



# *Biorigin*

Sodium reduction –  
Trends and Solutions

Biorigin is a business unit of Zilor, a company that has more than 65 years and it is one of the largest Brazilian producers of ethanol, sugar, and electric power from sugarcane.



## **Raw Materials**

- Our Own Production
- Agriculture Partnerships



## **Processing**

- Sugar and Ethanol
  - Electric Power
  - Biotechnology



## **Sales & Marketing**

- Copersucar  
(sugar and ethanol)
- Electricity distributors and traders
- Biorigin (biotechnology)

# BIORIGIN IN THE WORLD



## SALT AND SODIUM - BENEFITS

**Salt** is essential for life and also for good health:

- Maintains electrolyte balance inside and outside the cells.
- All body functions are affected when there is a change in salt ingestion : body water balance, muscle contraction, nervous impulses and heart rate.

In food **salt** is extensively used for several reasons:

- enhances the flavour and aroma of foods,
- extends their shelf life,
- reduced water activity,
- controls the action of enzymes,
- increases the solubility of some proteins.



## SALT AND SODIUM - PROBLEMS



**However**, when excessively ingested, salt may cause several health problems:

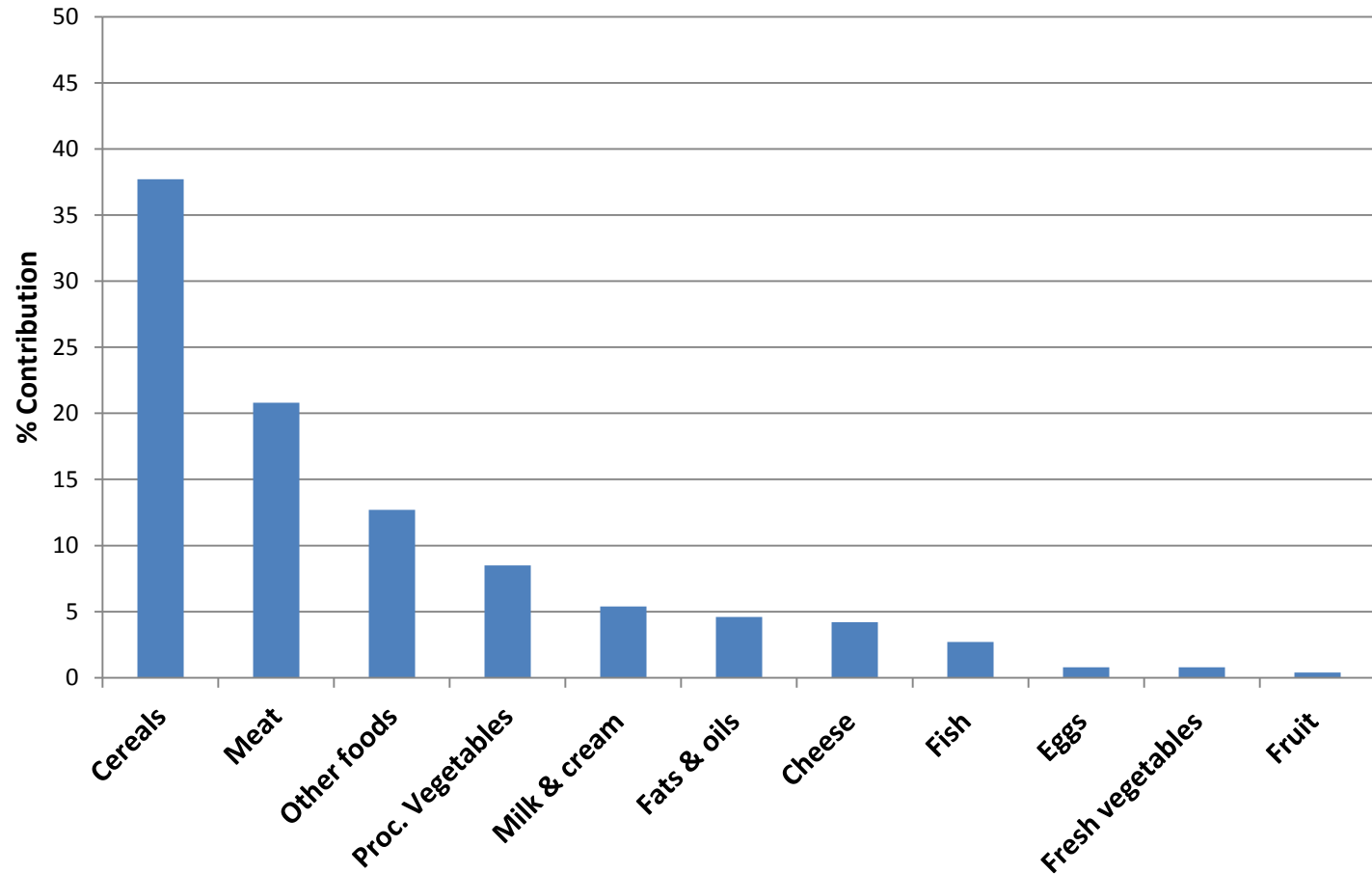
- hypertension (high blood pressure),
- cardiovascular diseases,
- heart attacks,
- triggers the release of some hormones, resulting in: body water retention and blood pressure increase, which may overload the heart.





