



# Factors influencing consumers' attitudes towards the consumption of edible flowers



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## ABSTRACT

Floral food represents a niche market in the food service industry. The aroma, colour, shape and beauty of flowers often attract consumers to try floral food. In this paper, we test a model of predictors of attitudes towards the consumption of edible flowers by sampling 357 consumers in Taiwan. The results show that specific curiosity and aroma are the greatest influences on attitude towards the consumption of edible flowers. Specific curiosity partially mediates the relationship between aroma and attitude towards the consumption of edible flowers. We also find that health consciousness both directly and indirectly, via a healthy and caring lifestyle, affects attitudes towards the consumption of edible flowers. Segmentation analysis shows that these direct and indirect effects on attitude towards the consumption of edible flowers are greater among the respondents who are more experienced with edible flowers.

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## 1. Introduction

Flowers, a wonder of nature and a symbol of beauty, are integral to many people's lives. The aroma, colour, shape and beauty of flowers often lift people's spirits. Many commonly seen flowers are edible, such as day lily, lotus, saffron, rose and marigold. These edible flowers supply a range of nutrients that include amino acids, vitamins, minerals and proteins. In the Far East, edible flowers are frequently used in dishes, cakes and tea. Some recipes specifically include edible flowers for their culinary, aesthetic or health properties (Alzoreky & Nakahara, 2003; Zeng, Deng, Lv, & Peng, 2014). However, the knowledge about peoples' attitude towards the consumption of edible flowers is limited.

In this study, floral food refers to edible flowers of plants in fresh or dried forms, such as marigold flowers in salads or dried rose petals in desserts. Floral tea is considered another form of floral food consumption, but further processed supplements in the form of tablets or capsules are not included in this study.

For some people, edible flowers offer a unique combination of aroma, taste, form and nutrition. For others, the nutritional value of unprocessed or minimally processed edible flowers represents an important reason for their consumption (Rop, Mlcek, Jurikova, Neugebauerova, & Vabkova, 2012). Many health consciousness people prefer unprocessed (e.g., lotus or marigold flowers) or minimally processed forms (e.g., dried rose petals or saffron

powder) forms rather than vitamins and supplements. Edible flowers can provide nutrients such as vitamin A, C, riboflavin, niacin and minerals (Arya, Kumar, & Gautam, 2014; Petrova, Petkova, & Ivanov, 2016). The antioxidant power of edible flowers (Benvenuti, Bortolotti, & Maggini, 2016; Chanwitheesuk, Teerawutgulrag, & Rakariyatham, 2005) can be an efficient anti-tumour, anti-nociceptive, anti-inflammatory and anti-mutagenic agent (Ratnasooriya, Deraniyagala, Bathige, Goonasekara, & Jayakody, 2005; Ukiya et al., 2002, 2006; Wongwattanasathien, Kangsadalampai, & Tongyongk, 2010). Table 1 summarizes the benefits of some well-known edible flowers (Arya et al., 2014; Roberts, 2014).

The health and aesthetic properties of edible flowers represent a niche market. The food service industry is operating in a mature market environment. From a strategic point of view, the inclusion of edible flowers in dishes, drinks, and desserts could be a way of product differentiation and service enhancement.

The consumption of edible flowers is part of a complex decision process in food choice. Frust, Connors, Bisogni, Sobal, and Falik (1996) propose a conceptual model of food choice that consists of three main components: life course, influences on food choice and personal systems. Life course relates to the integration of personal ideas, resources and social influences with the social, cultural and physical environments in which we make our food choices. The environment influences our personal systems of choices, for instance, in value negotiations and operational strategies. Researchers are increasingly interested in consumers' food choices and consumption, as they inform marketing issues.

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**Table 1**  
Examples of floral food benefits.

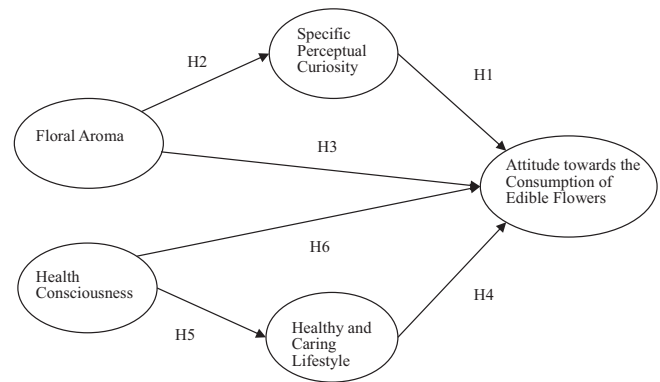
Flower	Health benefits
Rose	Cleaning the gall bladder and liver; improving bile secretion; alleviating mild sore throats and bronchial infections
Lily	General well-being of the heart; flavonoid that stimulates arterial dilation
Lavender	Anti-inflammatory and antiseptic properties when applied topically
Chrysanthemum	Detoxifying blood, regulating blood pressure and calming the nerves; antibacterial properties; hypertension and angina
Jasmine	Accelerating the metabolism; rich in flavonoid antioxidants; a mild sedative effect; calming coughs, regulating insulin levels and lowering blood pressure
Saint John's Wort	An antiseptic and anti-inflammatory when used topically; treatment of Parkinson's disease, attention deficit disorder, irritable bowel syndrome, premenstrual syndrome and alcoholism
Chamomile	Antioxidant and anti-inflammatory properties; can ease indigestion as well as relieve diarrhoea.
Echinacea	Treating inflammation and pain; easing coughs and relieving sore throats
Hawthorn	Contains potent antioxidants; improving circulation; lowering blood pressure; improving cardiovascular function

