Achocha as an alternative crop

Summary

Achocha is a traditional cucurbit crop grown in regions of South America. It is often touted to have the taste of a cucumber and the texture of a pepper. We tested the spiny 'Fat Baby' achocha (*Cyclanthera brachystachia*) with 61 growers distributed around the UK. This variety was chosen as it is thought to have more resilience in UK growing conditions.
In a growing season beset by slug damage, achocha seemed to fare well, with some reporting that the plants were left alone when everything else was attacked.
Yields were respectable, with 50% of growers achieving yields of 0.4kg – 2.8kg from a wigwam of 4 plants over the summer period. Some of the highest yields were from sites in Scotland, showing that this crop is well adapted to UK conditions and poor growing seasons.
The eating qualities drew a mixed opinion, with the majority reporting that they had a very mild flavour. The harvest stage is a very important factor determining the quality. If you want to eat them raw, it is best to eat them at a small stage (less than 3 cm) before the seeds have developed. At this stage they taste more like a cucumber.
If you let the fruits get larger, it is much easier to allow them to reach 5 – 7 cm when the fluffy central tissue has dried out so that the seeds fall out freely. At this stage, it is better to stir fry them, and they will taste more like a green pepper.
It we are going to introduce a new crop, growers generally want to see an obvious benefit of growing it, aside from its novelty value. Participants were evenly mixed as to whether they would grow them again. Their resilience in a poor season is a plus point, so if space allows, it is worth growing some to ensure that you get something to eat.

Introduction

Achocha (*Cyclanthera spp.*) is a cucurbit crop thought to originate from South America [1] It is also known as Bolivian cucumber, caigua, caihua, stuffing gourd, slipper gourd or climbing cucumber. It is commonly found grown at altitude in the Andes in Peru and Bolivia but it is also widely cultivated throughout South America, Central America, Mexico, and the Caribbean [2].

There are two main types of achocha which are different species: Fat Baby' (*Cyclanthera brachystachya*) has cordate leaves and grows single fruits that are covered in soft, fleshy

spines. ‘Lady’s slipper’ (*Cyclanthera pedata*) has palmate leaves and sets smooth fruits in pairs. The ‘Fat Baby’ type was trialled here. The larger, ‘Lady’s slipper’ is some times deemed more desirable, as it produces larger smoother fruits that are good for stuffing, but it is reported that it is not as resilient at growing outdoors in a UK climate as its smaller spiny cousin, ‘Fat Baby’[3]

Cylanthera brachystachya
‘Fat baby’

Cylanthera pedata
‘Bolivian

Achocha is best grown as a vertical vine, which is quite vigorous and can reach 2m high. It produces small white flowers which are highly attractive to pollinators and beneficial insects that then go on to form large numbers of small hollow fruits. They are commonly described as having the texture of a pepper and the taste of a cucumber. The fruit is technically a berry with an outer green mesocarp and a fluffy white endocarp inside that also contains the seed [4]. Younger fruits can be eaten raw, like a cucumber with both the outer mesocarp and inner endocarp eaten. Once, the fruits become larger, the seeds become large and woody and need to be removed. The endocarp will also dry out, making it easier to remove the seeds. For this reason, older fruits are often baked and stuffed with the seeds removed. The fruits have also been shown to contain high levels of antioxidant and anti-inflammatory compounds[4]

The aim of this study was to introduce our members to achocha as an alternative crop, trial it in a range of locations around the UK, and evaluate its performance, qualities resilience.

Methodology

Participants were sent seeds 8 seeds of achocha which were sown into 7 cm pots in a warm place. After the date of the last frost, 4 plants were planted out around a wigwam of canes to allow the plants to climb.
Participants noted key dates such as first flowering and fruit set.
Harvests were taken when fruits were around 5 cm in length, at least twice a week.

Taste tests were taken on raw and stir-fried fruits.

Results

Plant ready to plant out

Response rate
117 people signed up to take part, 61 returned results giving a response rate of 52%.

Planting out
Like most cucurbits, achocha is sensitive to frost so should not be planting out until after the date of the last frost. The median date for planting out was 27th May with 50% of participants falling within range 6 May – 1 June.

