Brief Note

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Wines with Biogenic Amines

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Brief Note

When a high concentration of biogenic amines is ingested, it has unfavourable physiological consequences. Biogenic amines can be found in a variety of foods and drinks. Amino acids can be decarboxylated by lactic acid bacteria. Biogenic amines can develop when winemaking involves the cultivation of lactic acid bacteria for malolactic fermentation. However, these activities are not present in all bacterial strains. Some wines in the same wine-producing region may have extremely low levels of biogenic amines, while others may have quite high levels. Based on the presence of the gene encoding histidine decarbo, it is now feasible to detect the presence of unwanted histamine-producing bacteria using a PCR test or DNA probe.

Amines have a crucial function in the metabolism of living cells.. The most dangerous is histamine, which can be amplified by other amines. Human sensitivity, on the other hand, differs according to the individual detoxifying processes of the human body. Biogenic amines, particularly histamine, are fixed in the intestinal mucosa by mucin. Some are absorbed if their concentration is too high. Furthermore, certain enzymes involved in biogenic amine metabolism are specialised, such as histamine methyltransferase, while others, such as monoaminoxidase and diaminoxidases, are not.

Even if each individual product isn't regarded dangerous, it's possible that consuming fermented meals and beverages at the same time produces problems. Amino acids may be decarboxylated by a wide range of microorganisms. Because it causes a rise in pH, this response is considered to benefit growth and survival in acidic conditions. Several amino acids can be decarboxylated in wine, resulting in the presence of histamine, tyramine, putrescine, cadaverin, and phenylethylamine, with the first three being the most common.

HDCs from Gram-positive bacteria previously examined belong to a category of pyruvoyl-dependent enzymes, in which the decarboxylative processes are mediated by a pyruvate residue connected to the protein. Consumer demand for better and healthier meals has rekindled interest in biogenic amine research. A number of analytical approaches have been offered.

Currently, accurate and dependable high performance liquid chromatography is utilised for a variety of foods, particularly wine analysis. Furthermore, with the use of chosen starters, the microbiology of fermented foods and drinks, which was formerly restricted to the natural growth of indigenous microflora, is now more regulated and technologically improved. Almost all red wines and most white wines require malolactic fermentation following alcoholic fermentation. Its main effects are de-acidification due to malic acid decarboxylation and sensory quality complexification due to secondary bacterial metabolism.

Because biogenic amines are generated by decarboxylation of amino acids, this assumes that the bacteria in the wine have all of the required enzymatic equipment (decarboxylase and transport system), as well as adequate amino acids. The presence of amines is closely linked to the microbiota, as well as the amino acid content of the wine during alcoholic fermentation. Furthermore, lactic acid bacteria discover more peptides and free amino acids to hydrolyze and decarboxylate if wines are kept in touch with yeast lees. This explains why certain wines made with longer lees contact have a greater amount of amines. Another explanation is because bacteria's decarboxylating ability varies greatly depending on strain.

In this regard, pH is the most significant element in influencing not only the biological activity but also the diversity of bacteria in wine. After malolactic fermentation, the wine is sulfited to remove any yeasts or bacteria that are no longer acceptable. This would typically keep microbes from changing the makeup. However, the amount of certain molecules varies, as is the case with biogenic amines. Histamine, tyramine, and putrescine levels have been shown to rise in Chardonnay and Pinot noir after malolactic fermentation and ageing in Burgundy wines. Histamine is the most common biogenic amine discovered in wines.

Histamine studies have revealed that the frequency of undesirable strains is more than previously assumed, that their existence is unpredictable, and that the activity is not confined to the species level but rather defines strain. Biogenic amines are always present in certain cellars, regardless of the vintage, whereas they are never present in others. As with histamine, the lack of amino acid-decarboxylating bacteria is likely the cause in the later cases. Wine lactic acid bacteria are found on wine cellar equipment and come from the natural microflora of grape berries. They are naturally chosen throughout the winemaking process, but commercial malolactic starters can overgrow them and destroy them.

Currently, there are no restrictions on the amount of biogenic amines allowed in wines. However, it is possible (and has already happened) that wines may be rejected on some markets due to excessive amounts of biogenic amines. Furthermore, it is natural for winemakers to be worried about this issue and take it into consideration in order to produce high-quality wines. In recent years, we have shown that lactic acid bacteria create biogenic amines and discovered that *O. oeni* strains are involved in histamine production.

Hybridization with particular DNA probes for HDC detection and *O. oeni* species revealed that they are both common and rare in some basements. To improve the extractability of phenolic compounds and the concentration of aroma precursors, grape ripeness is extended as much as feasible. As a result, the overall acidity is reduced and the pH is greater. This has a side impact since pH is the most efficient determinant for bacterial selection. Indeed, as pH rises, so does the quantity and diversity of microbial populations.