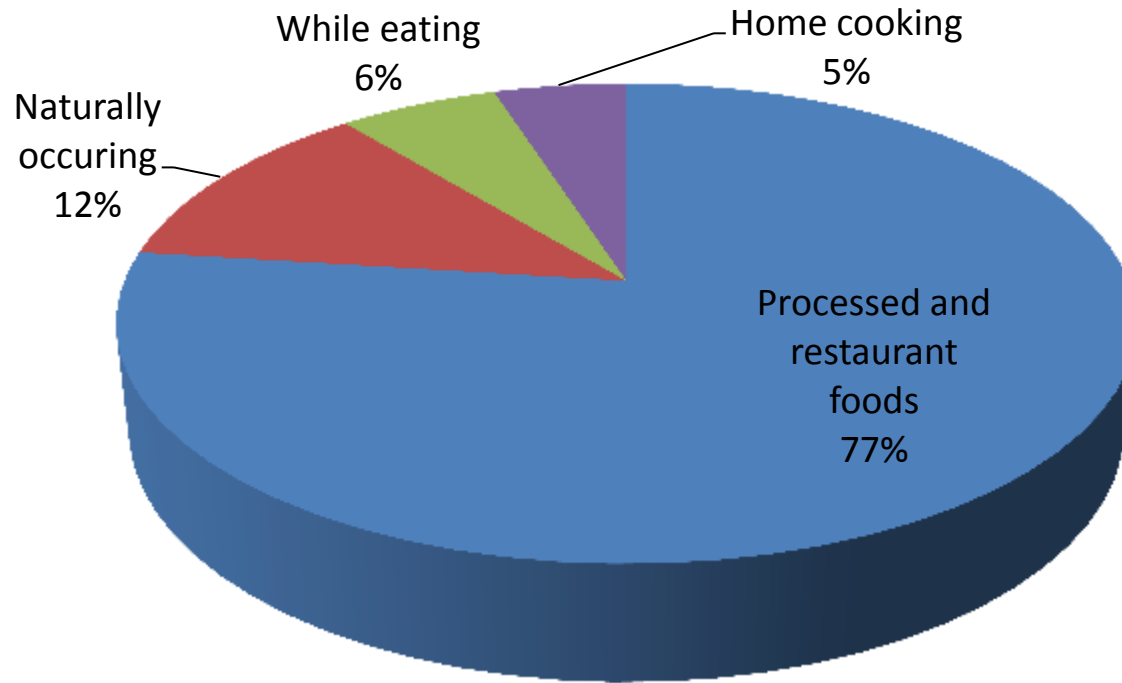
Figure : The World Health Organization recommends maximum daily salt consumption of 5g daily. that is. 1.950 mg Sodium.

# MAIN SOURCES OF SODIUM FROM FOODS



Source : Scientific Advisory Committee on Nutrition; Salt and Health Report (2003)

# MOST SODIUM COMES FROM PROCESSED AND RESTAURANT FOODS





## HOW COULD THIS SCENARIO BE CHANGED?

- Health agencies, representatives of medical associations and food companies have to work together worldwide.
- Educating the public to reduce the mortality rate caused by conditions related to excessive sodium consumption.
- Investing in new technologies to maintain food attractive: sodium reduction became a technological challenge.