Flowering:

Male flower

The median date for flowering was 20th July which is 54 days after planting out. 50% of the participants fell with range 14th July – 30 July. The flowers were quite small and clustered so were not always easy to see. Achocha is monoecious so has both male and female flowers on the same plant. The male flowers are often formed first and form in clusters, whereas the female flowers are more often solitary. The female flowers will give rise to the fruits just below the base of the flower, as with other cucurbits.

Fruit set

Female flower with fruit forming

The median date for fruit set was 3rd August, 68 days, almost 2 months after planting out.
50% of planted out within the range 24th July – 12 August. Once the fruits were set, the fruits grew quickly and were ready to harvest within a week. If you harvested the fruits smaller than 3 cm, the seeds were small enough to eat. Once the fruits got larger than this, the seeds became woody and needed to be removed. This became much easier if you let the fruits develop beyond the 5 cm size, when the inner flesh was loose enough to let the seeds fall out.

Yields

2025 was cold and very wet and dull and proved to be a very difficult season for slugs. Although many people reported that they lost all their plants to slugs, many also said the plants were left alone, when everything else around them was severely damaged or lost.

Young fruit cut open

“One of the few crops that didn't get badly chewed by the slugs this very damp growing season”.

The mean yield of fruits that was harvested from a wigwam of 4 plants was 1.8 kg.
50% of the yields fell within range 0.4 - 2.8 kg This yield was achieved by producing a large quantity of small fruits. Throughout the growing season, a mean of 142 fruits was harvested, and 50% of the participants produced a harvest with the range 14 - 200 fruits.

Yields were plotted on a map of the UK, dividing the yields into 4 categories corresponding to the four quartiles of the data (Figure 1)

It was not possible to draw conclusions as to the effect of the location on the yields, as too many other factors were having an influence. However, it is interesting that there were two locations in Scotland near Glasgow and Edinburgh that both produced yields in the highest category, suggesting that this is a crop well adapted to growing under UK conditions and can produce even in a cold wet summer.

Lowest yields 0 - 437g

Lower yields 437 - 1720g

Higher yields 1720g - 2873g

Highest yields 2873-6099g

Figure 1. Yields around the UK

Taste
There was a slight preference for the stir-fried flavour over the raw flavour.
For the raw fruit 41% rated them as pleasant or very pleasant (Figure 2). For the raw crop, many of the comments said that they were similar to cucumbers but that the flavour was very dependent on the stage at which you picked them.

"They have the taste when small of cucumbers, and as they age slightly fluffy green peppers".

Most people preferred the raw taste when they were picked small, and this also avoided the extra work of having to remove the seeds.

Once they were cooked, 55% rated them as pleasant or very pleasant.
A large proportion (40%) rated them as neutral whether raw or stir fried.

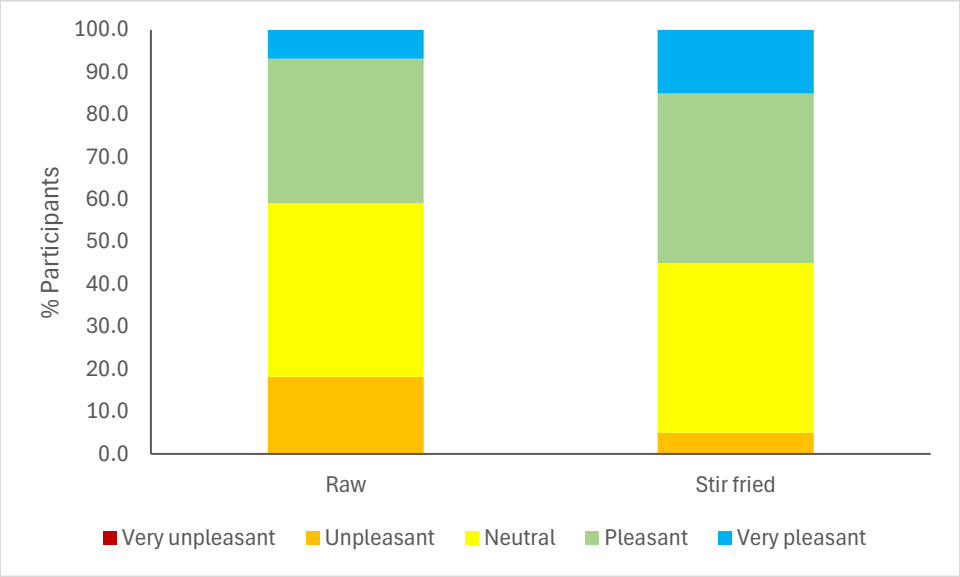


Figure 2 Participant rating for pleasantness

The comments on the stir-fried fruits commonly stated that they had a mild or even no flavour, so were useful for bulking out a dish but needed extra flavouring.

