

Why do Malt Whiskies from the distilleries of Islay and Jura vary in character? A brief insight into contrasting production techniques through observation and fact.

Islay is the Inner Hebridean island only 20 miles across (pop. 3,500), famed for its peaty malts from the 8 distilleries, namely Lagavulin, Laphroaig and Ardbeg to the south; Bowmore, central; Bunnahabhain and Caol Ila to the west; and Kilchoman and Bruichladdich to the north-west. Jura is to the north-west of Islay (pop. 190), smaller, with 1 distillery, namely Isle of Jura.

Malt whisky is made from malted barley, yeast and (soft, peated) water, yet despite using similar ingredients, the results between distilleries are completely different.

No-one knows *exactly* why malts vary, but subtle differences in production techniques (adding distillery character of the new spirits) and the influence of oak ageing are the key.

DIFFERENCES IN THE FIVE STAGES OF PRODUCTION:

1. MALTING:

The process of converting the starchy interior of the barley grain into available sugars.

BARLEY: This is fairly standard across the 2 islands, with Optic barley being favoured amongst the distillers. This is imported from the mainland (Simpsons, Berwick), though Kilchoman grow their own on the island.

MALTING: Malting can either be carried out on-site (Laphroaig (Photo 1) and Ardbeg) or use the Port Ellen maltings (Ardbeg, Bruichladdich, etc.). Quality and consistency are paramount. Water quality plays little part here as the malted barley is kiln-dried.

KILN-DRYING: One of the key differences is the influence of peat infusion (measured in parts per million, ppm). These range from:

High: Ardbeg 54ppm, Laphroaig 43ppm, Lagavulin, Kilchoman and Caol Ila 35ppm.

Medium: Bowmore 25ppm.

Low: Bruichladdich 3ppm, Bunnahabhain and Jura 2ppm.

MILLING: Most use the traditional (1900's) Boby mill (Ardbeg, etc.), but modern (1960's) Porteus mills are now used (Bowmore, Bunnahabhain). Both types can be calibrated according to grain size, the Boby being less complicated to use. The resulting milled grains (husk-grist-flour) have a similar consistency throughout the distilleries (mainly grist with 12-14% flour), due to similar installed machines.

MALTMEN: The skill and experience of the maltman.

2. MASHING:

The process of converting and extracting the fermentable sugar through mixing the above milled grains with heated water in a mash tun, producing 'wort'.

Water plays an important part here. All distilleries have their own water source:

<i>Distillery:</i>	<i>Colour:</i>	<i>Peat:</i>	<i>Location:</i>
Ardbeg:	brown	trace of peat	Loch Uigeadail.
Laphroaig:	brown	trace of peat	Kilbride Reservoir.
Lagavulin:	brown	trace of peat	Sholum Loch.
Bunnahabhain:	brown	trace of peat	River Laggan.
Bunnahabhain:	clear	no peat	Margadale spring.
Caol Ila:	brown	trace of peat	Loch Nam Ban.
Bruichladdich:	brown	trace of peat	Bruichladdich reservoir.
Bruichladdich:	clear	zero peat	James Brown spring.
Isle of Jura:	soft	trace of peat	Bhaille Mharghandh spring.

Bunnahabhain require their finished whisky peat free. Any colour in the water will be lost with fermentation and distillation.

Mash tun sizes, shapes and wash temperatures can be seen in Appendix 1.

All use stainless steel (easy clean) except Bruichladdich which uses cast iron.

All distilleries run 3 washes except Bunnahabhain, which has a fourth (12 hours long), producing a cleaner wort. This in turn will produce a lighter spirit with a longer fermentation time and higher acidity and a better quality spirit (once distilled). Their mash tuns are the largest on the island.

Lagavulin's mash on the other hand is relatively small, with lower temperatures due to higher phenolics.

3. FERMENTING:

The process of converting the sugars (starch) into alcohol.

YEASTS: Mauri and Quest cultured yeasts are favoured by the distilleries for their consistency, ability to start a fermentation and imparting flavours. A stuck fermentation in a 66,000ltr charge is not an option!