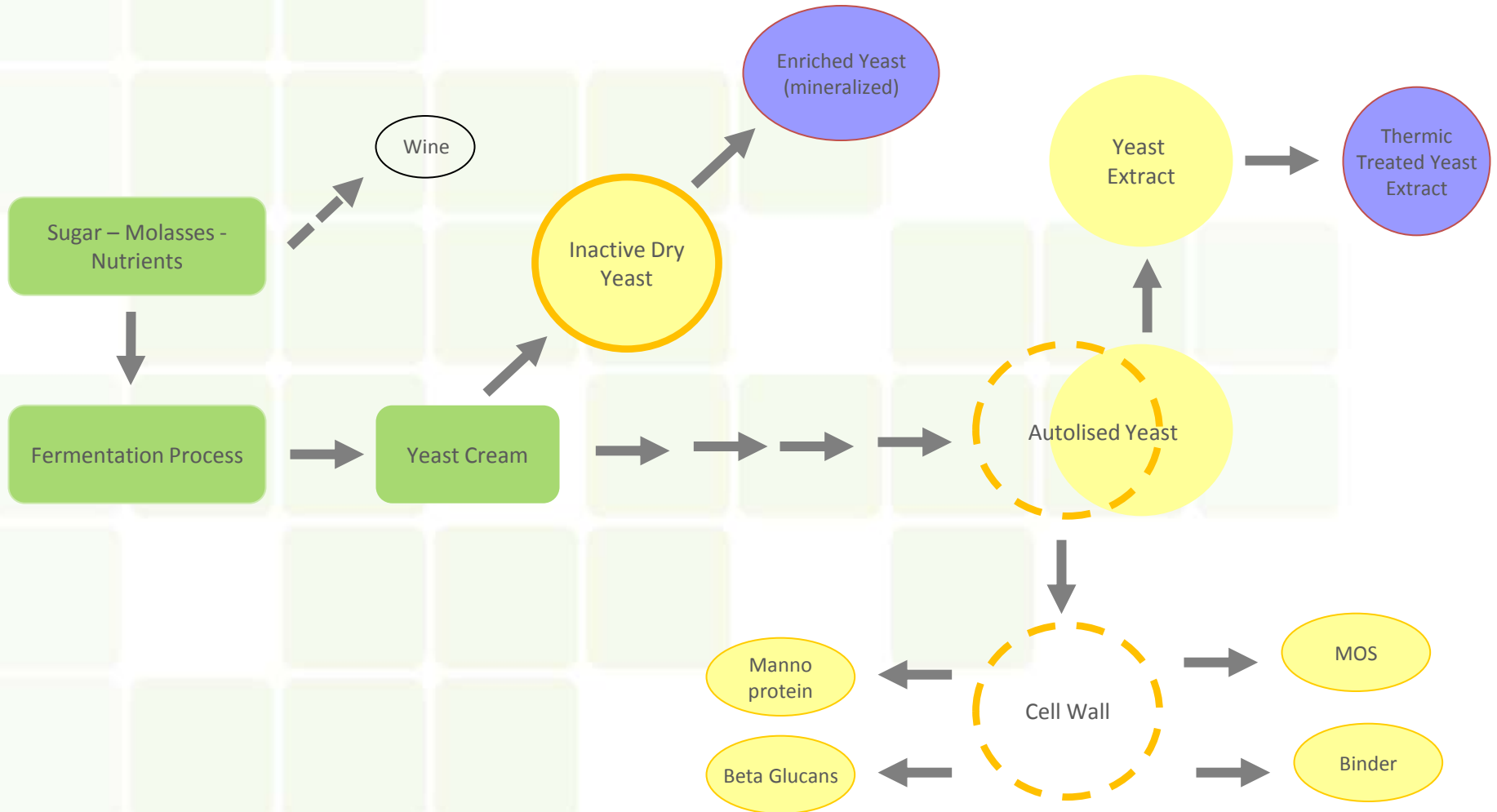


## BIORIGIN SOLUTIONS

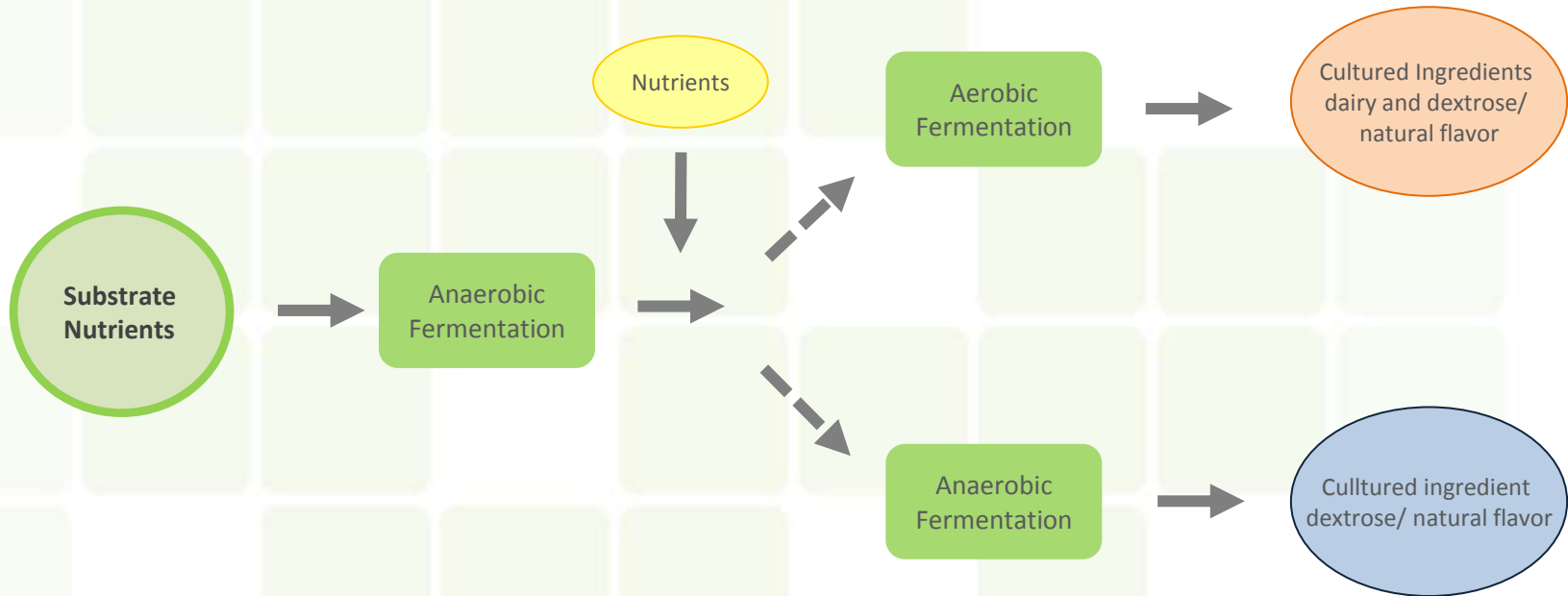


- Naturally rich in amino acids and nucleotides;
- Promote the Umami flavour and the taste enhancement;
- Enable the sodium reduction;
- Give more body and harmonize the flavour;
- Natural;
- Clean label;
- Certified by ISO 9001, ISO 22000, Halal and Kosher.

