

# CONDITIONS OF GEOSMIN PRODUCTION OF FUNGI FROM GRAPE BERRIES

For several years, organoleptic deviations called earthy-mouldy taste were observed in wine from several French vineyards such as Val de Loire, Bordeaux or Beaujolais. Though many molecules could be incriminated, Darriet et al. (2000) showed that the main molecule involved in earthy-mouldy deviation was geosmin. This molecule is produced precociously on grapes by filamentous fungi. Investigations on the production conditions of fungal communities from grapes could improve our knowledge concerning the control of this sensorial defect linked to the presence of certain fungi.

## MATERIAL AND METHODS

### ◆ Capacity of geosmin production

Many species were collected during 2002, 2003 and 2004 vintages on three different concerned vineyards. The isolated strains were tested for their geosmin production on Petri dishes. The molecule was quantified by the method described by Schneider et al. (2005).

### ◆ Influence of main factors

The factors tested were:

- **physiological state:** mycelium and spore were considered: these states were defined on Petri dishes
- **grape varieties:** three grape varieties were chosen
- **temperature:** this parameter varies from 15 to 25° Celsius
- **hygrometry:** this parameter varies from 60 to 90 % of humidity.

These two last parameters were controlled in a climatic chamber (photo).

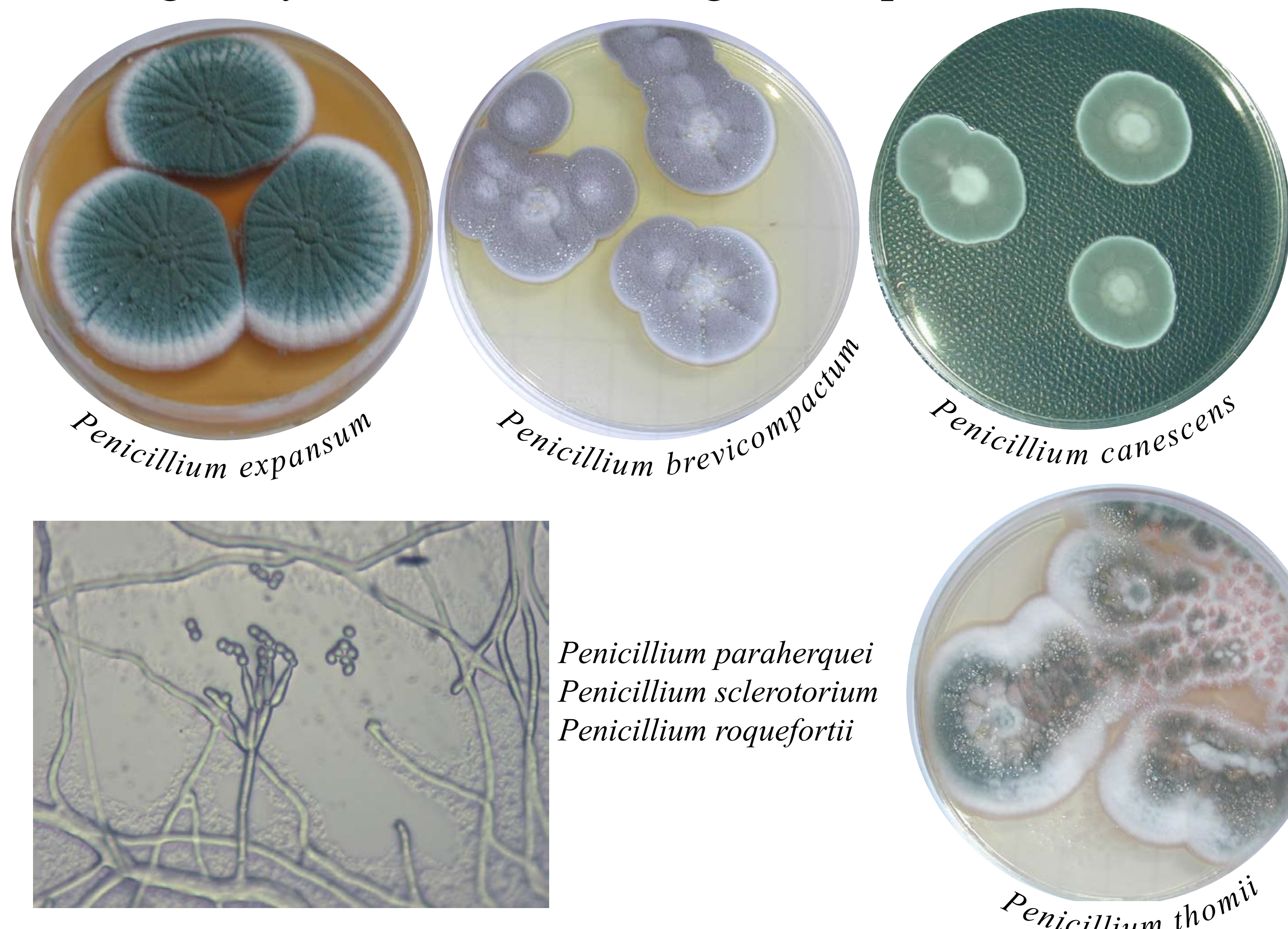


Inoculation of *P. expansum* on Gamay berries

## RESULTS

### ◆ Capacity of geosmin production

Among many strains isolated, the geosmin producers are:



All strains of *Penicillium expansum* tested are producers of geosmin, whereas all strains of the other species of *Penicillium* are not producers.