Our experiences were that the small fruits could be eaten raw, but once the fruits were allowed to develop to a larger size, they were only suitable for cooking. At this stage, the skin was tougher, but the seeds easily fell out, and once cooked, it developed more of the flavour of a green pepper.

The ratings for sweetness, bitterness, saltiness and sourness was in accordance with the comments that they were very mild in flavour, with the majority of people only rating the fruits as slightly bitter, slightly sweet, slightly salty or slightly sour – very few people stated that they had strong flavours (*Figures 3&4*)

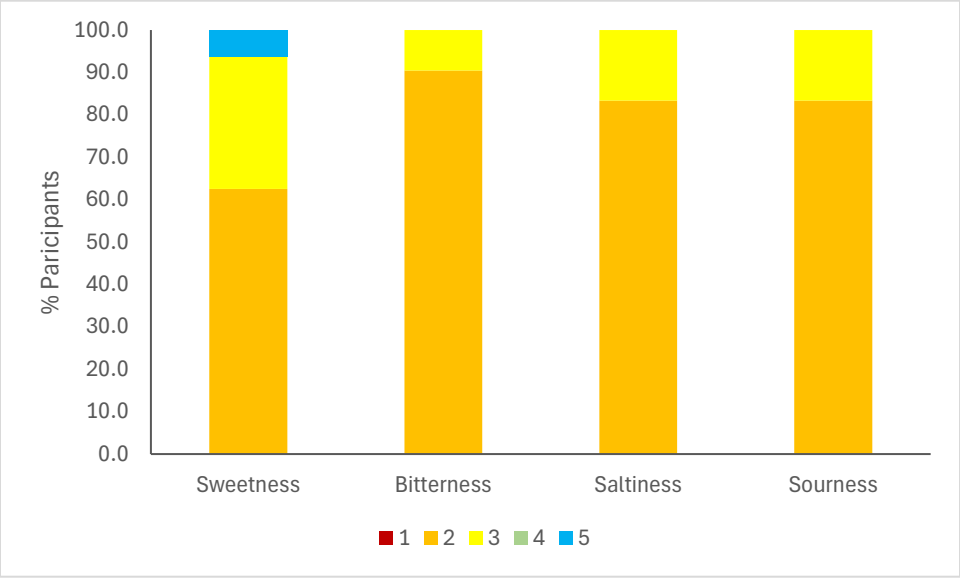
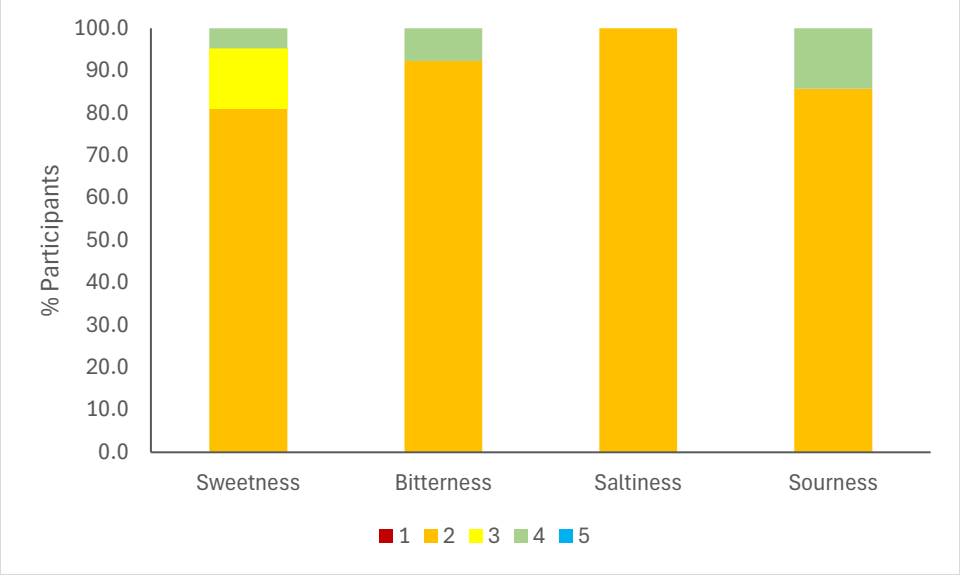


Figure 3 Raw Achocha taste test



1. Not at all sweet/bitter/salty/sour 2. Slightly sweet/bitter/salty/sour 3. Quite sweet/bitter/salty/sour 4. Sweet/bitter/salty/sour 5. Very sweet/bitter/salty/sour

Figure 4 Stir fried achocha taste test.

