

# GIN

## THE STILLDRAGON WAY

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*A guide to the use of StillDragon's*

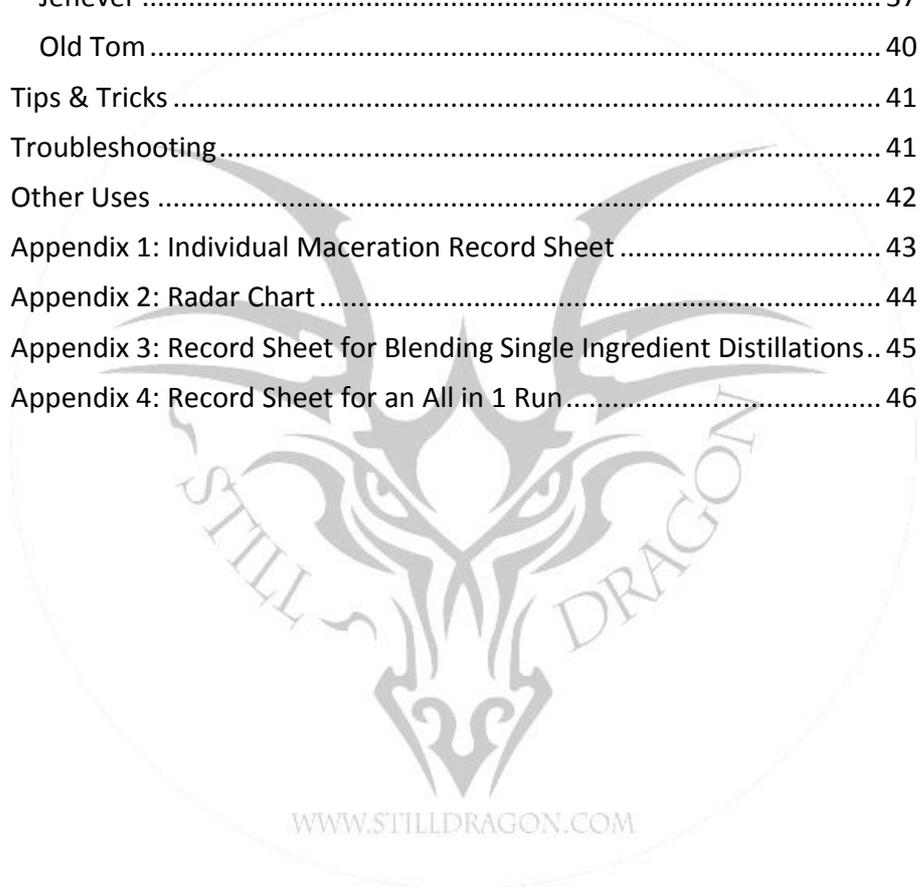
*"Carter Head" gin basket.*

By Crozdog©

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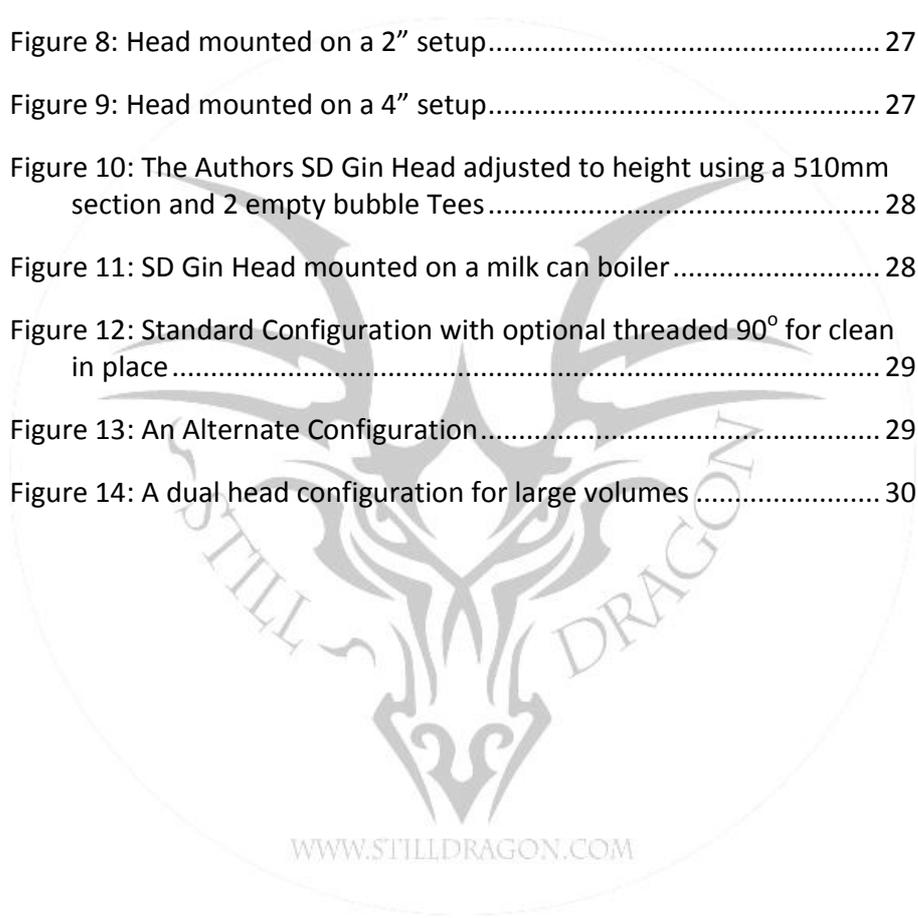
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## Introduction

Welcome to the StillDragon world of gin production. This manual is a follow on from the StillDragon Users Guide to provide information specific to the use of the StillDragon “Carter Head” gin head.

If you haven’t already, please read the StillDragon Users Guide as it will provide you with a lot of useful information on the setup and use of StillDragon stills.

The StillDragon “Carter Head” gin head has been carefully designed to provide the distilling community with an incredibly flexible piece of equipment which has not been commercially available for many years and never for the artisan distiller as an off the shelf item.

The StillDragon “Carter Head” gin head has been specifically developed with the following key features:

- The unit can be connected to either be on the left or right of the column to suit any distillery layout
- Ability for the operator to perform rapid basket changes during a run, perfect for long runs or experimentation
- Offset design so neither the column nor the boiler get contaminated thereby simplifying cleanup

This guide has been developed to provide an understanding of how StillDragon’s modular “Carter Head” gin head can be configured and operated so you can start producing quality Gin. It will also provide you with some ideas on other uses.

Please don’t take this guide as being the one and only way; rather treat it as the starting point which shows you how to quickly get up and running using tried and tested techniques. Once you are comfortable with the information provided here, feel free to experiment if you wish – but you don’t have to if you don’t want to.

Regardless of whether you experiment or not, please provide your feedback as, StillDragon recognises that our customers are the innovators and the catalysts that push the craft distilling movement forward into creating better, safer, more precisely manufactured distilling equipment. Your experimentation and feedback will help the evolution and deliver of quality products to meet the needs of the distilling community. After all, that is how the Still Dragon “Carter Head” came about.

Feedback on StillDragon products & this guide are best provided by signing up and posting on the StillDragon User Group forum. Simply visit <http://www.stilldragon.org>

## Guarantee

Don't forget StillDragon offer the following Guarantee:

Every item is backed by an unconditional money back guarantee. If you don't like it for any reason, send it back within 30 days in unused condition for a prompt, no questions asked refund of your purchase price.

## Legal Considerations

Depending on your location, distilling alcohol without a license may be a violation of the law.