### ◆ Influence of physiological state, temperature and hygrometry

- the concentration of geosmin on Petri dishes was higher when the fungus was in the shape of **mycelium** than in the shape of spores,
- the growth and production of geosmin by fungi were higher in the climatic conditions of **25°C** and **90 %** of humidity (figure). These results depend on the sensibility of the grape varieties (**Gamay** and **Alledo**) and on the realisation of pinholes on the berries.

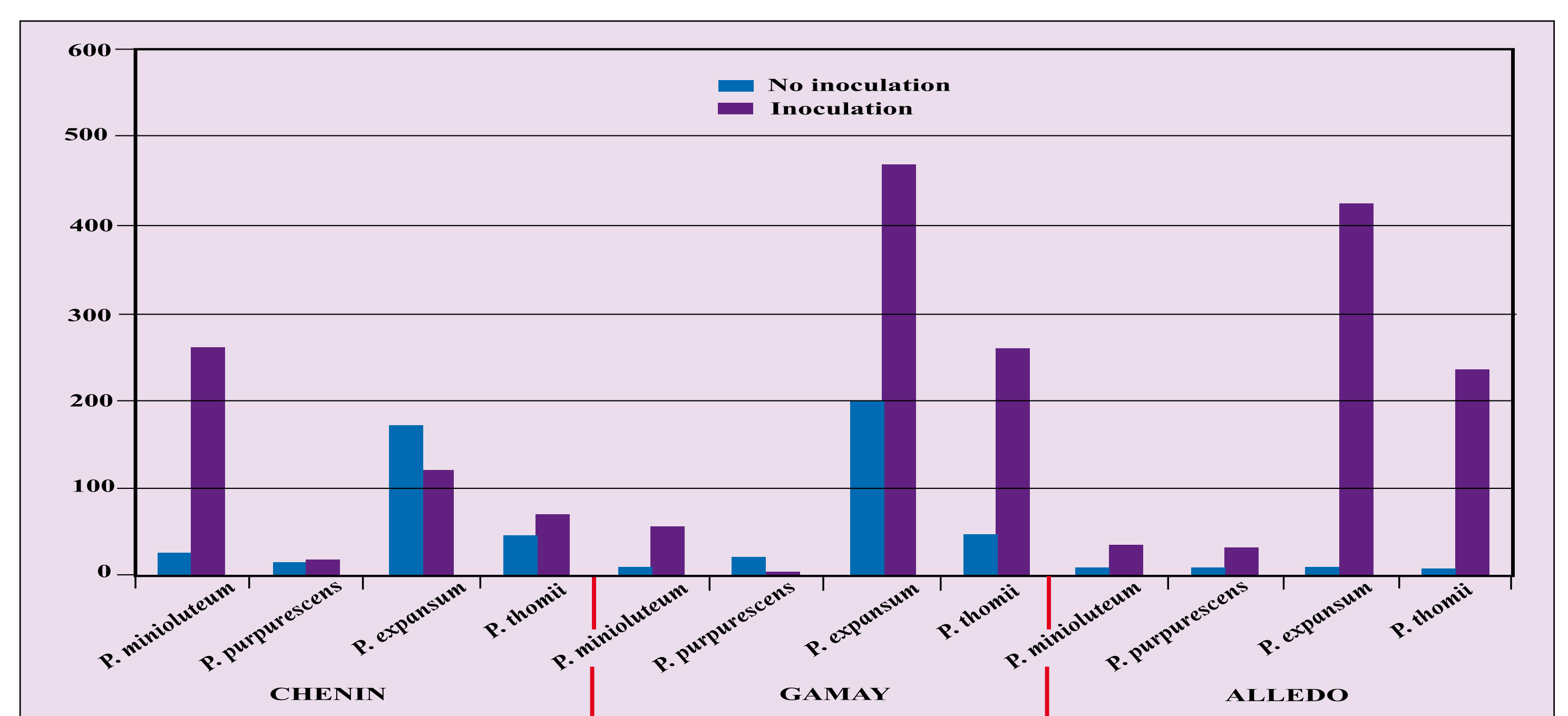


Figure: Inoculation on grapes of different strains, producers of geosmin : *P. expansum*, *P. thomii* and non producers of geosmin : *P. purpurescens*, *P. minioluteum*. The conditions tested are : 25°C, 90 % of humidity and 6 days of growth

## CONCLUSION

It seems that the production of geosmin by these fungi strains depends on their physiological states (mycelium, spore), the climatic conditions (temperature and hygrometry), the grape varieties and their possibilities to colonize the berries. This first data could help establish a better control of geosmin production in the vineyard.

### Bibliographie :

- Darriet P., Pons M., Lamy S. and Dubourdiou D. 2000. Identification and quantification of geosmin, an earthy odorant contaminating wines. J. Agric. Food Chem., 48, p. 4835-4838.  
Schneider R. Guérin L., Vincent B. et Baumes R. Stable isotope dilution assay of 3-propyl-2-methoxy-pyrazine, 2-methylisoborneol and geosmin in Petri dishes, musts and wines using SPME and GC-MS/MS. In vino analytica scienta, 7/9 juillet 2005, Montpellier.