Innovative taste enhancer stimulates early feed intake in piglets

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Taste modifiers are now regularly used in feed to improve palatability. They help to ensure feed is appetising and that optimum feed intake is achieved. A great number of published studies and trials refer to long-lasting intense sweeteners and demonstrate their positive effect on feed intake.

The appeal of feed is a key contributor to healthy growth and rapid development in weaning animals. To reach this goal, solid feed intake must be maximised in the early stages. Young animals being offered solid feed for the first time are more likely to accept sweetened feed.

Pancosma have developed extensive knowledge on various taste enhancers: from salty, to sour, through umami and sweet.

Sweet ingredients such as sugar, glucose and molasses are commonly used in feed for their ability to improve feed taste in addition to being highly available energy sources. However, their use as palatability enhancers has always been limited due to their cost and technological constraints.

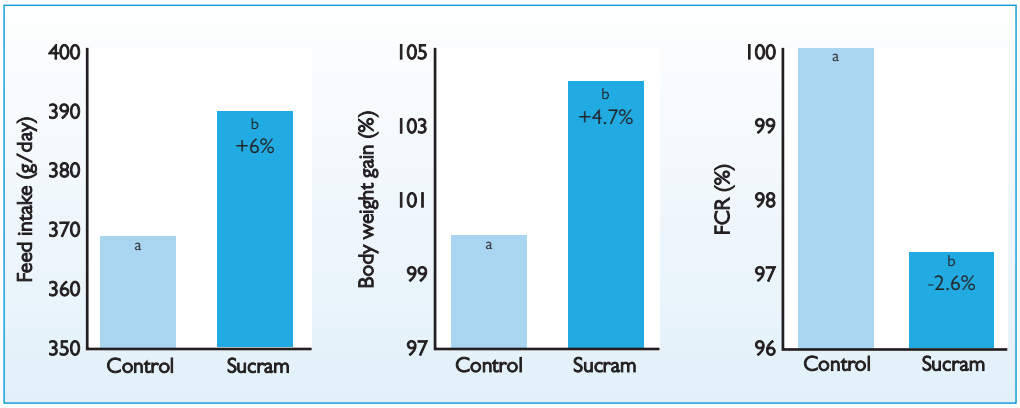
In the 1980s, sweeteners such as saccharin and aspartame started to become popular in food. In 1992 Pancosma became the first company to create and promote a long-lasting intense sweetener as a taste modifier in feed: Sucram. It is a patented, sophisticated combination of sweeteners with potentiators and enhancers, encapsulated in micronised particles. Inclusion of sweetening palatants in the diet of young animals has become an increasingly widespread method of stimulating early intake of solid feed. Currently 75% of piglet feed manufacturers use sweeteners in their diets.

Asia is one of the biggest markets as most piglet feed contains high levels of unpalatable ingredients such as zinc oxide or antibiotics.

The Americas are also important markets: here, weaning ages are traditionally low and therefore requirements for rapid feed intake are important. Europe has reduced market potential as feed ingredient legislation limits the level of certain permitted sweetening ingredients.

The worldwide market for long-lasting intense sweeteners will continue to grow faster than that of the sugar and iso-glucose market. It has been estimated that this sweetener market has had an average yearly growth of 3.4% between 2012 and 2014. The sweetener market in feed is not expected to decrease in coming years as it is an important economic alternative to sugar based ingredients which are highly price volatile. Pancosma is interested in new sweetener sources that are being developed, including natural sources even if they still remain marginal.

Fig. 1. Trial results for 384 weaned piglets (at 21 days) fed with two different treatments.



Value added solutions

A good taste enhancer must improve feed palatability and stimulate intake. It has been proven that ingestion of sweet molecules such as sucrose or saccharin decreases the level of 'stress' hormones and increases the concentration of 'feel-good' hormones.

Consequently, consumption of sweetened feeds increases intake and reduces stress. However, certain molecules such as monosodium glutamate (umami taste) are known to trigger hormonal secretion (CCK hormones), which reduce appetite.

One other very important aspect of the sweetener is its ability to neutralise the bitter taste often associated with medicinal products. In many countries, medicated feeds make up a high proportion of the total feed supplied to farms and potential effects on intake must be taken into account.

