



ILLUSTRATION BY ALICE STEVENSON

A matter of taste

Last year, *The Garden* invited a panel of experts to assess the flavours of a range of fruit and vegetables. As an introduction to her new series, which will explore the results of the tastings, **Christine McFadden** examines the principles behind the perception of flavour. Photography by Tim Sandall

FEW GARDENERS taste their home-grown produce in the same way that connoisseurs taste wine, but it is only by consciously assessing and recording nuances of flavour that home gardeners can develop a benchmark for themselves and for future gardeners.

As Raymond Blanc (Chef Patron of Le Manoir aux Quat'Saisons restaurant in Oxfordshire) says, 'When you taste a good one, you absolutely know, without any doubt, that this is the perfect strawberry or tomato or pear, that this is the

essence of what it should taste like.' It is vital not to lose sight of this knowledge, especially at a time when shelf life often seems to take precedence over flavour.

Tasting is valuable on a practical level too. If we taste throughout the growing season, we can judge when produce has reached its prime and when it should be harvested. This can also give us a clearer understanding of the cultivation techniques that affect flavour. Armed with this knowledge we can adjust feeding, watering and planting times to maximise exposure to all important sunlight.

What is taste?

Most scientists agree that there are four main identifiable tastes: sweet, sour, salty and bitter. There is also *umami*, a translation-defying Japanese term that means something like meaty or savoury. We experience these basic tastes through thousands of taste buds, mainly on the tongue but also inside the cheeks and at the back of the mouth. Taste is sensed all over the tongue: most research suggests that certain tastes are sensed more strongly in particular areas of it.

The intensity with which we experience taste depends on several factors, including sex and age. Children have a huge number of taste buds in their mouths, which makes them incredibly sensitive to taste; when a child recoils in horror from a Brussels sprout, they do so with reason. The sensitivity and amount of taste buds gradually decline with age, especially after the mid-40s. Older people therefore understandably complain that 'food doesn't taste like it used to'.

Some people are born with a better sense of taste than others. Scientists have identified a group they call 'super tasters' who detect flavours at levels that the rest of us would barely notice. This ultra-sensitivity is directly related to hormonal

GETTING TO KNOW YOUR TASTES

(clockwise from top left) Quinces have a sour taste, while tomatoes contain a mixture of sweetness and sourness. Radishes are known for being distinctively hot or pungent; chicory is often described as having a bitter taste



activity, and women are more likely to belong to this group than men. Genetic factors also explain why some people are 'taste-blind' (totally insensitive to one or more of the basic tastes) and why certain foods taste fantastic to most of us, but others find them disgusting.

Is taste different from flavour?

Even though the words are used interchangeably, there is a difference between taste and flavour. We experience taste purely in the mouth, but flavour involves the nose as well. When we chew food, cells in the lining of the back of the mouth capture the aromas and transmit them to the olfactory bulb, an organ behind the bridge of the nose. These chemical messages, and those from the taste buds, are transmitted to the brain, which interprets them as flavour.

As anyone suffering from a heavy cold will know, food has little flavour when we lose our sense of smell. Try holding your nose and eating a slice of onion, then a piece of apple. Their flavour vanishes and the two radically different tastes are barely distinguishable.

The senses of sight, sound and touch also come into play. For example, the colour and crunch of an apple, and the way it feels in the mouth, add to our perception of its flavour. Another factor is cultural conditioning. We in the West are wary of bitterness, which we may associate with unpleasant medicine or poison. But in Oriental cuisines a meal is not a meal without a bitter component to balance sweetness.

What produces taste?

The characteristic flavours and tastes of fruit and vegetables arise from a chemical cocktail of sugars, organic acids, enzymes and aromatic compounds. If it weren't for sugars, sweet corn, peas and carrots would have little to commend them. Even the sharp pungency of onions is tempered by a shot of sweetness, as are chillies and, to some extent, radishes.

The tanginess we so enjoy in fruit is a blend of sugars (including glucose, fructose and sucrose) and organic acids (malic and citric acid). The bitterness inherent in certain vegetables comes from various families of chemicals: glucosinolates in swedes and lactones in endives, for example. However, it is the widely varying and potent aromas of volatile compounds that enable us to distinguish flavours. The sharp, citrusy fragrance of lemons and grapefruit comes from compounds called terpenes, and the fruity hint of nail varnish in pears, strawberries and bananas comes from esters and aldehydes. ►

TASTE CATEGORIES

Fruit and vegetables can be classified according to their predominant tastes, as with the examples below. Interestingly, no land-grown vegetable can be described as 'salty', even those that contain relatively high levels of sodium or are grown on saline soil

	sweet	sour	salty	bitter	umami	pungent
apple	●	●				
pear	●	●				
quince		●				
strawberry	●	●				
tomato	●	●			●	
aubergine				●	●	
beetroot	●			●		
chicory				●		
chilli	●					●
onion	●					●
pea	●				●	
radish				●		●
spinach		●		●		
swede				●		●

As fruits ripen, their flavours change. Most obvious is an increase in sweetness as sugars start to override acidity. In vegetables such as sweet corn and peas the opposite takes place, as starches take over from the sugars and the flavour becomes bland. Salad greens develop bitterness as they mature, while leafy vegetables and herbs become more intense, particularly in the outer leaves. The aromatic flavour compounds also undergo complex chemical changes that remain poorly understood.

