UNDERSTANDING AND IMPROVING FLAVOUR AND TEXTURE IN POTATOES

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BACKGROUND

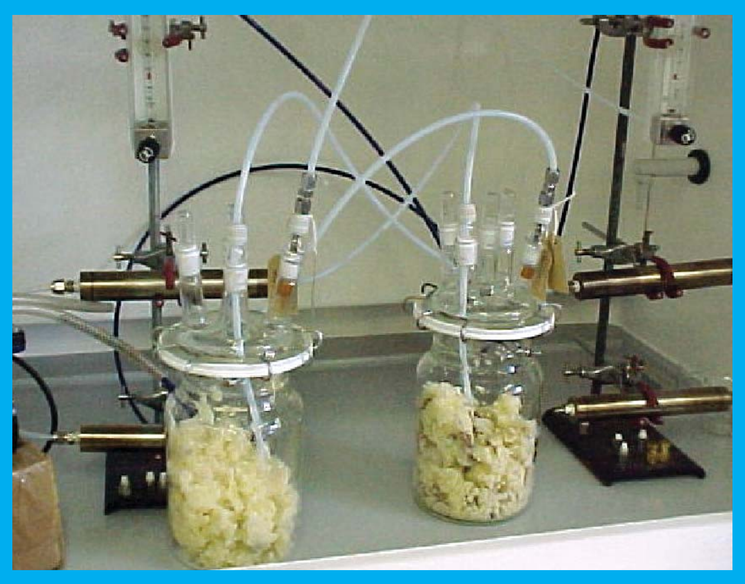
In potato breeding, selection for flavour, aroma and mouth-feel has been limited due to the small amount of variation for these characters between cultivated *Solanum tuberosum* varieties. In South America, at least seven types of potato are cultivated and some are considered particularly flavoursome and of good eating quality. Varieties of the species *S. phureja* are particularly prized for their delicate yellow flesh, flavour and speed of cooking.

Our aim is to obtain an understanding of the genetic and biochemical control of sensory attributes and to use this knowledge to assist in future breeding programmes aimed at improving eating quality in potatoes. In order to do this, the progeny from a cross between a Tuberosum and a Phureja were studied for the segregation of these these sensory attributes using three separate approaches.

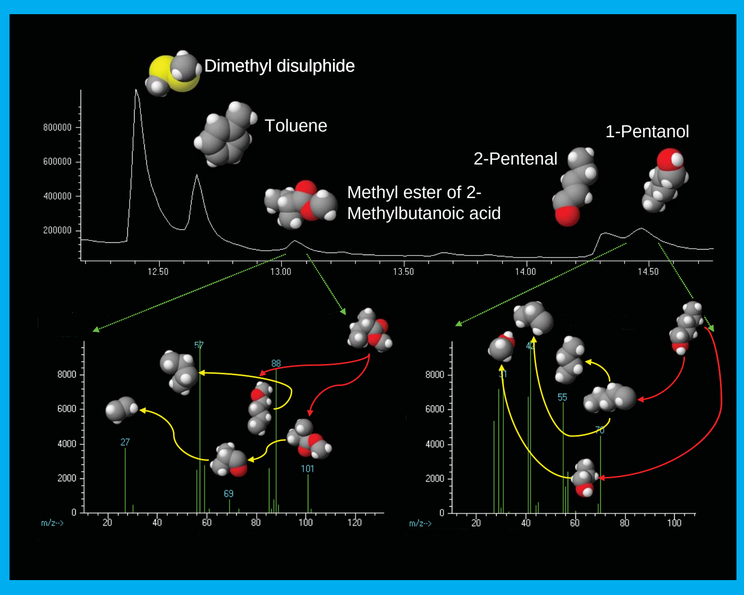
SENSORY ANALYSIS

A sensory panel of 16 tasters assessed the boiled potatoes of 120 clones for 21 sensory attributes falling into five main categories: appearance, aroma, flavour, after-taste and mouth-feel. They also scored the potatoes for overall acceptability. Significant differences were observed between the individual clones for many of the characters.

VOLATILE ANALYSIS

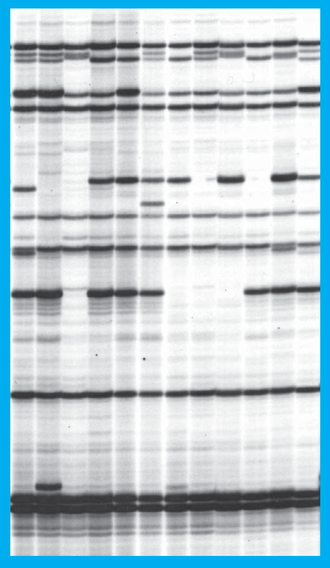


The volatile chemical compounds released by the cooked potatoes were collected and then analysed by Gas Chromatography - Mass Spectrometry (GC-MS) in order to identify them. A large number of compounds have been identified in boiled potatoes. Several of these compounds seem to be significantly different between Phureja and Tuberosum potatoes. We are looking for those compounds that distinguished the two types and that may account for the differences in their eating quality.

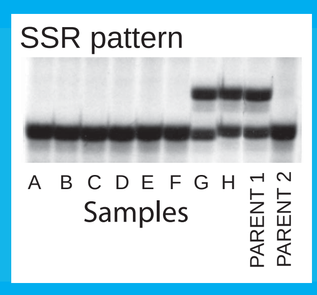


GENETIC ANALYSIS

All 120 clones have been studied using the DNA "fingerprinting" techniques AFLPs and SSRs. These provide a distinctive banding pattern ("fingerprint") for each individual. By comparing the banding patterns of the parents with those of the progeny, it is possible to determine the inheritance pattern for each band. The segregation of the individual bands can then be related to the inheritance of the sensory characters and volatile compounds. The bands thus



become "markers" for the characters themselves and, without having to grow plants to maturity and cook the tubers, can be used to assist in the selection of plants possessing desired characteristics in future breeding programmes. What is more, the chromosomal position of the DNA



fragments is known, so we are able to map the location of gene that might be involved in the character themselves

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