

Hair Tissue Mineral Analysis / Nutritional, Herbal and Natural Medicine / Practitioner Education



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## RESEARCH ARTICLE

### How Do Bitter Herbs Stimulate Digestion?

Digestive bitters have a long history of traditional use, but how exactly do they work? This month we explore how herbal bitters are able to stimulate our digestive secretions. We consider a number of theoretical models and the evidence for them.



*Photograph of Gentiana lutea*

Traditionally, fluid preparations of bitter herbs have been prescribed to facilitate digestion and improve appetite.<sup>(1, 2)</sup> Historically the use of bitter herbs as sialagogues and digestive tonics has been mentioned in many traditional medicine systems including Ayurvedic, Traditional Chinese and European pharmacopoeias.<sup>(1, 2)</sup> Currently this practice is common in eastern and southern Asia and throughout Europe.<sup>(1, 2)</sup>

Several theories have been proposed as to how the ingestion of bitter herbs, like *Gentiana lutea*, are pharmacologically able to act as salivary and gastric secretion stimulants. Some researchers favour the *cephalic-response* theoretical model where ingestion of bitter substances sends a message via the glossopharyngeal nerve to a specialised collection of cells in the cerebral cortex. Here the brain interprets the taste as bitter and innervates the vagus nerve which in turn stimulates the digestive processes and increases salivary and gastric secretions.<sup>(3)</sup> Evidence to support this theory comes from a study of

*Gentiana lutea* and *Artemisia annua* where researchers sought to investigate whether bitter tastants stimulate a cephalic-response and/or a gut receptor response, leading to altered cardiovascular activity during the gastric stage of digestion. The results of the experiment support the theory that bitter tastants provoke cephalic-phase responses, increasing sympathetic nervous activity which in turn stimulates blood flow to improve digestion.<sup>(3)</sup>

A second theory called the local-response model suggests that the effect of bitter tastants acts directly on the mucosa of the upper gastrointestinal tract, (particularly bitter receptors on the tongue), stimulating the release of saliva and gastric digestive juices.<sup>(2)</sup> Evidence for this theory comes from a double-blinded, double-controlled, clinical study examining the ability of herbal extracts to directly induce increased salivary output. The researchers examined six bitter herbs including *Gentiana lutea*.<sup>(3)</sup> Salivary secretions were measured in twenty four normal volunteers over a two hour period. The test preparations induced a significant increase in salivary secretions peaking at 30 minutes, whereas placebo and component-controls remained unchanged.<sup>(3)</sup> Additional preclinical support for this idea comes from animal research where taste receptors cells have been discovered not only in the oral cavity of rats, but were also found throughout the various sections of their gastrointestinal tracts.<sup>(5)</sup>

A third theory propounds that bitter tastants may provoke a direct sympathetic nervous response that improves digestion indirectly due to enhanced circulatory blood flow to the abdominal organs.<sup>(2)</sup>

There is encouraging preliminary evidence for the use of herbal bitters as digestive stimulants. It would appear from this evidence that bitter herbs such as *Gentiana lutea*, have a direct effect on oral receptors, whilst simultaneously producing a cephalic response to the bitterness, which leads to increased sympathetic nervous activity. This indirectly enhances gastric circulation and digestive activity by improving blood supply to the salivary and gastric mucosa.<sup>(3, 4, 5)</sup> Thus herbal bitters appear to act via both direct and indirect mechanisms to stimulate digestive secretions.

## References

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02 9693 2888 | [lab@interclinical.com.au](mailto:lab@interclinical.com.au) | [www.interclinical.com.au](http://www.interclinical.com.au)

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