The alchemy of taste and flavour

Basic tastes interact with each other, as we discovered time and again in our tasting trials. For example, the Yin and Yang relationship of sweetness and sourness is

TESTING TIME

Freshly picked lettuce leaves (below) await the scrutiny of the tasting panel, the analysis of which will be reported in September



'WHEN YOU TASTE A GOOD ONE, YOU ABSOLUTELY KNOW THIS IS THE PERFECT TOMATO OR PEAR'
Raymond Blanc

key to the flavour of tomatoes. If a fruit has both in more or less equal proportions, the result is what every gardener strives for – a satisfyingly well-rounded flavour that is sweet and tangy at the same time. When either sweetness or acidity is missing, or poorly represented, the flavour suffers accordingly.

Another phenomenon is that tastes are impossible to detect unless they are in solution – usually saliva, or the fruit's natural juices. This means the taste of juicy fruit such as strawberries or apples is immediately apparent in the mouth, whereas salad leaves, though succulent, have to be chewed fairly thoroughly to create the necessary saliva.

Layer upon layer of tastes and flavours present themselves at different stages in eating, as Raymond Blanc explains. Popping a whole cherry tomato into his mouth, he noticed the immediate explosion of acidity as he bit into it, followed by a complex mix of tastes and flavours that developed as he chewed.

The alchemy continues in the kitchen. Slicing a tomato, Raymond describes how exposure to air changes the flavour

of any fruit or vegetable, as does the way it is chopped or sliced – 'something the Japanese and Chinese have known for thousands of years', he says, but which is not often appreciated in the West.

The various ways in which fruit and vegetables are seasoned and cooked have an effect on flavour (as the institutional smell of cabbage demonstrates). Salt and sugar can be used to round out flavours and, to a certain extent, compensate for imbalances of sweetness and acidity. If your strawberries lack the 'wow' factor, a dusting of sugar draws out water, firms the texture and intensifies the essential flavour. Similarly, a sprinkling of crunchy sea salt brings tomatoes to life and adds welcome texture. Roasting or grilling works miracles on seemingly bland root vegetables. The dry heat of the oven concentrates starches and sugars, drawing out deeply delicious complex flavours.

The language of tasting

As important as recognising tastes and flavours is the ability to describe them, but language and vocabulary can present problems. Sourness is also called acidity;



STIMULATING THE PALATE Fresh fruit and vegetables appeal to the appetite via a combination of all the human senses. The sense of smell is crucial to the full enjoyment of food, and even hearing is involved, with the crunch of a juicy apple or a crisp lettuce playing its part. In forthcoming issues of *The Garden*, the taste of strawberries, apples and pears, tomatoes and salad leaves will be analysed by experts (see panel, right)

bitterness is confused with alkalinity; and pungency is described as piquant, hot or biting. Professional wine tasters use officially recognised descriptions, but no such vocabulary exists for fresh produce. We resort to descriptions that relate to the natural environment – earthy or herbaceous, for example – or rely on memory of a similar taste or flavour. Such descriptions may mean different things to different people, so the results of taste testing can be subjective.

Conscious and careful tasting of crops is vital for the gardener with an interest in flavour. Only by systematic tasting and recording can we build the knowledge and confidence to choose from the thousands of cultivars available. Tasting and comparing our produce with that of fellow gardeners enables us to establish standards to aim for and to pass on. The actual tasting process is enjoyable, too, especially in good company.

Bear in mind that tasting is an inexact science and one isolated tasting is not an entirely fair judgement of a fruit or vegetable. As all the experts involved in the taste trials pointed out, had the samples that we tasted been grown in a different location, or picked on another day, the results would have differed. It is simply not possible to control so many variables in small-scale trials.

Despite that, thanks to breeding and genetic make-up, most cultivars of fruit and vegetables have broadly recognisable characteristics that remain consistent. The exquisite flavour of a 'Cox's Orange Pippin' apple, for example, is instantly recognisable, as is distinctively fragrant strawberry 'Mara des Bois', despite the vagaries of climate and soil. ■

Christine McFadden is a food writer with a particular interest in fruit and vegetables

WHAT THE EXPERTS SAY



From July, **Christine McFadden** (left) will present a new series on taste. Based on the results of sessions

held last year, it will also provide advice for boosting the flavour of home-grown crops. Subjects are:

- **July** – strawberries;
- **August** – tomatoes;
- **September** – salad leaves;
- **October** – apples and pears.

THE TASTERS



Heading the team, world-famous chef **Raymond Blanc** (left) will define the flavours he expects

to find in top-quality produce.



Commercial organic vegetable grower **Charles Dowding** (left) gives practical growing advice on an

extensive range of salad crops.



Gardens Supervisor at West Dean Gardens in West Sussex, **Sarah Wain** (left) was the first woman on the RHS

Vegetable Trials Sub-Committee.



Professional fruit grower **Will Sibley** (left) will suggest practical ways of achieving the best

flavours from crops.

Others joining the taste sessions included: **Adam Johnson**

(Development Chef to Raymond Blanc), **Nurdin Topham** (Head Tutor at the Raymond Blanc

Cookery School), **Anne Marie Owens** (Head Gardener at Le

Manoir) and **Neil Wigfield** (Head Vegetable Gardener at Le Manoir).

i Further reading

● *The Elements of Taste*, by Gray Kunz and Peter Kaminsky, Little, Brown & Company, 2001, ISBN 9780316608749

● *Tasting*, by Dina Cheney, Dorling Kindersley, 2006, ISBN 9781405316187

● *Cool Green Leaves and Red Hot Peppers: Growing and cooking for taste*, by Christine McFadden and Michael Michaud, Frances Lincoln, 1998, ISBN 9780711212237

● *Food Flavours: Biology and Chemistry*, by Carolyn Fisher and Thomas R Scott, The Royal Society of Chemistry, 1997, ISBN 9780854045389