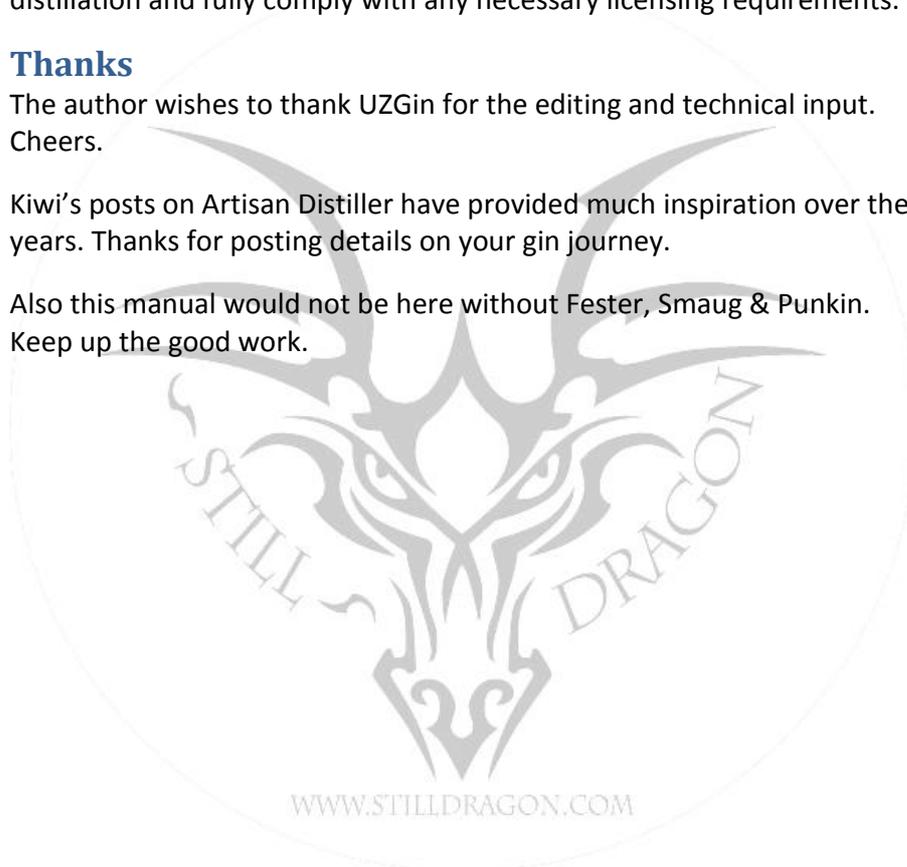
StillDragon equipment is only intended for legal uses, and we strongly discourage illegal use of any kind. Before purchasing or using our products, we recommend that you investigate your local laws regarding distillation and fully comply with any necessary licensing requirements.

## Thanks

The author wishes to thank UZGin for the editing and technical input. Cheers.

Kiwi's posts on Artisan Distiller have provided much inspiration over the years. Thanks for posting details on your gin journey.

Also this manual would not be here without Fester, Smaug & Punkin. Keep up the good work.



## History

The Dutch physician Franciscus Sylvius is credited with the invention of gin. By the mid 17th century, numerous small Dutch and Flemish distillers (some 400 in Amsterdam alone by 1663) had popularized the re-distillation of malt spirit or wine with juniper, anise, caraway, coriander, etc., which were sold in pharmacies and used to treat such medical problems as kidney ailments, lumbago, stomach ailments, gallstones, and gout.

It was found in Holland by English troops who were fighting against the Spanish in the Eighty Years' War who noticed its calming effects before battle, which is the origin of the term Dutch courage. Gin emerged in England in varying forms as of the early 17th century, and at the time of the Restoration, enjoyed a brief resurgence.

When William of Orange, ruler of the Dutch Republic, occupied the British throne with his wife Mary in what has become known as the Glorious Revolution, gin became vastly more popular, particularly in crude, inferior forms, where it was more likely to be flavoured with turpentine as an alternative to juniper.



Hogarth's [Gin Lane](#)

Gin became popular in England after the Government allowed unlicensed gin production and at the same time imposed a heavy duty on all imported spirits. This created a market for poor-quality grain that was unfit for brewing beer, and thousands of gin-shops sprang up throughout England, a period known as the Gin Craze. Because of the relative price of gin, when compared with other drinks available at the same time and in the same geographic location, gin became popular with the poor. Of the 15,000 drinking establishments in London, not including coffee shops and drinking chocolate shops, over half were gin shops. Beer maintained a healthy reputation as it was often safer to drink the brewed ale than unclean plain water.

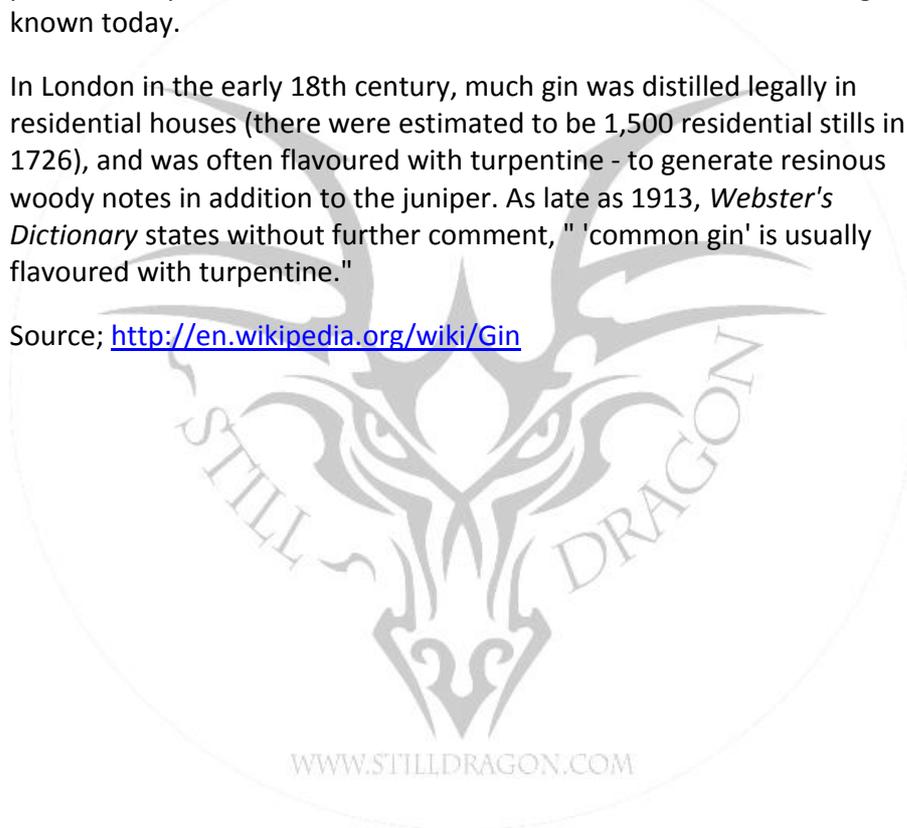
Gin, though, was blamed for various social problems, and it may have been a factor in the higher death rates which stabilized London's previously growing population, although there is no evidence for this and it is merely conjecture. The reputation of the two drinks was

illustrated by William Hogarth in his engravings *Beer Street and Gin Lane* (1751). This negative reputation survives today in the English language, in terms like "gin mills" or the American phrase "gin joints" to describe disreputable bars or "gin-soaked" to refer to drunks, and in the phrase "mother's ruin", a common British name for gin. Paradoxically the "negative" connotations are now becoming associated with "positive" connotations - with the resurgence of gin, upmarket bars now frequently refer to "mother's ruin", "gin palaces", where printed copies of Hogarth paintings may sometimes be found.

The Gin Act 1736 imposed high taxes on retailers and led to riots in the streets. The prohibitive duty was gradually reduced and finally abolished in 1742. The Gin Act 1751 was more successful, however; It forced distillers to sell only to licensed retailers and brought gin shops under the jurisdiction of local magistrates. Gin in the 18th century was produced in pot stills, and was somewhat sweeter than the London gin known today.

In London in the early 18th century, much gin was distilled legally in residential houses (there were estimated to be 1,500 residential stills in 1726), and was often flavoured with turpentine - to generate resinous woody notes in addition to the juniper. As late as 1913, *Webster's Dictionary* states without further comment, "'common gin' is usually flavoured with turpentine."

Source; <http://en.wikipedia.org/wiki/Gin>



## Styles / types

So what exactly is Gin?

The European Parliamentary Regulation (EC) No. 110/2008 defines 'gin' as follows:

*a) Gin is a juniper-flavoured spirit drink produced by flavouring organoleptically suitable ethyl alcohol of agricultural origin with juniper berries (*Juniperus communis* L.).*

*(b) The minimum alcoholic strength by volume of gin shall be 37.5 %.*

*(c) Only natural and/or nature-identical flavouring substances as defined in Article 1(2)(b)(i) and (ii) of Directive 88/388/EEC and/or flavouring preparations as defined in Article 1(2)(c) of that Directive shall be used for the production of gin so that the taste is predominantly that of juniper.*

Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:039:0016:0054:EN:PDF>

This Regulation also defines Distilled Gin & London Gin.

