



# The importance of peat for whisky production

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## Summary

For centuries, one of Scotland's most famous products has been its whisky. This barley-based product, malted and distilled, is surely the finest alcoholic beverage in the entire world. The distinct flavour is found in its peaty taste which is produced in the early malting process by adding peat smoke or 'reek' as it is known in Scotland. Peat is used during the malting process, when the barley is dried after sprouting. It seems essential that peat from Scottish moors is used. Peating the fire is a skill of the maltster, who knows the required amount of peat to be burned. The suppliers of peat are becoming hard to find, since in Scotland it is now impossible to develop new bogs. This presents a threat to the whisky industry that is neither justified nor fully appreciated.

**Key index words:** malting peat, peatiness of whisky, peat for distilleries, sod peat.

## Introduction

Whisky is produced in most areas in Scotland, from the Orkney Islands in the north to Berwick on Tweed in the south and from Aberdeenshire in the east to the islands of Islay and Skye in the west. 60-70% of the distillers are in north-east Scotland from Inverness along the Moray coast to Aberdeenshire. The whiskies from this area are usually prefixed by the word Glen, being the valley from which the water is obtained. Here it is said that the distillers put more emphasis on the flavour derived from the sherry or oak casks in which the whisky is stored and matures, than on its peatiness.

In the west, particularly on the islands of Skye and Islay, the peatiness of the whisky is of greater importance. Traditionally the main fuel for drying the malt would have been peat since neither gas nor coal were readily available on these islands. During the first half of the 20<sup>th</sup> century, coke from the coal mines in central Scotland was the principal form of energy and peat was only added in varying degrees to give the required amount of smokiness to flavour the malt. The peat was added to the kiln by shovel by the maltster, where personal skill determined the amount required. To this day, there has never been any written formula for the correct amount of peat to be added, and even the maltsters admit that peatiness can vary, depending on the maltster in charge at the time.

The types of peat used vary considerably, although the older, darker sedge peats in eastern Scotland are thought to give the best results. An air dry moisture content of between 50 and 55% enables the peat to burn more slowly and produce the maximum amount of smoke in the kiln. On the island of Islay, the blanket bog peat induces an even smokier flavour and is used in greater amounts. Islay distillers are very reluctant to use peat from any other source.

To grow barley and transform it into malt is halfway towards the making of whisky. While it is easy to obtain sugars from fruit i.e. grapes or apples, grain is less yielding. Firstly the barley is placed in large chambers where water is added to induce sprouting. When the sprouts reach a certain length, perhaps 3-4mm, the water is drained off through a perforated floor and warm air is blown in to re-dry the barley. This is the first step towards the unlocking of the sugars in the barley for the process of malting. During the process, peat smoke is introduced and this is blown through the barley to add the peaty flavour. Up to the mid 1960s most of the distillers made their own malt, buying their barley from local farmers or grain merchants. It became evident then that the maltings with their bigger capacity, accuracy and quality control could produce a better and cheaper malt. This allowed more time and room for expansion, thus increasing their whisky production. Now fewer distillers make their own malt and usually only as a visitor attraction, which is very popular with holiday-makers during the summer.

## Malt whisky and its production process

### *The history and development of malt whisky*

The art of distillation is thought to have first been attempted in Asia as long ago as 800 BC and to have found its way to Europe via Egypt. In the British Isles it is unclear as to whether the practice originated in Wales, Ireland or Scotland. The first recorded mention of distilling in Scotland was in 1494 in the Exchequer Rolls: 'And by payment made by Brother John Cor by the King's command, to make aquavite within the period of the account, 8 bolls of malt' *Aqua vitae* (water of life) is the generic Latin name given to early distilled alcoholic



beverages irrespective of their basic raw material. The Gaelic translation of *aqua vitae* is 'uisge beatha', the corruption of which gave 'uisge', then 'usky' and finally whisky which became an official name in 1755 when Dr. Samuel Johnson entered the word in his dictionary.

In Scotland, distillation was originally the domain of the abbeys and monasteries. During the sixteenth century, the dissolution of the monasteries resulted in the spread of distilling knowledge from the monks to others. The resulting widespread production of whisky necessitated the Act of the Scottish Parliament of 1579 which allowed whisky production by lords and 'gentlemen' only. This was an attempt to decrease the detrimental effect distillation was having on grain supplies. After the Union of Parliaments in 1707, the English revenue staff crossed the border to begin their lengthy attempts to bring whisky production under control. It was realised that significant revenue could be collected from the ever growing distilleries of Scotland, and by 1756 duty paid on spirit had increased to eight times that of 1708. A trend of stricter regulation and increasing taxation characterised subsequent years as well as short periods of prohibition, generally provoked by disastrous grain harvests. Illicit distilling flourished, the smugglers seeing no good reason for paying for the privilege of making their native drink.

