Tea leaves identified using neural networks

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Tea leaves are identified using neural networks. Credit: J. Marcos Jurado et al.

A team of chemists from the University of Seville (US, Spain) has managed to distinguish between different kinds of tea leaves on the basis of their mineral content and by using artificial neural networks. This technique makes it possible to differentiate between the five main varieties of tea - white, green black, Oolong and red tea.

"This method makes it possible to clearly differentiate between the five types of tea - something that is often not easy to do by eye alone - by using analysis of the leaves' mineral content and then mathematically processing these data", Jose Marcos Jurado, co-author of the study and a researcher at the US, tells SINC.

The technique makes it possible to distinguish between the five main tea varieties (white, green, black, Oolong and red) using chemometrics, a

branch of chemistry that uses mathematics to extract useful information from data obtained in the laboratory.

Firstly, the concentrations of the chemical elements in the leaves were determined using 'inductively-coupled plasma atomic emission spectroscopy', which showed the most abundant elements to be calcium, magnesium, potassium, aluminium, phosphorus and sulphur.

Other essential elements were also identified in the tea, such as copper, manganese, iron and zinc, according to this study, which has been published online in the journal Food Chemistry.

Once the mineral content of the leaves was established, probabilistic neural networks were used to find out which type of tea a sample belonged to. These networks are "mathematical algorithms that mimic the behaviour of the neurons in the human nervous system in order to process the information", the expert explains.

This generates a model that receives an input signal (chemical data) and produces an output one, making it possible to predict the type of tea in the sample with a probability of 97%.

The second most commonly drunk beverage in the world

Tea is the second most commonly drunk beverage in the world after water, and this has been the case since 2700BCE. This infusion is prepared from the plant Camellia sinensis. The five tea varieties result from the different kinds of preparation process that the leaves are subjected to after being harvested.

White tea is a non-fermented tea made up of new buds and leaves that are protected from sunlight as they grow in order to limit chlorophyll production. Green tea is another unfermented tea, but it is made by using

older green leaves.

The Oolong and black tea varieties are made by fermenting the leaves, although in the first case these are completely fermented, while black tea undergoes an intermediate controlled fermentation process of between 10% and 70%.

Red, or Pu-erh, tea is a fermented product obtained from another variety of the plant, Camellia sinensis var assamica, which is cultivated in the Chinese region of Yunnan.

The health benefits of the leaves of this plant are well known. Aside from acting as an antioxidant, diuretic and relieving hypertension, it is also an important source of essential elements such as aluminium, copper, zinc, calcium and potassium.