Biotransformation
A natural way to improve the flavour, digestibility and/or shelf life of food

Fact Sheet

Biotransformation involves using natural processes, to transform raw materials into ingredients to improve the flavour, digestibility and/or shelf life of food. Such processes have been used in food production for centuries, and adapted to the local needs of different parts in the world. Three example of biotransformation are

- **Fermentation** is used to provide the characteristic taste of a wide range of foods. For example, the fermentation of cocoa beans is an essential step to generate the flavours of chocolate.
- **Enzyme technology** is used for specific applications, where enzymes speed up certain biochemical reactions. For example, an enzyme in rennet helps to separate milk into solid and liquid fractions (curds and whey) during cheese making,
- **Probiotics** are natural live microorganisms that influence the composition of the gut microflora and have a variety of different beneficial effects on health. These effects include protection against infectious diarrhoea, constipation and allergy - depending on the strain of probiotic and the dose used.

Example of the benefits of biotransformation
- **Enhanced digestibility, bioavailability and shelf life**
  - Tempe – fermented soy beans commonly consumed in South East Asia for its nutritious value
  - Yoghurt and cheese – fermented milk products with longer shelf life and still delivering the nutritious benefits of milk
  - Salami sausage and ham of Jinhua and Parma type – fermentation delivers natural preservation and delicious flavour properties
- **Enhanced Flavours**
  - Soy sauce – fermentation liberates the taste enhancing properties for food preparation globally
  - Fish sauce- enzymatic activities enhance flavour especially for Asian cuisine
  - Dou Ban – fermented beans with chili, a natural taste delivering paste for Chinese dishes
  - Dawadawa – fermented soya, the specific taste is loved in Africa and is a signature taste for good food
  - Kimchi – fermented vegetables together with chili in Korea to provide unique taste impressions

Nestlé R&D
- Nestlé has expertise in biotransformation and its application is found in several of its R&D and Product Technology Centres, worldwide, and supports a number of different Nestlé businesses.
- R&D Singapore is collaborating on biotransformation research with A*Star, the Singapore Agency for Science Technology and Research. This research is part of a new research framework agreement, announced on the 22nd of January 2014.

Examples of Nestlé products
- **Fermentation:**
  - MAGGI Liquid Seasoning is based on wheat gluten fermentation
  - MAGGI Bouillon Cubes in West Africa are based on soya fermentation.
- **Enzyme technology:**
  - MILO relies on the enzymes in barley malt during extraction to gain the authentic MILO flavour
  - Nestlé infant cereals: enzyme treatment liberates the taste of healthy ingredients and makes cereal products better digestible
- **Probiotics:** Globally, Nestlé uses probiotics in many products, including infant formula, infant cereals and NIDO growing up milk.