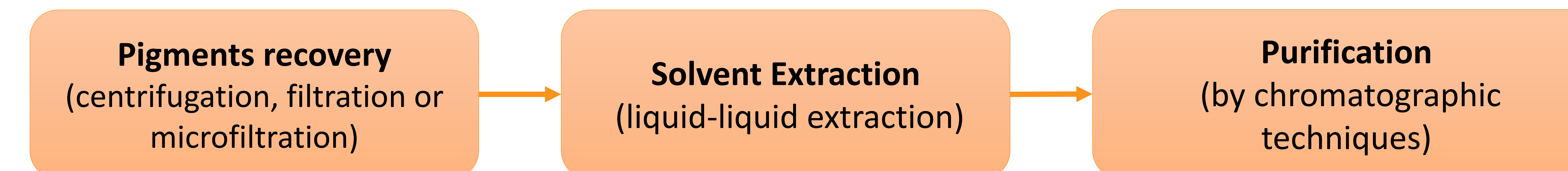
The basic *Monascus* pigments have been identified in species of *Talaromyces*.

In addition, a subgroup of Azaphilones called Atrorosins were identified in *T. atroroseus*.



**Figure 1.** Atrorosins structure (Isbrandt et al. 2020)

## 4 AZAPHILONE OBTAINING PROCESS IN TALAROMYCES SPECIES



## 5 CONCLUSIONS

- *Talaromyces* species are a good source of Azaphilone pigments.
- Can produce unique azaphilones such as Atrorosins.
- These species do not produce any mycotoxins.
- The pigments production process needs to be optimized to obtain higher yields.