The length of fermentation varies from 48-80 hours (short, weekdays) up to 120 hours (Caol Ila, long, over the weekend).

WASHBACKS: Are all (Bowmore, photo 2) wood except for Laphroaig and Jura (stainless steel). Wood is meant to give a waxy estery style to the wash with high phenolic content, retaining a sweetness and fruitiness. This can be seen in Ardbeg and Lagavulin with smaller washbacks and therefore larger surface area: volume ratio. (Though debatable as the washbacks are steam-cleaned and contact is only for 2-3 days).

TEMPERATURES: Low temperatures at Caol Ila (16°C) are lower than most, producing a clean, green grassy spirit. Longer and slower fermentations produce a light and purer high-strength wash (and a finer spirit), as seen at Bruichladdich.

Higher temperatures generally lead to nuttier and spicier flavours as the fermentation is quicker. This can be seen at Bowmore (a vivacious and boisterous fermentation of 48hours, strength 7% abv). They claim their floral notes are from their washbacks.

Bunnahabhain choose a long fermentation producing a light and pure high-strength wash. Ardbeg's slow fermentation is due to the high phenolics.

The nature and strength of the wash, as well as the cycle of filling and emptying the stills must also be taken into consideration.

Fermentation data can be seen in Appendix 2.

4. DISTILLING:

The process of converting the wash into a purified spirit.

All distilleries use double distillation using a wash still then a spirit still using indirect steam heated coils or pans inside the copper stills.

Distilling data can be seen in Appendix 3.

The first distillation creates the broad character of the low wines and the formation of esters.

NUMBER OF WASH STILL: Ardbeg have 1, but Laphroaig have 4. This just determines quantity of production. La

CAPACITY / CHARGE: Bunnahabhain and Caol Ila (c. 35,000l) are the largest stills, but are filled to only c.50% of capacity. This can accentuate lightness and finesse in the distillate. Ardbeg and Bowmore (c. 65% capacity) promote pungency.

SPEED OF DISTILLATION: Bunnahabhain and Jura run for 8 hours (others 4 -5 hours). The slower speed will give more time ('conversation') for the vapours to interact with the copper and remove impurities, producing a cleaner spirit (See Photo 4).

HEIGHT AND SHAPE OF STILL: An assignment topic in itself. Bunnahabhain and Jura have the highest, over 7.7m each, most are over 6m. Their still shapes are classed as 'plain', though Lagavulin's are conical (Photo 3), Bowmore's more onion-shaped and Kilchoman garlic-shaped. Ardbeg and Laphroaig have the shortest (under 4m), and lamp-shaped, unusual for the island.

Only the lighter, purer flavour (sweet and fruity) compounds will collect and be condensed as low wines. The heavier, denser compounds will condense back into the still (reflux). A rounder still (eg Bunnahabhain) will have a larger 'boil' area and therefore increase reflux. With the waisted lamp-glass design, the vapours reflux with themselves with a cleaner outcome than the plain designs, that interact with the actual wash.

LYNE ARM: In Bruichladdich and Lagavulin, the lyne arm slopes down, allowing stronger flavours to pass into the low wines. Laphroaig and Ardbeg slope upwards, returning these flavours back into the wash still.

PURIFIERS: Ardbeg use a purifier that removes all the heavier alcohols in the lyne arm, producing a fruitier and sweeter spirit.

STRENGTH OF LOW WINES: Vary from 25 - 28% across the distilleries.

The second distillation refines and reduces the range of characteristics of the low wines by removing further undesirable elements.

CAPACITY / CHARGE: The spirit stills are smaller, with a higher charge than the wash stills, as there is less liquid to distil and it is purer. Bowmore's 2 spirit stills are 50% smaller, Bunnahabhain's 2 are 60% smaller. Lagavulin are unusually slightly larger.

SPEED OF DISTILLATION: Use similar techniques and results as the wash stills.

