PhD student grows bell pepper with a hint of chilli

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Martijn Eggink is cultivating a new bell pepper variety with an exotic flavour. This is the basis for his PhD research at Wageningen UR, in which he will correlate the flavour of the bell pepper to sugars, acids and aroma substances produced by the plant. These flavour substances are different for each variety and location.

Eggink cultivated 35 different types of bell peppers from various countries in a greenhouse. Among these were eleven types of chilli peppers; the chilli pepper is closely related to the bell pepper. He presented the hot chilli peppers to a test panel comprising mainly Asian people used to eating spicy food. The chilli peppers went down well with this panel, which particularly liked the crunchiness, fruity taste, sweetness, sourness and aroma. Based on these qualities, Eggink selected a delicious chilli pepper with a distinct flavour and crossed this with the bell peppers of his employer, breeding company Rijk Zwaan. That produced a new bell pepper variety with an 'exotic flavour', says Eggink. He cannot reveal any more details at present, to protect the interests of his company.

Eggink is doing his PhD research at the Laboratory of Plant Breeding where he tries to understand the more fundamental link between the bell pepper genome and its flavour. For this purpose, he also set 24 different bell peppers before a Dutch taste panel. In addition, he used a gas chromatograph to determine the substances present in each of the bell peppers. In so doing, he discovered that the sweetness of the bell pepper is due mainly to sugars, especially glucose and fructose. 'That came as no

surprise.' The fruity taste and the aroma are determined largely by certain volatile substances derived from fatty acids, and the texture (crunchy or tough) can be related to the dry weight content of the bell pepper. What still remains a mystery is the sourness of the bell pepper. 'You would expect that acids are largely responsible, but this is not so. It appears that the degree of sourness is camouflaged by other substances, especially sugars. We still don't know which chemical component determines sourness.' The PhD student will publish these results soon in Food Chemistry.

The next step is to find the genes responsible for the substances which give something its dominant flavour. This is what Eggink is doing now. It has long been established that the difference between hot chilli peppers and sweet bell peppers is caused by one gene. In the same way, Eggink hopes to find the genetic codes for the fruity taste and fructose production, for example. The difficulty is that no less than 224 flavour substances are involved. The expected publication of the bell pepper genome within a year will be a shot in the arm in his attempt to find the link between characteristics and genes.

As far as the new 'exotic' bell pepper from Rijk Zwaan is concerned, work in correlating genetics and flavour is almost accomplished. Eggink's bell pepper is ready where research is concerned; all it needs are some adjustments in terms of quality and resistance. It will then be subjected to the approval procedure for new varieties. Rijk Zwaan aims to introduce more unusual bell pepper flavours to the market. Eggink is a pre-breeder - the link between the laboratory and the greenhouse - for this breeding company.

Provided by Wageningen University