### Distilled Gin

Distilled *gin* is:

*(i) a juniper-flavoured spirit drink produced exclusively by redistilling organoleptically suitable ethyl alcohol of agricultural origin of an appropriate quality with an initial alcoholic strength of at least 96 % vol. in stills traditionally used for gin, in the presence of juniper berries (*Juniperus communis* L.) and of other natural botanicals provided that the juniper taste is predominant, or*

*(ii) the mixture of the product of such distillation and ethyl alcohol of agricultural origin with the same composition, purity and alcoholic strength; natural and/or nature-identical flavouring substances and/or flavouring preparations as specified in category 20(c) may also be used to flavour distilled gin.*

*(b) The minimum alcoholic strength by volume of distilled gin shall be 37,5 %.*

*(c) Gin obtained simply by adding essences or flavourings to ethyl alcohol of agricultural origin is not distilled gin.*

### London Gin

London *gin* is a type of distilled *gin*:

*(i) obtained exclusively from ethyl alcohol of agricultural origin, with a maximum methanol content of 5 grams per hectolitre of 100 % vol. alcohol, whose flavour is introduced exclusively through the redistillation in traditional stills of ethyl alcohol in the presence of all the natural plant materials used,*

(ii) the resultant distillate of which contains at least 70 % alcohol by vol.,

(iii) where any further ethyl alcohol of agricultural origin is added it must be consistent with the characteristics listed in Annex I(1), but with a maximum methanol content of 5 grams per hectolitre of 100 % vol. alcohol,

(iv) which does not contain added sweetening exceeding 0,1 gram of sugars per litre of the final product nor colorants,

(v) which does not contain any other added ingredients other than water.

(b) The minimum alcoholic strength by volume of London gin shall be 37,5 %.

(c) The term London gin may be supplemented by the term 'dry'.

## Other Styles

### Jenever/ Genever

Dutch, gin is very different to English gins, being made from malted grains making it somewhat similar to un-aged whisky. They are generally lower proof than other gins, and are often aged for a short time.

Jenever is a juniper flavoured spirit. It is made in a more complicated method that allows for more of the flavours from the original base spirit to come through in the final product. It is less neutral than London Dry Gins and is regularly sold with fruit flavourings – citrus is a popular choice.

It is made by blending two spirits together:

- 'Moutwijn' (malt wine) - basically an un-aged whisky made from a mixture of rye, malted barley and wheat which is double or triple distilled in a pot still to around 45-50%. It is this malt wine that gives Jenever its distinctive flavour.
- Botanically flavoured neutral spirit. The botanically flavoured neutral spirit is essentially gin only using less conventional botanicals such as caraway and aniseed.

The blend of the two spirits is decided by the by the distiller depending on which style they are making – 'Jonge', 'oude' or 'kornwijn'.

### Jonge Jenever

This lighter style was developed in the 1950's uses around 5% malt wine content and fewer botanicals. It is called 'jonge' Jenever as it is a 'young' style rather than being lightly aged.

### Oude Jenever

Contains a minimum of 15% malt wine and will often use more botanicals than the 'jonge' style. More intense botanicals like myrrh and aloe are used to match the heavier malt characteristics from the larger

percentage of malt wine used. 'Oude' refers to the 'Old' style of traditional Jenever rather than it being an aged spirit.

### *Kornwijn*

The use of a minimum of 51% malt wine makes these Jenever's much heavier and richer. They are characterized by complex malt character combined with wood and wine flavours. Kornwijn must by law be cask aged.

### *Plymouth*

Gin produced in Plymouth has its own appellation. It cannot be called Plymouth gin if it is not made in Plymouth. Plymouth gin is sweeter than dry gin due to a higher than usual proportion of root ingredients, which bring a more 'earthy' feel to the gin as well as a softened juniper flavour

### *Old Tom*

Old Tom gin was very popular during the eighteenth-century and is sweeter than London dry gin. At that time gin production was fairly clandestine, and the resulting spirits were often impure, poor quality and harsh. To overcome these problems, gin was sweetened to make it more palatable.

Old Tom is lighter and less intense than Jenever, but more viscous and fuller-bodied than dry gin, with a sweetness derived from naturally sweet botanicals, malts or added sugar. It's not as aggressively flavoured as dry gin, so some of the more subtle notes don't get overwhelmed by the juniper. The alcohol is also a bit lower.

Old Tom lost its popularity after the column still enabled the production of dry gin.

At the time of writing, Haymans and Ransom are two of the few commercial examples of Old Tom currently available.

### *Sloe*

Sloe gin is a tradition liqueur made by infusing the fruit of the blackthorn in gin, although modern versions are almost always compounded from neutral spirits and flavourings. Similar infusions are possible with other fruits, such as damsons.

The production of Sloe Gin will not be covered in this guide.

### *Aged*

Aged gin is simply a gin which has been left on oak for a period of time to gain colour and develop additional flavour complexities which only oaking can provide.

The production of Sloe Gin will not be covered in this guide, but please experiment and report your results on <http://www.stilldragon.org>

## Techniques

In very broad terms, there are two ways to make Gin, compounding and vapour infusion.

There are two methods of compounding:

1. Cold compounding involves adding essential oils and or essences to neutral spirit which is then diluted and bottled. It is regarded as producing lower quality Gin.
2. Macerating involves soaking botanicals in alcohol before the botanicals are strained out and the remaining liquid is re-distilled. Note, some distillers do not strain, but put both the liquid and the botanicals in the still. Many commercial Gins are produced by this technique; they are often called “Distilled Gins”.

Vapour infusion involves placing botanicals in the path of the vapour coming off the still before the vapour is condensed. The vapour picks up the flavours from the botanicals as it passes by. The resultant product is considered by many to be fresher and more “delicate” than that produced by maceration. Vapour infusion is also considered to retain higher “more volatile” aromas than maceration. Bombay Sapphire is made using vapour infusion on old “Carter Head” stills. The Still Dragon Gin head is a modern version of a Carter Head.

Both maceration and vapour infusion can be used to distil individual botanicals, thereby producing “single ingredient distillates” which can be blended to produce gin. Making “single ingredient gins” provides the producer with the ultimate control of the quantity of that botanical used.

Making single ingredient distillates is a good way for novice producers to learn about the flavours and aromas of each botanical and allows experimentation with blending different botanical ratios to be performed.

WWW.STILLDAGON.COM

## Ingredients

### Spirit

An ethanol base is required to make gin. Many commercial operations purchase Grain Neutral Spirit (GNS), however as Licenses are required to purchase GNS in most countries, the artisan keen to produce their own "London / Dry gin" will need to either purchase commercial vodka or make neutral using a Tomato Paste Wash (or similar) and distilling it with their StillDragon configuration of choice.

Most gins, apart from Jenever, will use the hearts cut of a neutral spirit run as their base. An all grain barley mash and subsequent distillation(s) will be needed to create the "Malt wine" which provides Jenever its characteristic flavour. Detailed instructions on all grain brewing are beyond the scope of this guide, however please refer to the Recipe Suggestions section for a basic process.

If you are interested in all grain brewing and would like to know more, please read John Palmers excellent beer making site [www.howtobrew.com](http://www.howtobrew.com). Also research "Brew in a Bag" also known as BIAB.

### Botanicals

The three main botanicals used to produce gin are juniper berries, coriander seed and angelica. However there are 100's of different botanicals that can be used. The producer is only limited by their imagination as to the botanicals used.

As per the definition above, juniper is the only botanical ingredient necessary for it to be called gin. However coriander seed also plays a large role by providing most of the citrus flavours and balancing the juniper.

Typically between six and twelve different botanicals are used. As Gin is typically mixed for consumption, flavours will tend to be "lost" If more than ten botanicals are used proving that sometimes "less is more". Gins with large botanical bills employ a "lots OF more" approach ie they use small amounts of a large number of botanicals to provide layers of complexity.

#### DragonTip

Produce the best ethanol that you can. Make tight hearts cuts – your finished product will greatly benefit.

#### DragonTip

It is not recommended to produce gin directly from wash or low wines. This is because:

1. Cuts cannot be easily made
2. A lot of flavour will be lost when cuts are

The following table describes characteristics that several of the common botanicals provide.