Step toe, Pollard, and Wardle's (1995) food choice questionnaire summarizes nine factors that influence daily food choice: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concerns. Prescott, Young, O'Neil, Yau, and Stevens (2002) apply Steptoe et al.'s work to evaluate consumers' food choice motivation in different countries. They find that the top three factors in food choice for people in Taiwan and Malaysia are health, natural content and weight control. This reflects the association in traditional Eastern culture of foods and medicinal properties. Therefore, health is one important element that affects food choice decision. Chen (2009) proposed that a healthy lifestyle mediates health consciousness and attitude towards organic foods. In our study, this concept of a healthy and caring lifestyle mediates the relationship between health consciousness and attitude towards edible flowers.

The sense of smell is closely linked to our state of mood (Castellucci, 1985), and scent impacts people's shopping desire (Mehrabian & Russell, 1974). Coffee shops and bakeries make good use of ambient scents to attract customers to purchase their products (Hunter, 1995). Even non-food retailer shops make use of ambient scent to entice their customers (Goldkuhl & Styvén, 2007). To increase sales, detergent and cosmetic industries often resort to people's olfactory senses (Chebat & Michon, 2003). Scent is a primary attribute of floral products. Among other factors, the smell of flowers often attracts customers' attention, interest and desire and even leads to the purchase of floral food (Yeh & Huang, 2009). The aroma of floral food might trigger consumers' specific curiosity, and this, in turn, influences their attitude towards edible flowers. This study intends to advance the understanding of attitude towards the consumption of edible flowers and the underlying mechanisms that affect that attitude.

## 2. Conceptual framework and hypotheses

Fig. 1 shows our conceptual framework, which indicates that functional (e.g., health consciousness) and sensory (e.g., aroma) factors shape individuals' attitudes towards the consumption of edible flowers. The model also shows that both sensory and functional factors have indirect path effects on attitudes. Specific perceptual curiosity is a mediator of aroma and attitude. A healthy and caring lifestyle is mediator of health consciousness and atti-



**Fig. 1.** Research framework for attitude towards the consumption of edible flowers.

tude. In the following sections, we explain the hypothesized relationships.

### 2.1. Specific perceptual curiosity and attitude towards the consumption of edible flowers

Consumers often try novel food simply out of curiosity. Curiosity refers to behaviours that explore novel, complex or ambiguous stimuli (Berlyne, 1966; Litman, Collins, & Spielberg, 2005). Berlyne (1966) differentiates between perceptual curiosity and epistemic curiosity. The former refers to novel perception stimuli that motivate individuals' visual and sensory inspection (Colline et al., 2004). The latter refers to individuals' intellectual search to eliminate their information gaps. Berlyne (1966) also refers to curiosity as a trigger of specific and diverse exploratory behaviours. When individuals are aroused by epistemic and perceptual curiosity, they examine the details of one particular stimulus or activity. By contrast, when individuals feel bored and seek a sense of novelty, this leads to exploration for a source of interest (Berlyne, 1966). Loewenstein (1994) interprets curiosity as a fluid form that, once satisfied, could broaden cognition and reduce the unfulfilled feeling from a knowledge gap or a sense of uncertainty. Litman et al. (2005) propose two facets of curiosity, i.e., feelings of interest when seeking information and feelings of deprivation when not knowing something. Collins, Litman, and Spielberg (2004) study specific perceptual curiosity and find that specific perceptual curiosity correlates with personal traits, sense of novelty, the search for sensation, anger expression and depression.

Attitude is "pre-disposition to respond in a consistently favorable or unfavorable manner with a given object" (Fishbein & Ajzen, 1975). An individual with a positive attitude towards an object will have a positive behaviour towards this object, such as approaching and showing concern for it (Wilson, Dunn, Kraft, & Lisle, 1989). Floral food is a relatively novel. When people are curious about floral food, they are likely to be interested in the floral food and show a positive attitude towards it. Hence we hypothesize the following:

**H1.** Specific perceptual curiosity relates positively to attitude towards the consumption of edible flowers.

### 2.2. Floral aroma and attitude towards the consumption of edible flowers

Olfactory stimuli activate human cognitive states that can affect individuals' behaviours (Berridge et al., 2010). Scent is a powerful cue in purchasing decisions (Ellen & Bone, 1998). Smell differs from the other senses in that it triggers emotions and memories (Arshamian et al., 2013). This can influence individuals' mood

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