Pancosma's laboratory is specialised in taste enhancer formulation and evaluation. Thanks to its renowned flavourists, its expert panelists and animal research stations, Pancosma has always been able to develop the perfect formulas (right ingredients and precise proportions) to enhance taste, mask bitterness and stimulate the appetite of animals. All Sucram products contain long lasting intense sweeteners, taste modifiers, taste enhancers, ingredients that reduce bitterness and long lasting potentiators.

Ingredients are chosen specifically, and it is all about finding the correct equilibrium between the intensity of a balanced active formula, the accu-

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rate dosage for efficient action and the cost effectiveness for the return on investment.

State of the art technology

Technologically advanced formulations are major factors to ensure that sweeteners are long-lasting and intense. These additives are usually incorporated at a very low level (50-300ppm) in feed and will only be efficient if they overcome specific technological constraints such as uniformity flowability, particle size and number, surface area, particle adhesion, mixability, dispersion in feed and solubility. Traditional sweeteners are usually manufactured by a simple mixing process.

The combination of ingredients may have correct statistical proportions but they can fail to mix evenly in either pure form or in the feed product. As a consequence their effect cannot be optimised due to a separation of the synergistically related components.

Pancosma develop their processes in-house, thus they have been the first to bring to market a 100% homogenous product.

Sucram products are made with a specific Iso Fusion Technology, a patented spouted bed spray dry process which incorporates all ingredients in one particle. This results in a final product with excellent physical properties: 100% soluble, free flowing, homogenous, dust-free, no caking, 100% resistant to high temperature (up to 180°) and extremely high stability (in mineral mix, premixes).

The aim is not only to manufacture excellent products, but also to do it in an efficient manner. 100% of the Sucram products are manufactured with this spouted bed spray dry technology; the final products conserve their quality. The Swiss Excellence Certification is an important guarantee of quality, particularly because the group is very export-oriented.

Positive field results

There is considerable independent trial data to support the efficacy of Sucram. Traditionally it gained prominence for the excellent performance it gives in piglet starter feeds.

In a trial performed on 384 weaned piglets the results (summarised in Fig. 1) show that the sweetener increases feed intake (+6%), body weight gain (+4.7%) and improves feed conversion ratio (-2.6%).

However Pancosma's ongoing research demonstrated a wider range of applications for numerous feed types (creep feed, prestarter, starter, milk replacer, drinking water) and for several species (piglets, pigs, sows, calves, beef, dairy and others).

For more than 30 years, trials and on-farm results have consistently proven Sucram efficiency in solving several challenges for example improving intake, growth and group homogeneity, reducing stress (weaning, transport), substituting ingredients (sugar, molasses) and finally optimising return on investment.

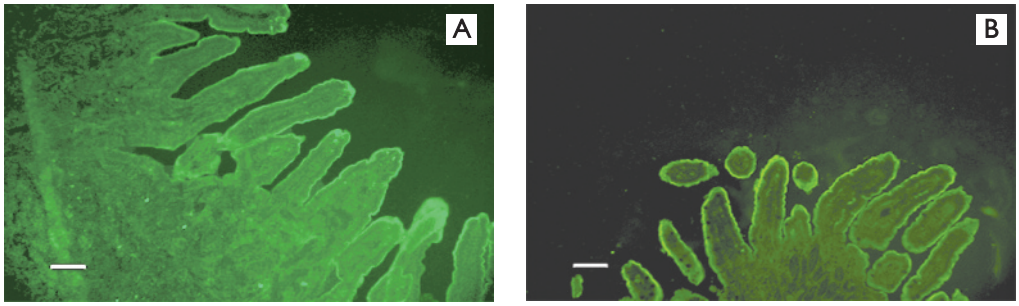


Fig. 2. Expression of glucose transporters (SGLT1) measured by immunofluorescence on the swine gut epithelium surface (A. Control, B. Sucram) (Moran et al).

Gut physiology

Thanks to consistent and transparent results from research, trials and innovation Sucram has been constantly shown to go beyond providing sweetness and feed palatability.