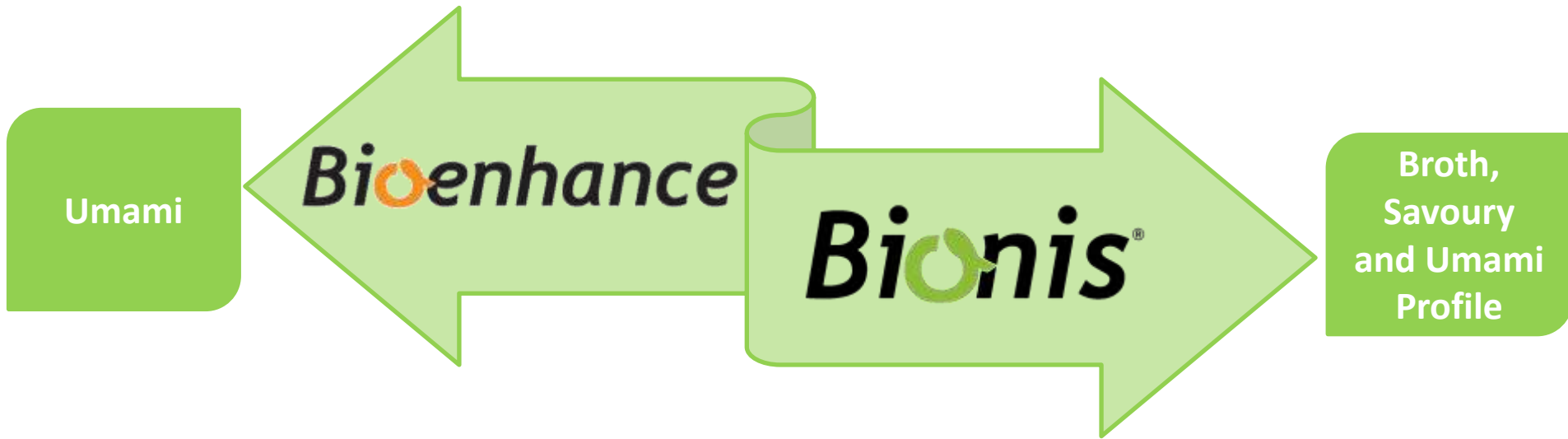
# Production process



# Production process



## HOW DO BIORIGIN SOLUTIONS ACT?



- Rich in peptides and amino acids that release a typical salty taste.
- Contain glutamic acid and nucleotides which boost the perception of Umami flavour.

**Bionis** is a line of yeast extract produced from strains of *Saccharomyces cerevisiae*.

- enhances the original flavours;
- provides body, mouthfeel and natural Umami enhancement;
- Is natural and Non GMO.

**Application:** soups, bouillons, seasonings, condiments, snacks, meat products.

**Recommended Dosage Level:** 0.1 – 5% by weight of finished product.



**Bionis**<sup>®</sup>

**Standard**

Bionis YE 10  
Bionis YE 18L  
Bionis YE 38

General savoury profile,  
enhancing the aroma  
present in products

**Industrial  
Fermentation**

Bionis YE MF  
Bions YE CMF

Without salt, with a  
high content of free  
amino acids

**No salt**

Bionis YE NS

Low sodium, with a  
general savoury profile, it  
works to enhance the  
aroma present in  
products

**Bionis**<sup>®</sup>

**Dark Savory  
Notes**

Bionis YE STDK  
Bions YE DRK

Dark in color,  
impacting a light  
roasted beef taste

**Premium**

Bionis YE XP

**Umami**

Bionis YE MX 18L  
Bions YE MX  
Bionis YE MXE  
Bionis YE GMX 18  
Bionis YE MXE NS

Enhancement of the aroma by  
impacting body and savoury

High natural in 5 nucleotides, create  
the Umami effect performing  
synergistically with other savory  
ingredients to boost the multiple effect

**Biorigin**

**Bioenhance** is a line of natural flavours derived from natural bacterial fermentation processes. The line is divided in dextrose and dairy based.

Designed to :

- unlock the natural taste providing a well rounded, mouthfull, savory enhancement;
- increase salty perception with minimal flavour contribution;
- Umami enhancement;
- off notes masking;
- build and round flavour while maintaining integrity of original food.

