In order to study the peppery typicality of Gamay N wines from cool climate vineyard a study was conducted on 21 Gamay N wines from the 2013 vintage and from 4 French viticultural areas (Auvergne, Beaujolais, Loire Valley, and South West). This research work contains a sensory, chemical and consumer part and was inspired by a study conducted by Lund et al. (1) on Sauvignon Blanc.

**MATERIAL AND METHODS**

- **Wines**: The 21 wines selected for the study were from Auvergne (n = 12), South West (n = 1), Loire Valley (n = 2) and Beaujolais (n = 6). They were selected on the basis of being predominantly from Gamay grapes (>85%) and their retail price varied from 4.50 to 9.00 euros.
- **Sensory Analysis**: 8 trained panelists assessed relevant attributes related to aroma and taste on a 5-point rating scale.
- **Analyses**: Conventional enological parameters and rotundone were determined.
- **Consumer study**: Four wines were chosen to participate in a consumer study (n = 97). Ranking tests were performed and the consumer panelists had to carry out an olfactory assessment based on aroma preferences. Wines were ranked from 1 “their favourite” to 4 “the less appreciated”.
- **Statistical treatment**: Statistical analyses including linear regressions were conducted with Xlstat software (Addinsoft, France). Olfactory data were treated through PCA and AHC. AHC was used to select four wines with distinct sensory profiles for the consumer study.

**RESULTS AND DISCUSSION**

- **Sensory analysis**
  - The PCA plot shows that four attributes explain the main differences observed between the 21 Gamay N wines of the study: intensity, fermentative/lactic, fermentative/amyllic and spicy/peppery. The scores discriminated a group of wines from Auvergne with similar sensory characteristics (A-1, A-2, A-3, A-5, A-6, A-7, A-10 and A-12) and heavier peppery notes. S-1, B-4 and B-6 wines had pronounced fermentative/amyllic notes, and B-1 and B-5 showed a fermentative/lactic aroma sensory profile. The other wines of the study showed less distinctive aroma profiles.
  - **Rotundone in wines**

Wines from Auvergne show higher rotundone concentrations which is in accordance with the sensory observations. They were produced using traditional winemaking techniques whereas the other wines all contained a percentage of wine produced by semisancarmonic [whole berries] maceration or prefermentation heat treatment of grapes. As rotundone is a hydrophobic compound, these higher levels may reflect a real “terroir” effect or arise from specific winemaking techniques. Climatic indices calculated for the winegrowing area showed that Auvergne was i) the coolest vineyard over the whole wine-growing season and the ripening period, and ii) the wettest during the veraison-harvest period. Therefore in accordance with previous results (2), its “terroir” is the most likely factor explaining the differences observed between the wines from Auvergne and the other regions of the study. These differences may be further amplified by the winemaking techniques. For the whole data set, a significant correlation was observed between peppery aroma scores and rotundone concentration in wine (r2 = 0.66).

There was high variability in rotundone content among the 12 wines from Auvergne. Wine rotundone concentrations were mapped according to the plots from which the grapes were primarily sourced and the rotundone distribution did not appear to be spatially structured. The only parameter that accounted for the variability among the wines was alcohol content and there was a significant positive correlation between this alcohol content and rotundone (r2 = 0.44).

- **Consumer study**
  - Four wines showing distinct sensory profiles were selected for the consumer study. S-1 had higher aromatic intensity and heavier fermentative/amyllic and fermentative/lactic notes. B-1 had a more complex profile marked by significantly higher "lactic" notes. A-6 and A-8 were characterized by "peppery" and "green" notes. Regarding the olfactory assessment of the wines, there were no significant differences according to Friedman’s test between the four wines. A lack of consensus was observed for wine S-1 and A-8. The group of consumers who preferred the ‘amylic’ wine frequently rated the ‘peppery’ wine as the least appreciated and vice versa. This led us to think that there is an opposition between the consumers who preferred the ‘amylic’ and the ‘peppery’ wines. Consumers who rated the ‘peppery’ wine as the most appreciated were managers and professionals who are willing to pay more for a bottle.

These results that scientifically investigated the typicality and originality of Gamay N wines from Auvergne should assist winemakers from this region in promoting their wines. They allow them to take advantage of the knowledge on rotundone obtained in another wine-growing regions with the aim to produce wines with a desired level of peppery aroma. The consumer study provides the key parameters for developing the Côtes d’Auvergne Gamay N wine range and adapting the products to consumer profiles.

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**CONCLUSIONS**

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