Ingredient	Description	Influences (Juniper, Citrus, Spice, Floral, Heat)
Almond	<p>Almond provides a marzipan, nutty, spicy flavour. It provides a balancing smoothness which binds all the other ingredients together. Both the bitter and sweet almond can be used. If nuts are used, they have to be ground into a powder before distillation.</p> <p>Bitter almonds may be hard to locate due to their Cyanide content. For the sake of safety, it is recommended that they are avoided where possible. Bitter almond essence can be substituted – it can be found in gourmet food suppliers (see pics below) or occasionally in the cake supplies section of the supermarket – make sure you don't buy an artificial essence.</p>  <p>While some have reportedly used apricot or peach kernels as a bitter almond substitute, neither Still Dragon nor the author can comment on or recommend this practice.</p>	Spice
Angelica root	An aromatic root with musky, nutty, woody, sweet flavour with a piney, dry sharpness. It provides an earthy backbone, balancing the freshness of juniper, lemon peel and coriander seeds while also fixing and marrying the volatile flavours of other botanicals, giving length and substance by fleshing out the mid-palate. <a href="http://www.stilldragon.com">www.stilldragon.com</a>	Spice
Aniseed	Aniseed has a fragrant liquorice taste.	Spice
Cassia	It gives a warm delicate spicy cinnamon note due to a higher Coumarin content than normal Cinnamon (they are related plants, but not the same). Used to help balance the overall flavour and aroma rather than be a primary flavour.	Spice, heat
Cinnamon	Used sparingly to provide background heat.	Spice, heat
Coriander seed	Provides the upfront lemon / citrus fresh aroma as well as providing mellow spicy, ginger and sage notes.	Spice, citrus
Cubeb	Provide a spicy, lemon-pine flavour similar to black pepper but with a more floral (lavender, geranium and rose) aroma. They also provide a dry, slightly hot flavour which results in the lively peppery characteristics	Spice, heat, floral
Grains of	Provide a hot, spicy, peppery flavour with hints of	Spice, heat, floral

Paradise	lavender, elderflower, chocolate, citrus and mint. Its use intensifies the flavouring effects of all the other botanicals and lasts into the finish	
Juniper	By law this is the main flavour element in gin. The use of juniper delivers a fragrant, piney, evergreen odour and taste. It has a fragrant, spicy, bittersweet taste with overtones of lavender and camphor with a peppery finish. Can sometimes smell slightly of turpentine.	Juniper, spice, floral
Lemon peel	Only the zest or coloured portion of the peel is used to impart the strong citrus astringency which gives gin its fresh, light, clean, aroma and taste. Use sparingly and try and use dried versions. The oils from fresh peel have really great variability, meaning it can be hard to get a consistent product.	Citrus
Liquorice	This dried root is used for its well-known flavour, very similar to aniseed. Its use adds a warm sweetness and a faint anise aroma whilst balancing other botanicals and fixing some volatiles.	Spice
Nutmeg	Used sparingly to provides a musky flavour and aroma	Spice
Orange peel	The peel of both bitter and sweet oranges is used; bitter to lend astringency similar to lemons, while sweet gives an impression of sweetness. As with Lemon peel, Use sparingly and try and use dried versions.	Citrus
Orris root	Orris is the root of the Florentine iris. It has a very perfumed flavour and has an aroma of violets, earth and cold tea. It is very hard and requires heavy grinding into a powder before use.  It is also used as a fixative for the flavours and aromas of the other botanicals.	Floral
Rosemary	Leaves are used for its stimulating and refreshing savoury aromas. Typically found in Mediterranean styles.	Spice

In addition to these commonly used botanicals, the following table lists others, which can be used. Please note that this list is not definitive.

Botanical	Influence
Cucumber	Floral
Rose	Floral
Hibiscus	Floral
Basil	Floral, spice
Lemongrass	Floral, spice
Rosemary	Floral, spice
Ginger	Spice, heat
Cardamon	Spice
Cumin	Spice, heat
Fennel seed	Spice
Caraway	Spice
Anise	Spice

Star anise	Spice
Clove	Spice
Savory	Spice
Calamus (sweet flag)	Spice
Chamomile	Floral, spice
Pepper cracked	Spice
Lavender	Floral
Violet Root	Floral
Grapefruit peel	Citrus
Vanilla	Floral, spice
Honeysuckle	Floral, spice
Pomelo (Chinese Grapefruit).	Citrus

## Individual Maceration

Before attempting to formulate your own recipe, it is beneficial (but not essential) to take some time to research the different botanicals to understand what they contribute to the finished product.

You might like to do small macerations of each individual botanical to gain first-hand knowledge of each botanical. This is simple to do and will assist in developing your palate.

You will need the following:

- Small sealable jars – 1 per botanical
- Botanicals
- Mortar & pestle
- 40% vodka
- Measuring cup
- Measuring spoon
- Labels
- Pen
- Cupboard space
- A print out of the record sheet in Appendix 1
- A teaspoon
- Water

## Process

1. Print out the record sheet in Appendix 1
2. Clean and dry all bottles (ensure they do not smell of the previous contents if recycling)
3. Measure 50mL vodka into each jar
4. One by one, measure out ½ - 1 teaspoon full of each botanical. Crush each in mortar and pestle then add to 1 of the jars. Screw lid on firmly. Label jar with the name of the botanical and mark up the record sheet. Repeat for other botanicals. NB simply peel some zest off a lemon and put in a jar with vodka. There is no need to crush powdered ingredients like Orris root ;-)

5. Shake each jar well
6. Place in a cupboard & shake each day for 2-10 days
7. Once you can't wait any longer, remove the jars from the cupboard and line them up on a bench or table.
8. Find the record sheet with the names of each botanical.
9. Take the 1<sup>st</sup> jar give it a shake before opening.
10. When you open it, smell the contents – don't poke your nose right in the jar, hold the jar under your nose and a little in front. Use your hand to waft the aroma from the jar to your nose.
11. Write down your aroma impressions on the record sheet.
12. Take a teaspoon and fill it half full from the jar. Add some water to the teaspoon before tasting.
13. Write down your taste impressions on the record sheet. What do you taste? Where do you taste it? Is there any after taste? What if you water it down some more?
14. Cleanse your palate with fresh water and plain crackers before evaluating the next sample.

The above is based on an idea published on <http://theginisin.com/other-thoughts/a-new-way-to-review-gin/>

The follow chart describing flavours found in Gin (categorised by the Scotch Whiskey Research Institute) will assist your evaluation:

Nasal Effects	Pungent
	Alcohol Burn
Juniper	Pine
	Grass
	Herbaceous / Waxy
	Woody / Resinous
Citrus	Lemon Peel
	Orange Peel
	Zesty
Green	Herbal
	Grassy
	Leafy
	Pine
Spicy	Dried Spice
	Cinnamon
	Corriander Seed
	Peppery
Aniseed	Liquorice
	Aniseed
Sweet	Vanilla
	Honey
Floral	Fragrant
	Perfumed
	Fresh Flowers
Fruit	Artificial Fruit Flavourings
	Fresh Fruit
Nutty	Marzipan

	Almond
Off Notes	Solvent
	Oily
	Buttery
	Sulphery
	Sour
	Musty / Earthy

When tasting, be aware how your sense of taste works:

Firstly a large part of taste comes from the aroma smelt by your nose; your tongue provides direct taste (1), while Trigeminal effects (2), retronasal (3) and aftertaste (4) all play their own parts.



## Suppliers

### *Australia*

Austral herbs <http://www.australherbs.com.au>

Herbies <http://www.herbies.com.au>

Newtons Pharmacy <http://www.newtonsparmacy.com.au/>

### *USA*

Star West <http://www.starwest-botanicals.com/>

Penzey's Spice Company <http://www.penzeys.com/>

MountainRose Herbs <http://www.mountainroseherbs.com/>



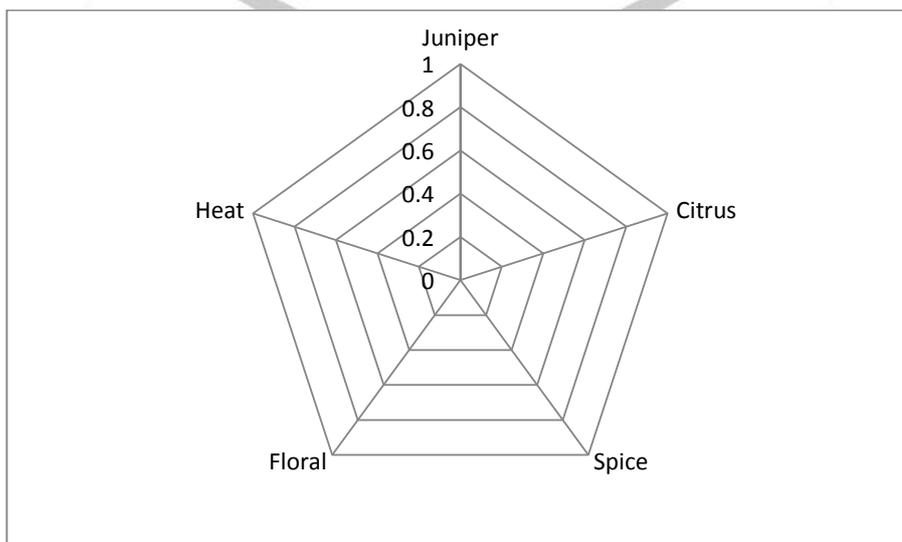
## Recipe Formulation

### Radar Charts

One technique to consider when developing a recipe is to think about what you want the resultant product to be in terms of its intensity of 5 flavour / aroma elements<sup>1</sup>:

- Juniper – the base note intensity. Don't forget that Pine/camphor/lavender notes derive from juniper
- Citrus – Lemon, lime, grapefruit etc
- Spice – the warm mouth feel and depth of earthy elements
- Heat – Alcohol "burn" combined with the ingredient mouth feel
- Floral – Self explanatory

Print out the blank chart in Appendix 2, then plot on that print out how you want the end product to be Chart this on a radar plot,. Once your plot is complete, consider which ingredients will provide you with what you envisage.