**Application:** soups, bouillons, seasonings, condiments, snacks, meat products and cheese.

**Recommended Dosage Level:** 0.1 – 3% by weight of finished product.



# Bioenhance

Dairy based – With low sodium, it unlocks the natural flavour of foods providing delicious and juicy flavour, enhancing the Umami effect. Non GMO

Dairy based – Enhance salt perception, eliminating or reducing the need to add salt. GMO Free and Non GMO

Dairy based – It provides Umami sensation, contributing with salty, slightly toasted and lightly milky notes. Non GMO

**Bioenhance  
Intense 101**

**Bioenhance  
Intense 2**

**Bioenhance  
Intense 2 MSF**

**Bioenhance  
SFE 101**

**Bioenhance  
SW 101**

Dextrose based – It enhances the salty and light notes of meats and sauces. Suited to be used with salt replacement systems due to its neutral flavour profile and enhancement properties. Non GMO

Dextrose based – It enhances salt perception and intensifies flavour and mouthfeel. Suited to be used with potassium chloride, as it helps masking its bitter taste. Non GMO

Dairy based – Enhance natural flavours. Appropriate for salted products with strong and robust flavours, such as beef and matured cheeses. GMO Free and Non GMO

# Bioenhance

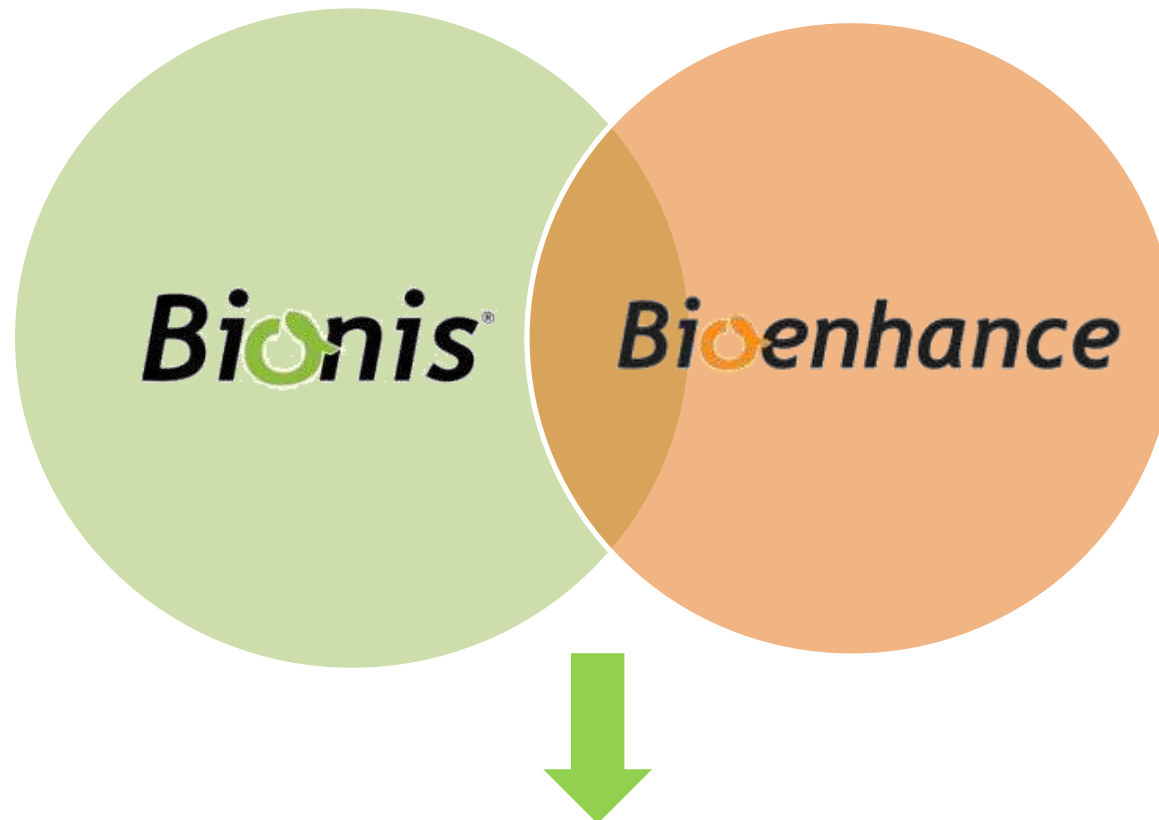
**Bioenhance  
SFE 201**

**Bioenhance  
SW 40**

**Bioenhance  
SW 40 MSF**

**Biorigin**

**SYNERGISM**



**Boost the Umami impact and body.**

**40-50% sodium reduction in typical applications keeping the original taste.**

**Biorigin**

## RECIPES

**70% of sodium reduction in tortillas**

*Good Umami effect*



***Tortilla- 70% Sodium  
Reduction with  
0.5% Bionis YE MXE NS  
and  
0.8% Bioenhance SFE 101***

## RECIPES

**40 - 50% of sodium reduction in broths and creamy soups**

*More juiciness  
and  
enhancement of meat notes*



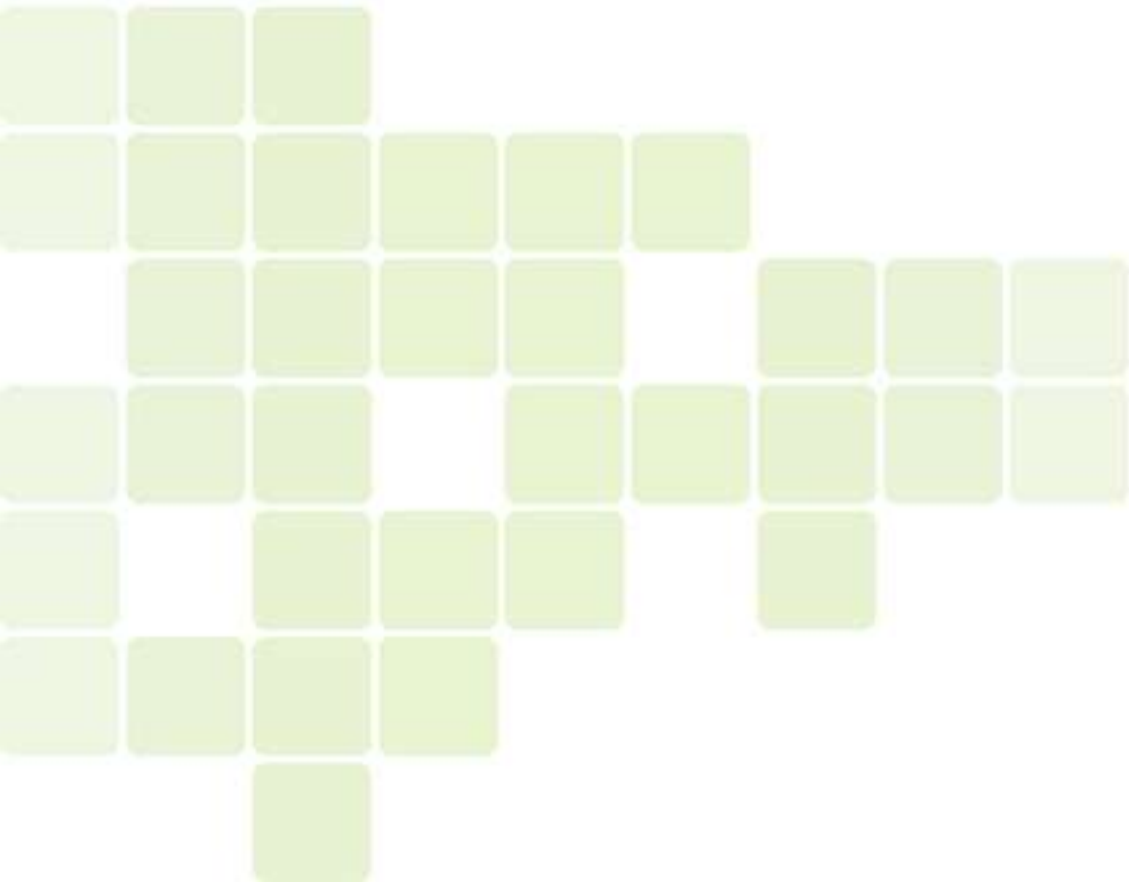
***Beef Broth – 40%  
Sodium reduction  
with  
0.04% Bionis YE 10  
and  
0.06% Bionis YE GMX 18***

