How predictive models for flavour levels of vegetables and fruits can benefit breeders

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Following on from the tomato, it has recently become possible to predict the flavour levels of both sweet pepper and galia melons using a model developed by Wageningen UR. These types of models provide plant breeders with a tool that allows them to make a strong pre-selection in their breeding programme based on solid arguments and at low costs, says scientist Wouter Verkerke of Wageningen UR Glastuinbouw in

Bleiswijk. "As of next year, we will also be able to predict the taste level of strawberries, for example."

Basic characteristics

The Wageningen UR predictive models work with a number of input parameters for basic flavour characteristics that can be measured in a laboratory. "These vary per product," says Verkerke. "For a tomato, one of the relevant characteristics is the ratio between sweet and sour; for capsicum, bitterness is also an important component; and for galia melons we measure other flavour characteristics."

Scientists measure these basic characteristics using a series of relatively simple laboratory measurements. "The trick is to develop a model that provides a realistic impression of what a taste panel will eventually think of a product. This requires some careful consideration. For constructing and checking the model we also use measurements from the laboratory and the evaluation of taste panels."

Changing flavours

While breeding for flavour has become a lot more efficient thanks to screening with the predictive model.

Verkerke warns that flavour preference is not a static issue. "For example, we can adjust the models to the flavour preferences of a specific country or over time. We are seeing strong indications that consumers nowadays find the 'bite' of a product increasingly important. This is illustrated by the many types of snack tomatoes that are currently on the market. We can adjust our measurements and models accordingly."

Faster selection on right genes

Verkerke explains that predictive models allow for a quicker screening of successful lines for specific regions at a comparatively earlier stage of the breeding process. "This can give breeders a competitive edge. But the principle is interesting for many other products as well. As of next year we will have a predictive model for the flavour of strawberries. But how about tangerines? People often buy tangerines that look far better than they turn out to taste, which obviously affects sales. If breeders can use such predictive models to determine whether a product will score high marks for flavour, and then continue to breed on this characteristic, it would result in significant profits."

Provided by Wageningen University