You can also use this technique when evaluating your final product. The use of this technique over time will build up your personal library of reference data that will allow you to not only see how the botanicals contribute to the end result, but enable you to make informed decisions.

<sup>1</sup> Based upon an idea on <http://theginisin.com/other-thoughts/a-new-way-to-review-gin/>

## Fixatives

Do not forget the important role that “Fixatives” perform in Gin. Apart from the flavour and aroma contribution they provide, Orris Root and Angelica Root are used as a fixative for preserving the flavours and aromas of the other chosen botanicals. They act much like ‘velcro’ and hold everything together. Without the use of fixatives, over time the floral notes will dominate, as the Juniper and citrus character will disappear.

## Ingredient Proportions

Whilst Gin must be a Juniper based spirit; coriander seed is the 2nd most important botanical. These two botanicals typically comprise up to 90% of the botanicals used. The ratio of juniper to coriander used will depend on the style that you are trying to produce. An “assertive” Gin will have a higher proportion of juniper to coriander seed (e.g. 10:1), while softer more “delicate” gins will use less – sometimes much less (even down to 1:1). You would use a lower ration if you wanted your product to highlight the notes of other more subtle botanicals.

Once you have determined the Juniper to Coriander ratio, you can then focus on determining what other ingredients to use and their quantity based on what flavours or characteristics you would like to appear.

## A Rough Rule of Thumb

If you spend any time researching gin recipes, you will quickly discover that everyone has their own idea on how much of each botanical to use and the ratio between them. That combined with the fact that most of the recipes available are for the maceration technique makes the process of determining botanical quantities (or ratios) for vapour infused Gin quite challenging.

To overcome that hurdle, we’ve developed the following table as a guide to provide you with indicative proportions to start your journey of developing your own gin flavours.

Be aware that what follows is a theoretical guide as the freshness and quality of botanicals able to be sourced will differ. Oil content is incredibly variable. Large Gin distilleries have departments dedicated to analysing botanical oil content to ensure product consistency. One person may be able to source fresh pungent Albanian Juniper berries, while someone else has to make do with whatever is on the local spice shop shelf. You will therefore need to work out what works best for you based on what you can source. Changing the source of your botanical(s) will impact your finished product.

Flavouring	Botanical	Juniper	Example
------------	-----------	---------	---------

Level		Flavouring Ratio	
Primary	Juniper	1	100g
Secondary	Coriander seed	10:1 to 1:1 <sup>2</sup>	From 10g-100g
Tertiary	Angelica Root, Cassia, Cinnamon, Liquorice, Bitter Almond, Grains of Paradise, Cubeb Berries	Up to 8:1	Up to 12.5g of each chosen botanical
Quaternary	Bitter Orange peel, Sweet Orange peel, Ginger, Orris Root, Cardamom, Nutmeg, Savory, Calamus (sweet flag), Chamomile, Lemon Peel, Cracked Pepper, Lavender etc	Up to 80:1	Up to 1.25g of each chosen botanical

Note: Botanicals used from the same flavouring “level” do not need to be added at the same rate eg you may use 5g Liquorice but only 2g Angelica.

Experiment. Add more of 1 botanical & less of another. Don't forget to keep records & report your results on [www.stilldragon.org](http://www.stilldragon.org)

### Botanical Amounts

One of the beautiful things about vapour infused gin is it scales well. This means you can produce small “All in 1” batches until you get a recipe you are happy with, then increase the quantities proportionally for a larger batch.

The use of ratios allows you to easily scale your recipes to match the quantity of spirit you want to produce.

As a guide use between 25 and 40 grams of botanicals per litre of spirit eg use between 150g and 240g total botanicals in a 6l “all in 1” batch. The basket has been tested to hold over 400g of botanicals (note exact amounts will vary depending on the botanical ratio uses as well as the size of the particles).

The use of less botanicals and more spirit will result in a “lighter” end product.

### DragonTip

If you find your end product is a bit “heavy” on the botanicals, you can always dilute it down with neutral spirit for a lighter product.

Note: this is called ‘stretching’ a Gin.

<sup>2</sup> 2 parts Juniper to 1 part Coriander seed is a good starting point

## Gin Head Assembly

It is assumed that you have read the StillDragon Users Guide and / or are familiar with the various components and their assembly.

### Components

The GB4 Gin Head Kit Includes

- (1) Gin Head
- (2) Baskets
- (1) Wire Stand
- (1) 2" Sight Glass Kit
- (2) 4" Clamps
- (2) 4" Gaskets
- (1) 2" Clamp
- (1) 2" Gasket
- (2) Choke Washers
- (1) 2" End Cap
- (1) 3/4" Clamp
- (1) 3/4" Gasket
- (1) DN10 Santi Valve
- (1) Custom 4" End Cap with handle
- (1) 4" x 3/4" Short Reducer

Fittings for the connection of the head to the still or the product condenser are not included.



Figure 1: SD Gin Head Supplied Components

## Basic Assembly



Figure 2: Assemble with the valve on the bottom and the handle at the top



Figure 3: Included accessories

The sight glass kit can be installed on either the left or right side of the head as required for individual configurations. Use the supplied end cap to close whichever port is not used. The Allen keys on the sight glass kit should be done up so they are just nipped up, no extra tension is needed to seal the unit.

The choke washer is installed on the input side of the housing to speed up the vapour flow.



Figure 4: A basket and stand

The kit supplies two baskets and one stand; the stand goes on the bottom under the basket to keep the botanicals out of any liquid that may collect in the bottom of the body.



Figure 5: Fully assembled body



Figure 6: Fully assembled body view 2

Don't forget to install the wire mesh stand off in the bottom of the housing so the vapour flows through the length of the botanical basket.



Figure 7: Stand and bottom of basket viewed through site glass



Figure 8: Head mounted on a 2" setup



Figure 9: Head mounted on a 4" setup

### Additional Information

For a gin run, configure the still to operate as a basic pot still with limited / no reflux. You will want your output to be at a convenient height. Depending on the components you have, you can use Bubble Tee's without plates &/or straight extensions to which you add the gin head assembly. You will need to experiment a little to find the right combination of components to get your parrot at the right height.



Figure 10: The Authors SD Gin Head adjusted to height using a 510mm section and 2 empty bubble Tees



Figure 11: Assembled SD Gin Head with optional cleaning port on 90° elbow

If you are doing a large batch you will need to install the dephlegmator on top of the column so you can put the still into full reflux allowing you to easily swap out baskets during the course of the run without having to shut down the still.



Figure 12: Standard Configuration with optional threaded 90° for clean in place



Figure 13: An Alternate Configuration



Figure 14: A dual head configuration for large volumes



## Operation

Whilst the Still Dragon Carter head makes it possible to produce a gin directly from a wash (by inserting the basket after the fores and heads cuts), it is not recommended. You will get a higher quality product that you can more consistently produce by using diluted high quality neutral spirit in the boiler. Doing a direct wash to product run or low wines to product run, would require making cuts on the fly, which as we know is difficult, and may not extract all of the characteristics from the botanicals.

When re-distilling a hearts cut with an “all in 1” run or if you do a juniper single ingredient run you need to make a small juniper oil cut at the beginning of the run. The first 5 to 10 mls will be full of juniper oils with a rather harsh smell & taste. You can see it when you collect the first 10 mls as there is a cloud in it. You can choose to add this back to the spirit when blending.

