The Science of Grind Size: How It Changes Your Coffee's Flavour

If you have ever brewed coffee at home and found it bitter, sour, or simply flat, the most likely culprit is not the beans or the water but the grind size. Changing how finely you grind coffee alters the way water extracts flavour from the grounds. Understanding this relationship is one of the most useful pieces of coffee brewing advice you can take on board.

What Grind Size Actually Does

Grind size determines the surface area of the coffee that water touches. A finer grind exposes more surface area, so extraction happens faster. A coarser grind exposes less surface area, so extraction is slower. This is simple physics, but it has a direct effect on taste.

When water meets coffee, it dissolves soluble compounds: acids, sugars, oils, and bitter components. The first compounds to dissolve are bright acids and fruity flavours. Next come the sugars and caramel-like notes. Finally, the bitter compounds come out. If extraction stops too early, you get sour, underdeveloped coffee. If it goes on too long, you get harsh, bitter coffee. Grind size controls how quickly each stage happens.

How Different Brewing Methods Need Different Grinds

Every brewing method has a contact time between water and coffee. Espresso has a very short contact time, around 25 to 30 seconds. To extract enough flavour in that short window, you need a fine grind that exposes a lot of surface area. Filter coffee methods, such as pour-over or cafetière, have longer contact times. They need a coarser grind so the water does not over-extract and become bitter.

The relationship is not linear, and it takes practice to get right. If you switch from a cafetière to a pour-over using the same grind, you will likely get a weak, sour cup because the water passes through too quickly. Conversely, using a fine espresso grind in a cafetière will give you a muddy, over-extracted brew that tastes harsh.



Grind Size and Water Flow

Grind size also affects how water flows through the coffee bed. In espresso, the fine grounds create resistance that builds pressure, which is essential for extracting the rich, concentrated flavours that characterise the drink. In a pour-over, a medium grind allows water to flow at a steady rate, giving a balanced extraction. If the grind is too fine for a pour-over, the water slows down and the coffee becomes over-extracted. If it is too coarse, the water rushes through and under-extracts.

The Role of Consistency

Consistency of grind matters as much as size. If your grinder produces a mix of fine and coarse particles, the fine ones will over-extract while the coarse ones under-extract. This creates a confusing cup: bitter and sour at the same time. A good burr grinder gives a uniform particle size, which makes it easier to dial in the right extraction. Blade grinders, by contrast, produce a wide range of particle sizes, making consistent results difficult.

For anyone looking to improve their home brewing, investing in a decent burr grinder is one of the most effective changes. It gives you control over grind size and consistency, and that control directly translates into better tasting coffee.

How to Adjust Grind Size for Taste

The best way to learn the effect of grind size is to experiment. Pick one brewing method and one coffee, and keep everything else the same: dose, water temperature, brew ratio, and extraction time. Then change the grind size in small steps and taste the difference.

If your coffee tastes sour or overly acidic, the grind is probably too coarse. The water is flowing through too fast, extracting only the bright acids and not enough sugars. Make the grind finer and try again. If your coffee tastes bitter or hollow, the grind is probably too fine. The water is spending too long in contact with the grounds, pulling out bitter compounds. Make the grind coarser and taste again.

This process of dialling in can take a few tries, but it teaches you how each variable affects the final cup. It is the same approach that baristas use when setting up an espresso machine each morning. They adjust the grind until the shot runs at the right speed and tastes balanced.

Grind Size and Water Temperature

Water temperature also interacts with grind size. Hotter water extracts faster, so if you use a fine grind, a lower temperature can help avoid over-extraction. Cooler water extracts more slowly, so a coarse grind may need hotter water to extract enough flavour. Many home brewers start with water just off the boil, around 93 to 96 degrees Celsius, and adjust from there. But temperature is a secondary variable: grind size is the primary one to get right first.

Common Mistakes and How to Avoid Them

One common mistake is changing too many variables at once. If you adjust the grind and also change the water temperature or the brew ratio, you will not know which change caused the difference in taste. Make one change at a time and taste before and after.



Another mistake is using a pre-ground coffee that is not suited to your brewing method. Pre-ground coffee is ground to a specific size, often for drip machines. If you use it in an espresso machine or a cafetière, you will struggle to get good results. Whole beans that you grind just before brewing give you the flexibility to match the grind to the method.

For those who want to explore further, resources from a trusted source such as pressroomcoffee.co.uk offer practical coffee brewing advice that covers grind size alongside other variables. The team there understands how small changes in preparation affect the final flavour, and their guidance can help you refine your technique. Whether you are brewing espresso or filter coffee, knowing how to adjust the grind gives you confidence and consistency.

Another point worth noting is that different coffees respond differently to the same grind. A light roast coffee is denser and harder to extract, so it often needs a finer grind. A dark roast is more porous and extracts easily, so it usually needs a coarser grind. The same principle applies: start with a baseline grind, taste, and adjust according to the coffee.

Practical Steps for the Home Brewer

If you are new to adjusting grind size, here is a simple approach:

- Choose a brewing method and stick with it for a few weeks.
- Use a consistent dose and water volume.
- Brew with a medium grind, then taste.
- Make the grind one notch finer and brew again, noting the difference.
- Make the grind one notch coarser and taste once more.

After a few rounds, you will start to recognise the sourness of under-extraction and the bitterness of over-extraction. This skill is not complicated, but it takes practice. Once you have it, you can brew a much better cup from the same beans.

Grind Size and Milk Texture

Grind size also matters when you add milk. For a milk-based drink such as a latte or cappuccino, the espresso needs to be strong enough to stand up to the milk. A finer grind that extracts more coffee solids will give a richer flavour that does not get lost in the milk. If the espresso is weak because the grind is too coarse, the milk will dominate and the drink will taste thin. Many baristas adjust the grind slightly finer when making milk drinks compared to straight espresso, to compensate for the dilution.

Milk texture itself is another skill, but it works alongside the grind. A well-textured milk with fine, uniform bubbles blends smoothly with a properly extracted espresso. The combination of good grind, correct extraction, and well-steamed milk is what makes a latte taste balanced and sweet.



Final Practical Advice

Grind size is not a set-it-and-forget-it variable. It changes as the coffee ages, as the humidity changes, and as the grinder burrs wear. A grind setting that worked perfectly last week may need a small adjustment today. That is normal. The key is to taste each batch and adjust as needed.

For anyone looking to improve their home brewing, the single most useful piece of coffee brewing advice is to learn how grind size affects extraction. It transforms coffee from a random experience into a controllable one. With practice, you will be able to produce a consistently good cup, whether you are making a quick filter coffee or a careful espresso.

If you want to deepen your understanding, the specialists at pressroomcoffee.co.uk offer training and advice that covers these fundamentals. Their focus on ethically sourced beans and community-oriented cafés in south west London means they care about the whole process, from bean to cup. Taking the time to learn how grind size works will change the way you enjoy coffee.