HEIGHT AND SHAPE: Similar to the wash stills, but shorter. Jura remains at 7.7m, most are smaller (4.4m - 6m). Ardbeg and Laphroaig are the smallest (as above). Bruichladdich's still is goose-necked, allowing for more reflux.

LYNE ARM: Similar to the wash stills, but Lagavulin's are gently rather than steeply ascending, allowing less reflux.

The second distillation comprises of 3 phases:

- Foreshots: Initial phase, collected and redistilled. Low boiling point.
- Potable spirit: the main part (heart) of the spirit.
- Feints: Heavy oils removed last, collected and redistilled. Highest boiling point.

FORESHOT RUN: Depends on the capacity and temperatures. Kilchoman's are run in 5 mins, Ardbeg 10 mins, Bowmore 15 mins. Bruichladdich and Laphroaig run for over 40

mins. Alcohol content is over 76% abv (undesirable).

SPIRIT CUT: This is one of the important means of creating the individual distillery character. Fruity esters occur between 72-68% abv. The distilleries range from Bruichladdich's cut (76-71% abv - high abv) only 5% abv (narrow cut), to Lagavulin (72-59% abv - lower abv) using 13% abv (larger cut). Most range from 72-64% abv. There seems no exact correlation between the cut window and peating levels, but the larger the cut, the wider the spectrum of phenolic characters, individually decided by the distilleries (tradition and consistency). Ardbeg's spirit safe can be seen in Photo 5.

FEINTS RUN: Alcohol content below 59% abv and undesirable and redistilled.

STRENGTH OF NEW SPIRIT: Similar. Vary from 72% abv (Bruichladdich) to 68% abv (Laphroaig).

STILLMAN: The skill and experience of the stillman.

5. MATURATION:

All new spirit is stored at a strength of 63.5% abv in oak casks for consistency and if any blending is required. Each cask has its own character and that influences the whisky.

Up to 90% of the whisky is aged in American Bourbon casks (first- or second-fill). Sherry (Bunnahabhain, Jura), Pedro Ximenez Sherry (Lagavulin), Port and Bordeaux casks (Bowmore) of various sizes are also favoured.

LOCATION: Depends on the style of the warehouse and whereabouts in the buildings where the cask lies in Islay and Jura. All are coastal, except inland Kilchoman (Photo 6) and Caol Ila. The latter actually mature their whisky in Fife.

HOUSE STYLE MATURATION TIME: In theory, the lighter peated whiskies of Bruichladdich, Bunnahabhain and Jura will marry quicker with the wood (10 years) and Bowmore (12 years) than the oilier heavily phenolic ones of Caol Ila (12 years) and Lagavulin (16 years). Laphroaig and Ardbeg (10 years) are anomalies to this.

Kilchoman have released miniatures of their new spirit. Youthful cask strengths (Ardbeg, 6 - 8 years) are becoming fashionable, but lack the finesse of older 15 to 18 year olds and older if you're lucky.

WAREHOUSEMEN: The skill and experience of the warehouseman.

CONCLUSION:

Despite using similar ingredients of barley, water and yeasts the character of each distilleries malts are different.

This is to differences in production differences:

Malting: Barley type, kiln-drying peat infusion, milling gauge, etc.

Mashing: Strength of the mash, water, temperature, wood / stainless steel etc.

Fermenting: Yeasts, washback size and materials, temperatures and fermenting times.

Distilling: Capacity and charge, shape and size of stills, lyne arm angle, operation speed, cut size, etc.

Maturation: Type of cask, length of time, location and staff expertise.

These together produce subtle differences which makes all distilleries, especially on the islands of Islay and Jura unique.

APPENDIX 1: MASH DISTILLERY DATA:

Mash tun construction:	Ardbeg stainless steel	Bowmore stainless steel	Bruichl. cast iron	Bunnah. stainless steel	Caol Ila iron top s/steel bottom	Lagavulin stainless steel	Laphroaig stainless steel
Mash size (tonnes):	4.5	8.0	7.0	12.5	11.5	4.3	8.5
First water (°C):	64	84	65	64	68	69	69
Second water (°C):	82	90	86	80	76	68	85
Third water (°C):	90	100	93	90	79	68-78	85
Fourth water (°C):	-	-	-	90	-	-	-

(Adapted from: 'Peat, Smoke & Spirit,' by Andrew Jefford).