*Good Umami effect  
and  
enhancement of creamy notes*



***Mushroom Creamy Soup –  
50% Sodium reduction  
with  
0.25% Bionis YE GMX 18  
and  
0.20% Bioenhance SW 40***

**Biorigin**



Examples

## SALT & SODIUM – TORTILLA

<b>Tortilla</b>	<b>NaCl (g /100g)</b>	<b>Na (mg/100g)</b>	<b>Recommended Daily Intake * Na - 2300 mg</b>	<b>Adequate Intake * Na - 1500 mg</b>
Control	2.0	780.0	34%	52%
Control (70% Na Reduction)	0.60	234.0	10%	16%
Bionis YE MXE NS & Bioenhance SFE 101	0.54	236.4	10%	16%

\* Source: Dietary Guidelines for Americans, 2010 – Chapter Three

## RECIPE - TORTILLA

	<b>Control</b>	<b>Control 70% Na Reduction</b>	<b>Bionis YE MXE NS &amp; Bioenhance SFE 101</b>
Ingredients	%	%	%
Tortilla (without salt)	98.00	99.4	98.16
Refined Salt	2.00	0.60	0.54
Bionis YE MXE NS	0.00	0.00	0.50
Bioenhance SFE 101	0.00	0.00	0.80
Total	100.00	100.00	100.00

## SALT & SODIUM – BEEF BROTH

<b>Beef Bouillon</b>	<b>NaCl (g /100ml)</b>	<b>Na (mg/100ml)</b>	<b>Recommended Daily Intake * Na - 2300 mg</b>	<b>Adequate Intake * Na - 1500 mg</b>
Control	0.78	303.42	13%	20%
Control 40% Na Reduction	0.47	182.05	8%	12%
Bionis YE 10 & Bionis YE GMX 18	0.46	181.94	8%	12%

\* Source: Dietary Guidelines for Americans, 2010 – Chapter Three



## RECIPE – BEEF BROTH

	Control	Control with 40% Na Reduction	Bionis YE 10 & Bionis YE GMX 18
Ingredients	%	%	%
Water	98.53	98.84	98.74
Sugar	0.20	0.20	0.20
Hydrogenated Vegetable Fat	0.09	0.09	0.09
Powder Beef Extract	0.32	0.32	0.32
Bay Leaf Powder	0.01	0.01	0.01
Caramel Color Powder	0.02	0.02	0.02
Succinic Acid	0.01	0.01	0.01
Garlic Powder	0.01	0.01	0.01
Onion Powder	0.01	0.01	0.01
Dried Herbs	0.01	0.01	0.01
Paprika & Black Pepper	0.01	0.01	0.01
Refined Salt	0.78	0.47	0.47
Bionis YE 10	-	-	0.04
Bionis YE GMX 18	-	-	0.06
Total	100.00	100.00	100.00

## SALT & SODIUM – MUSHROOM CREAMY SOUP

<b>Mushroom Creamy Soup</b>	<b>NaCl (g /100ml)</b>	<b>Na (mg/100ml)</b>	<b>Recommended Daily Intake * Na - 2300 mg</b>	<b>Adequate Intake * Na - 1500 mg</b>
Control	0.80	312.0	13.6%	20.8
Control 50% Na Reduction	0.40	156.0	6.8%	10.4
Bionis YE GMX 18 & Bioenhance SW 40	0.35	155.8	6.8%	10.4

\* Source: Dietary Guidelines for Americans, 2010 – Chapter Three

## RECIPE – MUSHROOM CREAMY SOUP

	<b>Control</b>	<b>Control 50% Na Red</b>	<b>Bionis YE GMX 18 &amp; Bioenhance SW 40</b>
Ingredients	%	%	%
Water	90.00	90.00	90.00
Modified Starch	3.98	3.98	3.98
Fat Powder	1.00	1.00	1.00
Creamy Mix Powder	4.00	4.00	4.00
Mushroom	0.15	0.15	0.15
Onion Powder	0.05	0.05	0.05
Parsley Flakes	0.01	0.01	0.01
Maltodextrin	0.01	0.41	0.01
Refined Salt	0.80	0.40	0.35
Bionis YE GMX 18	0.00	0.00	0.25
Bioenhance SW 40	0.00	0.00	0.20
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Regulations can vary between countries.  
Always consult the local requirements regarding the labeling and use of the products.

**Thank you!**