Different flavours will come out at different stages of the run. Think of the run and flavours as being tree like. The fruitier floral notes found higher in a tree will come out first while the lower earthier root like flavours will appear later in a run. However, some ingredients are ‘ghosts’ they have early extraction, then late extraction.

### Method 1: Blending Single Ingredient Distillations

This method produces a distillate of each individual botanical, which you then blend together using your chosen ratio to obtain a finished product.

You will need to perform a full run per ingredient so you capture every aspect of the botanical in the resulting distillate.

Whilst it is time consuming and requires some preparation, Individual ingredient runs provide the base distillates that will allow you to experiment with many different blend permutations prior to committing to an “all in 1” run.

Product consistency is a key feature of most commercial products. Large commercial operators adjust their ingredient proportions based on chemical analysis of their supplies. That is not feasible for the small operator. Single ingredient runs provide a mechanism for smaller distillers to adjust the ingredient ratios of their “all in 1” runs when new batches of ingredients arrive or a new supplier is used.

Single ingredient distillations are achieved by:

1. Loading the 1<sup>st</sup> botanical into the gin basket, inserting it in the head & clamping it up
2. If you run an electric boiler, fill the boiler with water to more than cover the element
3. Charge the boiler with Neutral (1.2l if you want to collect 1l of end product)
4. Run the still with no reflux and collect a 1l jar of extract #1 down to 20%– label it.
5. Shutdown the column

### DragonTip

A small brandy balloon is good as it allows excellent olfactory inspection (smelling) & the way you hold the glass assists to warm the spirit & release volatiles.

6. Drain the liquid from the carter head into a waste jar using the drain valve on the bottom of the head.
7. Load the 2<sup>nd</sup> botanical into the 2<sup>nd</sup> basket then insert it into the head & clamp it up.
8. Flush the output path with clean fresh water – drain from the valve on the bottom of the parrot.
9. Charge the boiler with another 1l of neutral. Periodically add more plain water to ensure you don't uncover the element.
10. Run the still with no reflux and collect a 1l jar of extract #2 down to 20%– label it.
11. Clean basket 1 and load with 3<sup>rd</sup> botanical.
12. Repeat steps 5 – 10 for all other botanicals

You may be tempted to charge the boiler with a larger volume of neutral then periodically put the still into full reflux and change the basket with a different botanical. That is possible, however this is not recommended as a full run of each botanical is required to get the full flavour. This is due to the flavour profile of each botanical changing over the course of a run. Each botanical's flavour extraction profile differs, some are dominant at the start with nothing in the middle of the run with more coming out at the end.

Note: Powdered botanicals such as orris root will need to be contained in a hop bag or cheesecloth as they will fall through the basket perforations & "gum up" the holes once vapour flows through the basket.

Once you have collected jars of each botanical, and prior to blending different distillates together, use Radar charts and the "rough rule of thumb" to determine the how much of each of the collected botanical extracts to mix together to produce your final gin.

This technique allows you to quickly experiment with creating product using different ratios of the individual botanical distillations.

Consider making 30ml blends. Why?

1. 30 ml is the size of a standard nip and if you don't like it, you haven't wasted a lot of extract.
2. Errors can be fixed by adding more of other botanical extracts to restore balance.
3. Many variations and permutations can be quickly developed without wasting a lot of time or materials such as would occur if the operator mixed up a large quantity of various extracts or put a lot of botanicals in the basket and did a full run.

Print out the Record Sheet for Blending Individual Distillations in Appendix 3. Determine the ratio then calculate the volume of each extract required in a 30 ml blend. Record details on the record sheet.

After you have allowed the individual distillates to sit overnight, use a pipette to carefully measure the required volume of each extract into a sampling glass and stir well.

### DragonTip

You may like to water the sample down or mix it with soda water or tonic.

Critically evaluate your creation. Swirl & smell. Sip then slowly breathe in through your mouth over the spirit. Swirl the spirit around your mouth then breathe out your nose for retronasal evaluation.

How does it compare to how you visualised it tasting? Is it like the radar plot? Does anything dominate? What is lacking? Is it what you anticipated? What else could it use (Spice / heat / floral / citrus)?

Take copious tasting notes of the ratios used as well as the aroma and flavour profiles. Mid palate weight is a key aspect to look for.

If you used Radar plots as part of the recipe / ratio formulation, how does the finished blend match the original radar plot? What needs tweaking? Is one aspect dominant or subdued?

If you didn't initially use a radar plot, why not use one as part of your product evaluation?

Adjust the proportions and repeat the process until you have found your perfect ratio. Be sure to post your results to <http://www.stilldragon.org> as these results over time will grow to become a valuable reference library of gin data.

Now you have the ratio, it is just a simple matter of blending the botanical extracts together in a larger quantity using your perfect ratio to produce the desired volume.

Here is a write up of this approach being used by Heriot Watt University <http://web.sls.hw.ac.uk/dl/IBD2013TLDC.pdf> Note the complexity of their radar (spider) plot!

## Method 2: All in One

This approach builds upon the knowledge gained from blending individual ingredient distillates to produce larger volumes of product without having to make & blend individual extracts. It simply involves loading all of the botanicals into the basket and performing the run.

It can also be used to forego the steps of making individual extracts and blending and simply make the final product. Why would anyone do that I hear you ask? Maybe you have been given a tried & tested recipe? Perhaps you are one of the impatient amongst us? Maybe you are someone who learns best by jumping in at the deep end. Perhaps you have tested the flavour profile using an all in 1 maceration and want to try the same recipe using vapour infusion? Technically you want to do all in 1 runs, as vapour molecules will bond under heat and form new complex characters that individual macerations or single ingredient runs cannot replicate.

Regardless of why you use this approach, once you decide on a ratio, calculate the required weight of each botanical based on the volume of spirit.

1. Determine the ratio and quantity of each botanical required.
2. Weigh out each botanical and place them in a mixing bowl.
3. Mix the botanicals together then add to the basket. Hold the basket over the mixing bowl so you don't get powdered ingredients everywhere.
4. Insert the basket in the head & clamping it up.
5. If you run an electric boiler, fill the boiler with water to more than cover the element.
6. Charge the boiler with Neutral (amount is dependent on batch size).
7. Top up boiler with water to reduce the % ABV to below 40%.
8. Run the still with no reflux.
9. Collect the 1<sup>st</sup> 10-20mL in a jar and set aside
10. Collect all other product down to 10-20%. It is up to you whether you collect in 1 large jar or many smaller ones & blend later.
11. Shutdown still.
12. Drain the liquid from the carter head into a waste jar using the drain valve on the bottom of the head.
13. Clean up.

## Dilution

Gin is typically diluted to 40-45%, 42% is common. Use quality spring or distilled water to dilute your spirit to your desired drinking strength, however if you charged the boiler with 40% neutral, you will typically end up with a 40% end product.

### DragonTip

If doing larger quantities the user may choose to put the still into full reflux then swap the basket with a 2nd basket of fresh botanicals.

### DragonTip

Despite what you may read about crushing botanicals it is NOT recommended as it forms over-extraction. It is only needed if you're using fresh ingredients that haven't been processed eg actual liquorice plant.

## Resting

All newly made Gin will benefit from a period of resting before consumption. Resting is simply the process of leaving the diluted / mixed Gin for a period of time to allow the flavours to blend together.

