1. What types of fibre should we be consuming?

In general to support a healthy diet we should eat a range of intrinsic and extrinsic fibres from cereals, wholegrains, fruit, vegetables, starchy foods and legumes as well as added fibres. Recent research has found a link between higher consumption of dietary fibre and a reduced risk of type 2 diabetes mellitus, coronary heart disease and colorectal cancer; and a positive effect of high fibre diets and reduction in body weight, total cholesterol and systolic blood pressure (Reynolds et al., 2019). It is interesting to note that not all dietary fibres are the same and therefore a variety of different fibres will provide specific health benefits. For example, soluble fibres can help reduce glycaemic response and help keep blood glucose levels healthy, whilst insoluble fibres, sometimes also referred to as roughage in the diet, provide a bulking effect. Some fibres are fermentable by gut bacteria (these are also referred to as prebiotic fibres in scientific literature) which provide further health benefits, such as improved mineral absorption and possibly even immunity benefits. Dietary guidelines globally encourage including a varied diet including fibres from a variety of different sources for health and wellbeing. Current global guidelines recommend daily fibre intakes of 25 to 38 g.

2. How are PROMITOR® and STA-LITE® labelled in Europe?

STA-LITE® labels as Polydextrose. PROMITOR® can label as: Soluble Corn Fibre, Soluble Gluco Fibre, Maltodextrin, Gluco-oligosaccharides, or Resistant Maltodextrin. Tate & Lyle’s Proprietary Global Consumer Perception Ingredient Research conducted in Europe shows that awareness and perception of Soluble Corn Fibre is preferred over the other options.

3. Comment on the importance of gastrointestinal tolerance of fibres. How can abdominal discomfort from consuming higher amounts of fibre be avoided or overcome?

It is well known that a sudden increase in dietary fibre may cause mild gastrointestinal disturbances, but these are generally transient and improve with adaptation to the dietary fibre source. Gastrointestinal effects include symptoms such as bloating, borborygmi (intestinal noises), cramping, flatus and diarrhoea, particularly at high consumption levels. These effects are due primarily to the production of gases by fermentation as well as osmotic effects of fibre in the large intestine, particularly to some soluble fibres. Soluble fibre absorbs water and thus, adequate fluid intake together with the consumption of dietary fibre is important to help minimize gastrointestinal intolerance. In general, smaller molecules (e.g. fructooligosaccharide (FOS)) are more osmotic and rapidly fermented, and thus more likely to cause flatulence and bloating as well as laxative effects or diarrhoea. Larger molecules that ferment more slowly and are less osmotic are usually better tolerated. Intestinal location of fermentation is important too. Fibres that are predominantly fermented in the latter part of the colon (distal colon), rather than the first part (ascending colon), show improved tolerance.

In vitro and human clinical studies show that PROMITOR® Soluble Fibre is well tolerated, even at high intake levels (40 g/day single serving and 65 g/day in multiple servings), and has a digestive tolerance more than twice that of inulin. To find out more about the digestive tolerance, we invite you to read this [White Paper](#) and watch this [video](#).

4. Is there any research looking at prebiotics to target specific types of microbiota? How do the different fibres work vs. different microbes?

Dietary fibre and microbiota research is very active and fast moving. Dietary fibres indeed are very specific and selectively used by certain strains of microbiota. Furthermore, some bacterial strains flourish on the products of another strain (cross-feeding). A fibre
can be directly utilized by a certain group(s) of bacteria but the products of their fermentation can further be fermented by other strains.

Different prebiotic fibres stimulate the growth of different indigenous gut bacteria. Prebiotics have a great potential for modifying the gut microbiota, but these modifications occur at the level of individual strains and species and are not easily predicted. Furthermore, the gut environment, especially pH, plays a key role in determining the outcome of interspecies competition. There are many reports on the beneficial effects of prebiotics on human health (for example, Markowiak and Śliżewska, 2017).

5. What is the source of the Tate & Lyle soluble fibres?

Tate & Lyle offers a portfolio of soluble fibres. PROMITOR® Soluble Fibre and STA-LITE® Polydextrose are made from corn and PromOat® Beta Glucan is made from oats. According to research conducted for Tate & Lyle, (Qualtrics, 2016) consumers report that both oats and corn are preferred sources of fibre.

6. Can you comment on the differences between fermentation of prebiotic fibres and other digestible carbohydrates, for example starch?

Digestible carbohydrates are hydrolysed to monosaccharides in the small intestine by the host intestinal enzymes such as glucose, which provides the majority of energy for the cells in the body. Starch is an example of a digestible carbohydrate. However, non-digestible carbohydrates present in most diets in the form of plant fibre and resistant starch cannot be broken down in the small intestine and thus reach the colon intact.

Prebiotic fibre goes through the small intestine undigested and is fermented after reaching the large intestine, and confers a health benefit on the host associated with modulation of gut microbiota. Prebiotic fibres are a non-digestible part of foods, and found in foods such as bananas, onions and garlic, Jerusalem artichoke, the skin of apples, chicory root, beans and cereals. Each prebiotic fibre is selectively utilised by specific species of gut bacteria. Prebiotics are present in whole foods, but they may also be added to food to improve their nutritional attributes. Such prebiotic fibre ingredients include galactooligosaccharides, fructooligosaccharides, inulin, polydextrose and soluble cereal fibres, just to name a few. For example, soluble corn fibre (PROMITOR®) is a prebiotic fibre which is not digested and absorbed in the small intestine. It reaches the colon where it is utilised by a select microbiota and has been shown to confer a health benefit, for example increased calcium absorption which may promote bone health.

7. For what technical function is STA-LITE® Polydextrose approved as a food additive in Europe?

STA-LITE® Polydextrose has a dual status in Europe. As a food additive (E1200) it functions as a bulking agent, stabiliser or thickener. STA-LITE® Polydextrose is also considered as an ingredient and used for fibre enrichment, mainly to enable nutrition claims such as ‘source of fibre’ or ‘high in fibre’.