Overall opinion

The overall opinion of achocha was that they were easy to grow, but many people were indifferent over their eating qualities (Figure 5). 74% of particpants agreed or strongly agreed that they were easy to grow and 60% said they were productive. However only 44% of participants said they enjoyed eating them, a large proportion of 32% were neutral, leaving only 25% who expressed a dislike.

42% agreed that they could make a subsitute for a pepper, but far less, 25% agreed that they would make a good substitute for a cucumber.

Opinions on whether they would grow achocha again were evenly divided between definitely not growing, probably not growing, neutral, probably and definitely .

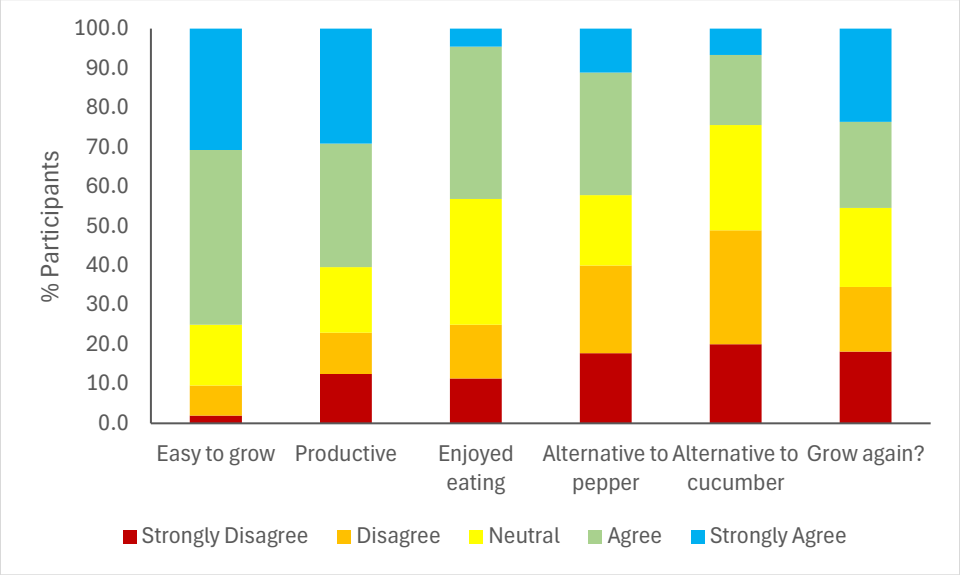


Figure 5 Participant rating of growing achocha

Conclusion

Achocha was an easy crop to grow with few pest and disease problems. This trial showed that it was possible to produce a high yield as far North as Edinburgh and Glasgow. Participants even reported that the plant showed resilience to slugs in a season that was dominated by this pest in many cases. Opinion was divided as to whether they were nice to eat, but with a bit more care with attention to the picking stage this could be improved. Often it can be difficult for gardeners to accept new crops unless it shows a very clear benefit over existing crops that are grown. In this case the resilience of the crop is a bonus, so if space is available, achocha would make a good standby for achieving something to eat in a difficult growing season.

1. Chomicki, G., Schaefer, H. & Renner, S. S. Origin and domestication of Cucurbitaceae crops: insights from phylogenies, genomics and archaeology. *New Phytol.* **226**, 1240–1255 (2020).
2. Council, N. R., Affairs, P. and G., Development, B. on S. and T. for I. & Innovation, A. H. P. of the A. C. on T. *Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation*. (National Academies Press, 1989).
3. Wong, J. Acocha, courgette's cute little cousin. *The Guardian* (2017).
4. Rivas, M. *et al*. Nutritional, Antioxidant and Anti-Inflammatory Properties of Cyclanthera pedata; an Andinean Fruit and Products Derived from Them. *Food Nutr. Sci.* **04**, 55–61 (2013).