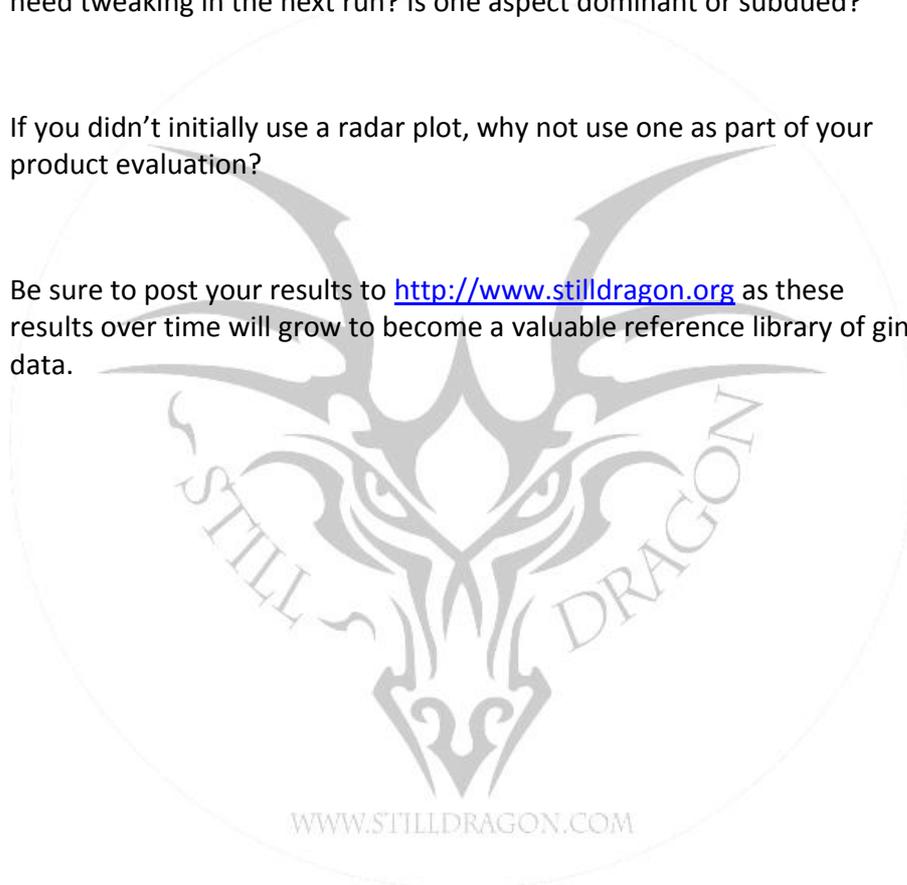
Resting for 7-21 days before consumption is common.

## Evaluation

If you used Radar plots as part of the recipe / ratio formulation, how does the finished product match the original radar plot? Does anything need tweaking in the next run? Is one aspect dominant or subdued?

If you didn't initially use a radar plot, why not use one as part of your product evaluation?

Be sure to post your results to <http://www.stilldragon.org> as these results over time will grow to become a valuable reference library of gin data.



## Recipe Suggestions

The suggestions below will provide you with a good starting point on your gin journey. You will note that they are all based on using ratios which totals 100%. This is deliberate as it makes the maths easy ;-).

The tables also provide minimum and maximum quantities based on the suggested botanical usage rate of between 25 and 40 grams of botanicals per litre of spirit. So decide the amount you want to use per litre of spirit, multiply that by the batch size & that is how much of each botanical you need to weigh out.

Remember these quantities are a guide. It is often more convenient to round the value up to the nearest whole number eg you may calculate you need 9.5g of Grains of Paradise, however for convenience & to save wastage, use 10g as that is the size of the packet that you've bought.

### London / Dry gin

#### #1

Botanical	Ratio (%)	Min / Litre (g)	Max / Litre (g)
Juniper	60%	15	24
Corriander	30%	7.5	12
Cassia	5%	1.25	2
Angelica root	5%	1.25	2

#### #2

Botanical	Ratio (%)	Min / Litre (g)	Max / Litre (g)
Juniper	55%	13.81	22.1
Corriander	28%	6.91	11.05
Cassia	6%	1.38	2.21
Angelica root	6%	1.38	2.21
Liquorice	6%	1.38	2.21
Bitter Orange Peel	1%	0.14	0.22

#### #3

Botanical	Ratio (%)	Min / Litre (g)	Max / Litre (g)
Juniper	62%	15.43	24.69
Corriander	31%	7.72	12.35
Angelica root	6%	1.54	2.47
Bitter Orange Peel	1%	0.15	0.25
Orris Root	1%	0.15	0.25

#### #4

Botanical	Ratio (%)	Min / Litre (g)	Max / Litre (g)
Juniper	47	11.85	18.96
Corriander	24%	5.92	9.48
Angelica root	5%	1.18	1.9
Cassia	5%	1.18	1.9
Liquorice	5%	1.18	1.9
Bitter Almonds	5%	1.18	1.9
Grains of Paradise	5%	1.18	1.9
Cubeb Berries	5%	1.18	1.9
Bitter Orange Peel	1%	0.12	0.19
Orris Root	1%	0.12	0.19

### Jenever

To make Jenever, you first need to make malt wine (Moutwijn). This is achieved by mashing equal amounts of Rye, Corn and Malted Barley. For an excellent introduction to All Grain Brewing, go to John Palmers excellent site [www.howtobrew.com](http://www.howtobrew.com). If you are new to all grain brewing, also research "Brew in a Bag" also known as BIAB.

The basic process outlined below is a summary of information sourced from <http://www.stillcooker.com>.

Equal amounts of Rye, Corn and malted Barley are ground into a coarse "grist" then a step mash is performed with an initial L:G ratio of 2:1 as follows:

- 55°C for 30 minutes
- 65°C for 60 minutes (the temperature is raised by adding more hot water)
- 72°C for 30 minutes

At the end of the mash your drained wort will have an SG of 1050-1060. Cool the wort to around 25°C and pitch the yeast. The resulting wash will be about 5–7% ABV. Typically three pot still distillation runs were used to produce Maltwine at about 46-48% ABV. However that can be cut back to 1 run on a StillDragon Dash.

To convert malt wine to Jenever malt wine is traditionally divided into four different volumes:

- One volume remains is pure malt wine
- The second volume is re-distilled in a small pot still loaded with Juniper berries.
- The third part is re-distilled to 75% ABV
- The fourth part is used to be re-distilled with the remaining botanicals.

The amount of each of these four products is what differentiates each Jenever brand.



To replicate this traditional process using a Still Dragon Dash unit & Carter Head use the following process:

1. Mash and ferment grains as described above
2. Configure the components into a Dash with 3-4 plates.
3. Charge boiler with wort and run
4. After airing, make cuts as usual
5. Divide resulting distillate into 2 parts:
  - a. The first part =  $\frac{1}{4}$  of the total volume at 75% ABV
  - b. The second part –  $\frac{3}{4}$  of the volume at around 47% ABV - you may need to dilute to achieve this.
6. Retain one third of volume of the 47% Malt wine and set aside.
7. Charge the boiler with the remaining two thirds of 47% malt wine.
8. Top up boiler with water to reduce the % ABV to below 40% & ensure the element does not run dry.
9. Load desired quantity of juniper into 1 basket and the remaining botanicals in the 2<sup>nd</sup> basket
10. Put the basket of juniper in the StillDragon Carter head and seal up.
11. Collect 1 volume of juniper infused malt wine – set aside.
12. Put still into full reflux
13. Drain the liquid from the carter head into a waste jar using the drain valve on the bottom of the head.
14. Load the 2<sup>nd</sup> basket of botanicals into the head & clamp it up.
15. Flush the output path with clean fresh water – drain from the valve on the bottom of the parrot.
16. Adjust the dephlegmator needle valve to stop any reflux & collect 2<sup>nd</sup> botanical.
17. Collect 1 volume of botanical infused malt wine
18. Shut down still and clean up.

## Blending

You will now have 4 jars of different Malt wines:

1. One volume 47%
2. One Volume 75%
3. One volume Juniper infused
4. One volume Infused with the remaining botanicals.

Use the technique in Method 1: Blending Individual Distillates to experiment with different blending ratios to create your own signature Jenever! Dilute to 38%-40% ABV and add 2g white sugar per litre. Age for several weeks before consumption.

### DragonTip

As per the Styles section earlier in this guide, you can produce the Juniper and botanical distillates using neutral alcohol instead of malt wine.

Research has shown that most modern Jenever is based on 2/3 neutral alcohol and 1/3 maltwine, Juniper extract and Botanicals extract.

Jenever producers also guard the ratio of botanicals used in their products. According to <http://www.stillcooker.com> the following will provide the distiller with a good starting point for making 5 litres of Jenever:

- 10 gr. Juniper Berries
- 5 gr. Coriander
- 2 gr. Caraway seed
- 2 gr. Alsem
- 2 gr. (Artemisia vulgaris)
- 2 gr. Blessed Thistle
- 2 gr. Angelica
- 2 gr. hops
- 1 gr. Cinnamon
- 1 gr. Nutmeg
- 0,5 gr. All spice
- 1,5 gr. Orange peel
- 1 gr. orange blossom

### Old Tom

You can make an approximation of Old Tom by adding some sugar syrup to a regular dry gin.

Then again, why not experiment with using “sweet” botanicals and creating your very own interpretation? Be sure to post your results to <http://www.stilldragon.org>



## Care Instructions

Wash out your still & boiler after each use.

Disassemble and wash all components on the output side of the gin head (extensions, product condenser, parrot etc.) in hot water. This is necessary, as you don't want to contaminate your next run!

