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'Flavour map' flags up connections between ingredients

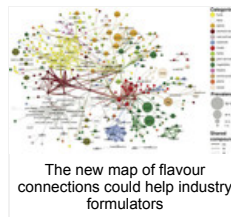
By Nathan Gray, 22-Dec-2011

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New research revealing how food ingredients are interconnected by their flavour compounds could help industry formulators develop new flavour combinations, say researchers.

The research – published in the Nature journal *Scientific Reports* – finds that North American and Western European foods tend to use ingredient combinations that share flavour compounds, while East Asian and Southern European cuisines tend to avoid such an approach.



The new map of flavour connections could help industry formulators

The researchers, led by a team from Northeastern University, USA, reported that their findings appear to debunk the food-pairing hypothesis – based on the principle that foods which share flavour compounds generally work well in combination.

“Some scientists in the molecular gastronomy community think foods with similar compositions taste well together, but we found that it really depends on the region,” said Professor Albert-László Barabási, who co-authored the study.

The findings have helped to create a new flavour network map, based on the number of compounds shared between ingredients. The new network could help industry formulators to explore new flavour combinations.

Dr Yong-Yeol Ahn Ahn, a co-author of the study, explained that statistical tests can then be used to unravel the connectedness, or the lack of connection, between different ingredients and their respective flavour compounds.

Study details

Barabási and his team of researchers took a network-based approach to explore the impact of flavour compounds on ingredient combinations. They designed and analyzed the network of links between ingredients and flavour compounds found in more than 56,000 recipes.

Two ingredients were connected if they shared at least one flavour compound. On average, a pair of ingredients in North American cuisine shared 11.7 compounds. By contrast, a pair of ingredients in East Asian cuisine shared an average of 6.2.

The researchers also found that a small number of ingredients contributed to the food pairing effect in each region. In North America, for example, 13 key ingredients – including milk, eggs and butter – were heavily linked, and appeared in around 74% of all recipes.

The researchers said the increasing availability of information on food

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preparation and formulation, means that data-driven investigations – such as the current study – can open new avenues towards a systematic understanding of culinary practice and food science.

Barabási and his team said such use of data-driven network analysis methods have transformed biology and the social sciences, and could to yield new insights into food science.

Source: *Scientific Reports*

Published online ahead of print, doi: [10.1038/srep00196](https://doi.org/10.1038/srep00196)

"*Flavor network and the principles of food pairing*"

Authors: Y.Y. Ahn, S.E. Ahnert, J.P. Bagrow, A.L. Barabasi

Keywords: [flavour network](#), [flavour](#), [formulation](#)

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