Using fundamental research, Pancosma focused on the gut physiology and has released data from mechanistic and basic research on the gastrointestinal tract.

The major interests are molecular physiology and the primary effects of the products at gut level; this 'Gut Effect' strategy includes gut sensing, gut immunity and gut microbiota which is defined as 'gut health' and promoted as 'Intelligent Gut Action' (IGA).

Having a detailed knowledge of the key physiological mechanisms allows Pancosma to activate levers on feed palatability and feeding behaviour, gut integrity and absorption surface, nutrient digestion and absorption, immune modulation, microflora activity and probiotic effects, and gut control (bacteria, toxins, etc) to name but a few.

For example, Pancosma can prove that Sucram not only targets lingual epithelium, but also the gut epithelium. This effect promoted as Intelligent Gut Action (IGA) leads to many crucial physiological responses such as improved nutrient absorption and better gut integrity (Figs. 2 and 3).

Some recent trials reported that Sucram also had an impact on lactobacillus population. An impressive change in microflora was observed in pigs when supplementing a specific sweetener in their diets. The sweetener is detected by the lactobacillus population increasing their number and their growth similar to the lactose effect (Fig. 4).

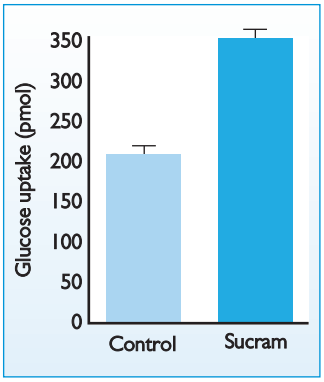


Fig. 3. Glucose uptake (Moran et al).

Taste modifiers

As the environment evolves, new challenges arise and it is a matter of principle for Pancosma to move forward in a continual process of discovery, improvement, and developments. With tailor-made solutions, the idea is to address the clearly identified needs of customers.

Based on this fundamental research, Sucram is used not only as a pure sweetener but also as a functional tool. Pancosma now integrates Sucram in more complex and complete solutions such as in TakTik products. TakTik solutions bring together much of Pancosma's know-how in the field of flavours, sweeteners, acidifiers, phytonutrients, minerals, etc.

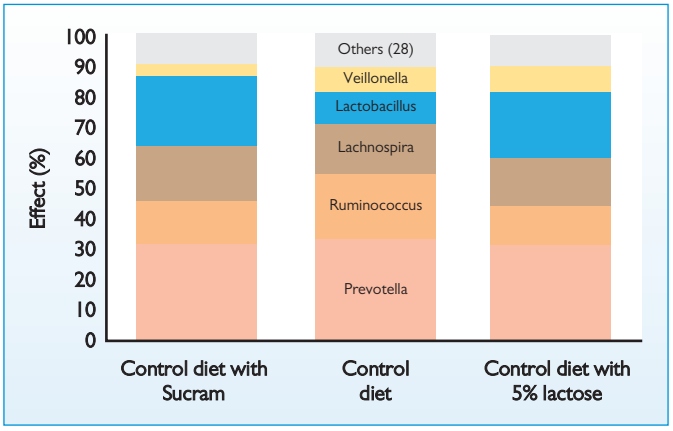
Ingredients are chosen in a very precise way to be recognised and utilised at gut level. This induces a physiological effect and results in an improvement in a parameter of zootechnical interest.

Combined, the selected ingredients are all the more valuable as their synergistic effects interrelate with the environment. Products, relying on the IGA approach, generate benefits at gut level which are converted into a systemic global response enhancing performance and improving return on investment.

A totally new range of products has also been developed combining Sucram and intense flavours. The association of the sophisticated sweetener and aromatic ingredients creates synergistic effects, providing remarkable sensorial properties which modify and significantly improve the palatability of feeds.

These products branded as Magnasweet HD also benefit from the IFT technology, which means all ingredients are incorporated in one particle for a 100% homogeneous palatant targeting all sensory receptors: nose, mouth and gut for an optimum positive impact on the animal. ■

Fig. 4. The effect of sweeteners on lactobacillus population in the gut, (Daly and others 2013).



References are available on request from clement.soulet@pancosma.ch