APPENDIX 2: FERMENTATION DISTILLERY DATA:

No. of washbacks:	Ardbeg 6	Bowmore 6	Bruichl. 6	Bunnah. 6	Caol Ila 8	Lagavulin 10	Laphroaig 3	Jura 6	Kilchom. 4
Washback construction:	Oregon pine	Oregon pine	Oregon pine	Oregon pine	Oregon pine	Larch	stainless steel	stainless steel	stainless steel
Yeast (cultured):	Mauri	Mauri / Quest	Quest / Mauri	Quest	Mauri	Mauri / Quest	Mauri	Mauri	Mauri
Ferment'n time (short):	65-68hrs	48hrs	60hrs	63hrs	80hrs	55hrs	55hrs	59hrs	50+hrs
Ferment'n time (long):	96hrs	62hrs	106hrs	80hrs	120hrs	55hrs	90hrs	60hrs+	n/a
Ferment'n temps (°C):	20	19	21	20	16	18	18	n/a	n/a
Ferment'n abv:	8%	7%	6 - 7%	6.5 - 8.5%	8%	8.9%	8.5%	8%	8%

(Adapted from: 'Peat, Smoke & Spirit,' by Andrew Jefford).

APPENDIX 3: DISTILLING DISTILLERY DATA:

	Ardbeg	Bowmore	Bruichl.	Bunnah.	Caol Ila	Lagavulin	Laphroaig	Jura
No. of WASH stills:	1	2	2	2	3	2	4	2
Wash still capacity:	18,279l	30,940l	17,275l	35,376l	35,345l	12,300l	5,000l x 3 10,500l x 1	25,000l
Charge:	64%	65%	69%	47%	51%	85%	94%	96%
Heat source :	steam coil + pans	steam coil + pans	steam coil + pans	steam pans	steam pans	steam coils + pans	steam coils	steam coils
Still height:	3.73m	6.3m	6.55m	7.87m	7.0m	6.89m	4.4m x 3 5.4m x 1	7.7m
Still shape:	lamp-glass	plain	plain	plain	plain	plain	lamp-glass	plain
Lyne arm:	gently rising	straight	gently descending	straight	gently descending	steeply descending	ascending	straight
Length low wines run:	5hrs	8hrs	4.5-5hrs	5hrs	4hrs	4hrs	n/a	8hrs
Low wines collect.run:	46»1%abv	46»1%	c.22.5%	46»0.5%	42»1%	50»0.1%	n/a	n/a
No. of SPIRIT stills:	1	2	2	2	3	2	4	2
Spirit still capacity:	16,957l	14,700l	12,274l	15,546l	29,549l	12,900l	n/a	22,000l
Charge:	81%	92%	58%	60%	37%	95%	95%	n/a
Strength of charge:	25%abv	27%abv	27%abv	26%abv	28%abv	25%abv	26%abv	26%abv
Still height:	3.66m	5.8m	6.25m	6.35m	6.09m	5.03m	4.4m x 3 5.1m x 1	7.7m
Still shape:	lamp-glass	plain	plain	plain	plain	plain	lamp-glass	plain
Lyne arm:	gently rising	straight	goose-necked gently descending	straight	descending 5°	gently descending	ascending	straight
Foreshot run:	10mins	15mins	40mins	10mins	25-30mins	30mins	45mins	n/a
Spirit cut (abv):	73-62.5	74-61.5	76-71	72-64	75-65	72-59	67.5	n/a
Distilled strength (abv):	69.5-70.5	68.8	72	68.5	70.5	68.5	67.5	n/a

(Adapted from: 'Peat, Smoke & Spirit,' by Andrew Jefford).

BIBLIOGRAPHY:

Over 140 photos around the distilleries were taken. These and discussions with the head distillers (below) were the main influence for this assignment.

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