Extracts from peppermint leaves, lemon balm leaves and in particular angelica roots mimic the pro-secretory action of the herbal preparation STW 5 in the human intestine.

The herbal preparation STW 5 contains fresh plant extracts from bitter candytuft whole plant, extracts from greater celandine herb, angelica root, lemon balm leaves, peppermint leaves, caraway fruit, liquorice root, chamomile flower and milk thistle fruit. We recently reported that STW 5 increased intestinal chloride secretion and proposed that this action may be involved in its clinical efficacy in the treatment of irritable bowel syndrome. The aim of this study was to identify the extracts responsible for the secretory action in order to provide the basis to develop novel target oriented herbal combinations. We used the Ussing chamber voltage clamp technique to study the effects of individual extracts of STW 5 on short circuit current (Isc, reflecting electrogenic ion transport across epithelial cells) in mucosal/submucosal preparations of human small or large intestinal specimens and the human epithelial cell line T84. STW 5 at concentrations of 512 µg/ml and 5120 µg/ml evoked an increase in Isc. The increase at the lower concentration was due to pro-secretory effects of angelica which were nerve mediated. The increase at the higher concentration was additionally mimicked by peppermint and lemon balm. The remaining extracts did not influence ISC in the large intestine. The results were similar in T84 cells except that
angelica had no effect while chamomile induced secretion. These pro-secretory effects were reduced by adenylate cyclase inhibitor MDL-12330A, cystic fibrosis transmembrane conductance regulator (CFTR) inhibitor CFTRinh-172 and calcium activated chloride channels blocker 4-acetamido-4-isothiocyanatostilbene-2,2-disulphonic acid (SITS). Liquorice decreased ISC only in small intestine which was reversed by the epithelial sodium channel blocker amiloride. Results suggested that the pro-secretory action of STW 5 is mainly due to angelica with lesser contribution of peppermint and lemon balm. Their effects involve activation of cAMP- and Ca(++)-activated Cl(-) channels. We suggest that peppermint, lemon balm and in particular angelica may be the basis to develop novel herbal preparations to specifically treat secretory disorder based on impaired epithelial secretion, such as constipation.