

## Guidelines for Fermenting and Distilling in Schools

Teachers strive to interest enthuse and encourage students in science and technology in order to maximize their learning. Use of relevant and topical contexts assists in this. Beer and wine making is a very powerful authentic learning context for students because of the profile of these industries within New Zealand's commercial activity as well as the profile that the products and their use has in everyday life.

We do not wish to break the law in our attempts to make learning effective and enjoyable, and we do want to keep our students safe in terms of the use of alcohol. We need to balance these constraints against the potential that brewing and winemaking has to engage students in rich and effective learning experiences in science and technology.

Current legislation requires that any premise upon which ethanol is prepared or distilled be licensed with NZ Customs for this practice. Home brewing is exempt, exemption is being sought for schools providing the ethanol production or distillation is carried out within the following guidelines.

Should schools wish to ferment and/or distill larger quantities of spirituous beverages than permitted within the following guidelines, they will need to be licensed and comply with the recording and payment of excise duty required. A licence may be obtained from HM Customs (address), accurate records of quantities involved must be kept, and excise duties paid.

Consideration of the ethics and legislation regarding consumption of alcohol by minors or the provision of alcohol to others requires schools to develop appropriate policies; these will need to include any brewing or winemaking practices carried out at school as part of teaching programmes.

### **Outline:**

The production of alcohol by fermentation and/or the distillation of the resultant mixture is currently carried out in some classroom science or technology programmes in schools in New Zealand.

Teachers value the opportunity for students to observe fermentation in bread dough and beverage manufacture. Distillation on a small scale is demonstrated in a laboratory setting. Fermentation is a valued context for the teaching of microbiology and biotechnology.

In a health context student awareness of safe alcohol use is beneficial in countering New Zealand's culture of binge drinking.

Vocationally, student experience of the processes and skills required in the wine and beer industries enhances their awareness of future career options and pathways to pursue them.

### **Current Practice:**

Fermentation is a component in the current science and technology curricula and may include the production and/or distillation of alcohols, usually ethanol.

To demonstrate distillation as a standard separation process, small volumes of ferment or WP methylated spirits are often used to distill off a very small amount of condensate. . This may be followed by the burning of the condensate to show the presence of alcohol, or by other safe disposal in accordance with HSNO Guidelines. Fractional distillation can also be demonstrated using WP methylated spirits.

In addition the oxidation of ethanol can be contextualised by considering breath and blood testing as everyday applications of chemistry.

In biotechnology and microbiology the fermentation process provides readily accessible learning experiences that can be used at all levels. Fermentation involves using yeast for the enzymatic conversion of glucose into ethanol and carbon dioxide. This process will occur, for example, in the making of bread, ginger beer, beer and wine.

Effective technology teaching requires an authentic need or opportunity from which a brief can be developed. The wine-making and brewing industries provide this need, ranging from choice of grape, through to the technological process of production to product labelling.

Some schools are offering cross-curricular courses, drawing for the assessment from elements of, for example, the social studies, health, technology and science curricula, and incorporating careers and industry unit standards. The cultural practices involved in the production and consumption of alcohol can be a valuable context. Such courses could cover the horticultural and technical processes through to considering cultural and social values surrounding alcohol consumption.

Schools need to be able to take advantage of the opportunities offered by local industries to engage and motivate students, as well as initiating interest in available careers. For example, as New Zealand continues to develop its niche at the high quality end of the international wine market, schools play a role in educating future workers for the industry and discerning consumers of wine. Links between schools and the wine industry can be fostered more effectively if students are able to have direct experience of the brewing and distillation processes involved.

Any fermentation or distillation processes must be carried out in line with policies determined by the school's Board of Trustees as well as relevant codes of ethical practice and legislation relating to fermenting and distilling. This may include the requirement for parental consent prior to beginning the activity, and ascertaining any allergies/ food sensitivities of individual students.

Fermentation practices:

- Teachers shall model conventional practice, and if in doubt should refer to standard references (eg library search, website, brewing experts).
- Containers made of non-reactive materials shall be used eg stainless steel, glass and plastic.
- All equipment used shall be clean, appropriate to the use and kept only for that particular purpose i.e. dedicated equipment.
- Safe food handling practices shall be adhered to, and equipment shall be sterilized before use.
- Commercially available yeasts shall be used eg purchased from a supermarket or specialty brewing shop.

Allowed alcohol fermentation and distillation activities include:

1. bread making
  - dough fermented in the laboratory shall be made with dedicated equipment, or used as demonstrations of the process, or as part of an investigation eg where the rate of gas production is measured.
  - bread intended for consumption shall be made with dedicated equipment or prepared in appropriate facilities eg school kitchen, food technology room
  - before consumption bread shall be baked to evaporate any alcohol produced during fermentation
2. ginger beer
  - fermenting in the laboratory shall be carried out in dedicated equipment, or as demonstrations of the process, or as part of an investigation eg testing different methods for preparing a starter 'bug' for ginger beer,
  - ginger beer intended for consumption shall be prepared with dedicated equipment, or in appropriate facilities eg school kitchen, food technology room.
  - teachers should be aware that the alcohol content of ginger beer can vary considerably, and could reach as high as 15% when using bakers' yeast.
  - Tasting may only be carried out as part of normal quality control procedures and shall be limited to a minimum volume

- at the end of the fermentation period bottled ginger beer shall be passed directly into the care of the child's parent/guardian, or alternatively, be safely disposed of.
3. beer and wine making (Year 12 and 13)
    - fermenting in the laboratory shall be carried out in dedicated equipment, or as demonstrations of the process, or as part of an investigation (eg testing different yeast types)
    - teachers should be aware that the alcohol content of beer/wine can vary considerably, and could reach as high as 15% when using commercial yeast.
    - fermentation shall be carried out following a conventional method, with supervision by the teacher/expert.
    - Tasting may only be carried out as part of normal quality control procedures and shall be limited to a minimum volume
    - wine and beer production in a school shall be limited to an alcohol volume of 500 mL per participating student per year.
  4. distillation
    - quantities of ethanol distilled will be kept to the minimum required for the demonstration eg to produce up to 50mL of condensate.
    - any condensate produced will be either combusted, or disposed of, in the appropriate manner.
  5. biofuels
    - investigations producing biofuels will be limited to the minimum volume required to satisfactorily carry out the investigation
    - any excess biofuel will be either combusted, or disposed of, in the appropriate manner.

Should schools wish to use the context of brewing or wine making in their technology education programmes, then they should adhere to the requirements and processes as for a commercial operation. This would require licensing by NZ Customs, maintenance of the records required as a part of licensing and payment of excise duty. In such a case, schools would not be required to meet the above guidelines for exemption. However, any alcohol produced could not be consumed by the students themselves, nor could it be given or sold to any other person unless the school also complied with Sale of Liquor regulations.