Disassemble and wash all of the gin head components in hot water.

### DragonTip

Most components can be put in the dishwasher to make clean up easy.

## Tips & Tricks

Record – EVERYTHING

Experiment with different types of juniper, Australia has many native Junipers that are phenomenal.

Experiment with different botanicals. Many native species will produce amazing flavours.

Keep botanicals in a cool, dark place.

Don't ever crush botanicals! Over-extraction can ruin a gin.

## Troubleshooting

Symptom	Issue	Solution(s)
Product turns cloudy in the glass when water added	Louching	Discard first 10-30ml collected  Slow down the distillation, you want those oils spread out across different cuts. It turns cloudy because the oils drop out of solution due to a lack of alcohol. Hence, the higher the abv of a Gin, the more potential flavour it can pack in.

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## Other Uses

The Still Dragon Carter Head and basket can also be used for several other purposes apart from making Gin. These include:

**Subtle liqueurs / flavoured vodka making.** Instead of macerating fruits and botanicals in neutral before straining and sweetening the liquor, why not try loading the basket with the fruits etc and vapour infusing the neutral for a really subtle flavour? The captured product can then be sweetened as required. If making fruit infusions, dried fruits will work better than fresh. Herbal-based products such as Raki (anise) and Absinthe (wormwood) are obvious candidates to experiment with.

**Cooking Essences.** Load the basket with fresh herbs such as basil, chopped lemon grass stalk etc to make extracts you can simply add to your next meal.

**Essential oil.** Essential oils are a large global industry. The perfume trade and cosmetics industries use lots of essential oils as does the health & wellness industry. Essential oils are typically produced using water as the solvent rather than alcohol as we do when making gin. Be aware you will need a lot of raw material to get a decent amount of oil.

**Flower waters.** Hydrosols are oils that are in solution with water at room temperature. Once the essential oils have been removed from the output the water that remains can be put into an atomiser for a refreshing spray (ladies love it ;-)) or used in cooking (eg rosewater is used to make Turkish delight).

**Carbon cleaning.** Prior to using activated carbon to polish neutral spirit eg in a StillDragon Philter, it needs to be prepared. After washing in fresh water to remove fine dust, load the carbon into the StillDragon basket and charge the boiler with water. The steam works really well to ready the carbon for use.

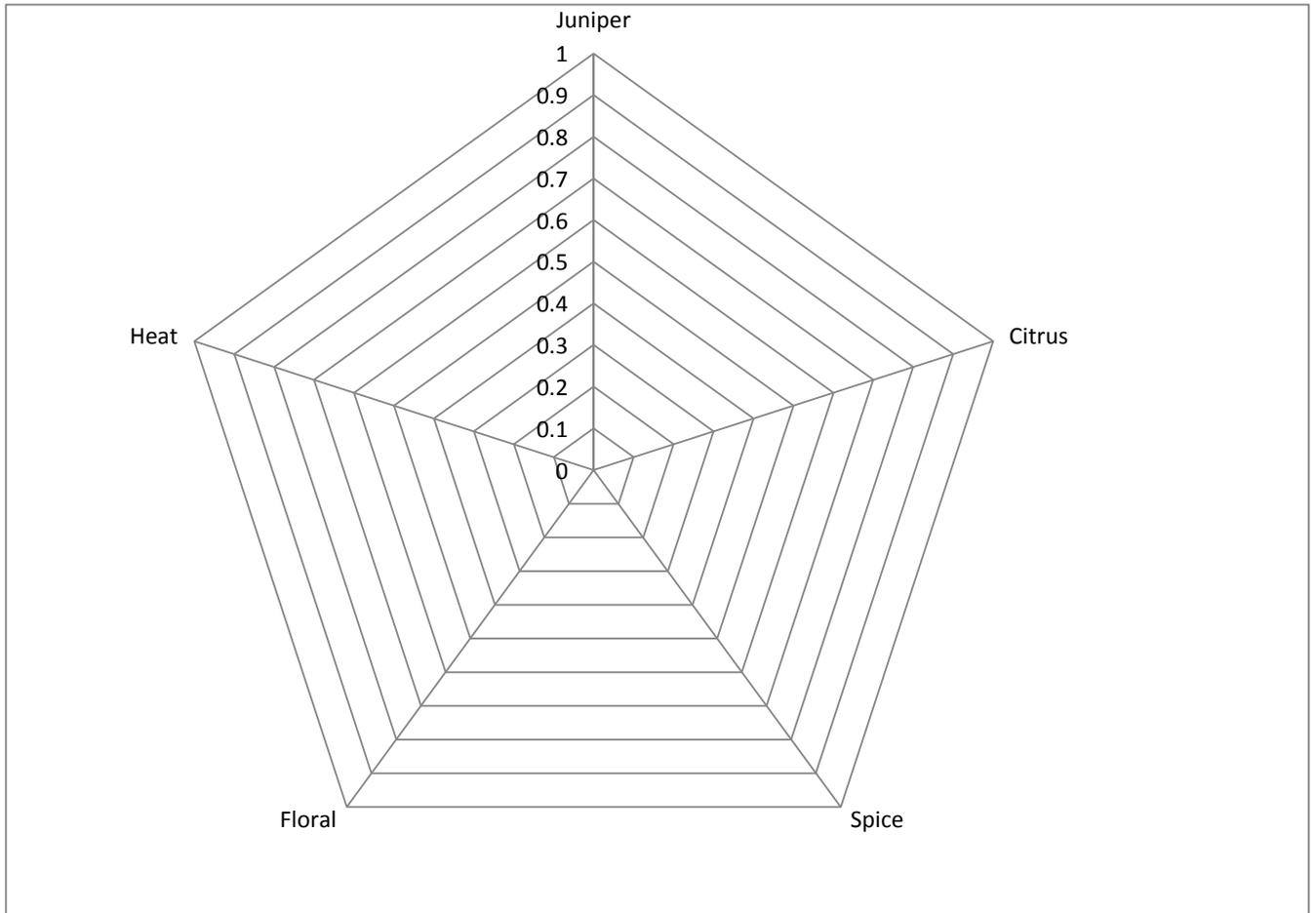
**Whiskey production.** Load the basket with peat for a subtly peated whiskey. This is actually part of what Carter-Head stills were originally designed for.

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## Appendix 1: Individual Maceration Record Sheet

Individual Maceration Record			
Jar	Botanical	Aroma Observations	Flavour Observations
Jar 1			
Jar 2			
Jar 3			
Jar 4			
Jar 5			
Jar 6			
Jar 7			
Jar 8			
Jar 9			
Jar 10	WWW.STILLDAGON.COM		
Jar 11			
Jar 12			
Jar 13			

## Appendix 2: Radar Chart



## Appendix 3: Record Sheet for Blending Single Ingredient Distillations

Record Sheet for Blending Individual Distillations			Date	
	Botanical	Desired Ratio <small>from radar chart or "rough rule of thumb"</small>	Amount in 30 mL blend	Amount in 1L blend <small>Multiply amount in 30 ml blend by 33.33</small>
Jar 1				
Jar 2				
Jar 3				
Jar 4				
Jar 5				
Jar 6				
Jar 7				
Jar 8				
Jar 9				
Jar 10				
Jar 11				
Jar 12				
Jar 13				
<b>Aroma Observations</b>		<b>Dominant:</b>  <b>Subdued:</b>  <b>Missing:</b>  <b>Possible enhancement:</b>		
<b>Flavour Observations</b>		<b>Dominant:</b>  <b>Subdued:</b>  <b>Missing:</b>  <b>Possible enhancement:</b>		

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## Appendix 4: Record Sheet for an All in 1 Run

Record Sheet for an All in 1 Run		Date	Neutral volume & ABV% used			
Botanical <small>including source &amp; batch info</small>	Ratio %	Weight used (g)	Collection Record			
			Jar #	Volume	%ABV	Comment eg aroma
			Jar 1			
			Jar 2			
			Jar 3			
			Jar 4			
			Jar 5			
			Jar 6			
			Jar 7			
			Jar 8			
			Jar 9			
			Jar 10			
			Jar 11			
			Jar 12			
			Jar 13			
<b>Run Observations / comments</b>						
<b>Blending / Cutting Comments</b>						
<b>Aroma Observations</b>		<b>Dominant:</b> <b>Subdued:</b> <b>Missing:</b> <b>Possible enhancement:</b>				
<b>Flavour Observations</b>		<b>Dominant:</b> <b>Subdued:</b> <b>Missing:</b> <b>Possible enhancement:</b>				