Following the Act of 1823, there was a dramatic rise in legal whisky production – within two years production almost tripled. During this time, a differentiation was made between grain and malt distilling with Highland whisky becoming exclusively single malt while Lowland grain distilleries used only a small amount of malt.

The expansion of the whisky industry was driven by several technical developments. Grain whisky production increased due to the development of continuous stills. One of the reasons whisky dominates the world market, rather than cognac for example, is that large amounts can be made using continuous stills. The use of casks to store whisky and allow it to mature gave a product which was more appreciated by the customer. The blending of both grain and malt whiskies allowed the production of consistently high quality products in large quantities.

### **Scotch malt whisky production process**

The following are descriptions of the major processes carried out during the production of Scotch malt whisky.

#### *Malting*

The cereal used in the production of Scotch malt whisky is barley. This in turn is converted into malt, a substrate suitable for alcohol production, by way of the malting process. This process can be divided into three stages: steeping, germination and kilning.

The steeping of barley involves the uptake of water in order to initiate uniform germination. Once the required moisture level is achieved the barley grains are allowed to germinate for a period of time. For malt spirit production, the purpose of germination is to maximize the fermentable extract.

The purpose of kilning freshly produced or green malt is to stop biological activity when the required enzyme levels and degree of modification have been reached, and to produce a dry storable product that can be milled.

During kilning, peat is burned, avoiding flaming, to produce a smoke called peat reek. Careful control of combustion temperatures is necessary to achieve the desired degree of peating. Adsorption of peat smoke on to malt is not a simple operation and is governed by both the intensity of the smoke and the rate of malt drying. Peat smoke will not readily adsorb on to malt when there is a surface water film, i.e. during free drying, and adsorbs only slowly when the surface is very dry. Greatest adsorption occurs when malt is hand dry. Peat smoke must therefore be applied very intensely during the early period of kilning.

### **Peat production**

For maltings, air dried peat is produced in sod form. In former times, production methods were based largely on hand digging but now are all mechanical, using Irish and Scandinavian machines for sod peat production.

Most commonly used is the Finnish 'Suokone' 5-sprout, tractor-pulled, extruder. For this Valtra 180 HP tractors are preferred because of their high power to weight ratio. After cutting the sods lie on the bog surface for 3-6 weeks until they have dried down to a 70% moisture level. They are then windrowed using a converted potato digger. This enables the peat to dry slightly further. Depending on weather conditions this process may need to be repeated before harvesting can proceed.

For harvesting, an Irish 'Herbst' peat loader is commonly used to load the peat into locally built tracked trailers. The trailer capacity is 22 m<sup>3</sup> or 10-12 tonnes @ 2 m<sup>3</sup> per tonne. Usually two trailers are used, but three is more efficient especially when the distance to the stockpile is over 600 m. The peat is tipped at the end of the stockpile where it is stacked, using an 11 tonne excavator which stands 3 m up on the stockpile.

In olden days, the peat was mostly delivered to the distilleries in the autumn where they had peat stocks on site to store the yearly requirements. Nowadays, the maltings only take lorry loads as required and have no storage facilities on site.

### **Export of malting peat**

Malting peat has been exported in 20ft containers for years as other countries have tried to copy Scotch whisky. Japan is perhaps the best example. Australia, Spain, Bulgaria and the Czech Republic have in the past also imported Scottish peat for malting purposes.

At the moment, the biggest threat is from India which has taken peat for the last ten years. The malt is made in Delhi and then transported over 1000 miles to Goa for distilling. We cannot comment on the product since the first production would only be matured around now. Undoubtedly India is a massive market and in China, the demand is also increasing rapidly. A statistic I heard some years ago said that if every Chinese person drank 1 pint of beer a year it would need all the malting barley in Europe!



## Conclusion

Whisky distilling is a major industry in Scotland. Its importance in sustaining employment in rural areas and its contribution to exports and GDP are essential and widely recognised. Its unique peaty flavour is renowned throughout the world. Peat smoke will be required to provide the characteristic flavour of the whiskies into the future. The authors suggest that a small percentage of the national peatland resource in Scotland (total extent of 600,000ha) should be

managed to provide the peat necessary to allow this industry to continue.

## References

- Harrison, B. (2007). *Peat source and its impact on the flavour of Scotch whisky*. Ph.D. thesis, Centre for Brewing and Distilling, University of Edinburgh.
- Jackson, M. (1989). *Michael Jackson's concise malt whisky companion*. Johnnie Walker Green Label, Dorling Kindersley Ltd, 144pp.