

## Yeast Extract A - Pure Autolysate

**Code: EX501**

Prepared by autolysis of primary grown cells of *Saccharomyces cerevisiae*, this is a premium quality spray dried extract, rich in essential amino acids, peptides, vitamins and carbohydrates. It promotes the growth of microorganisms, making it an essential component of culture media for the growth of fastidious species. When used in fermentation applications good yields can be achieved due to the high nutrient content of this extract.

### Description

Yeast Extract A is a light beige free-flowing homogenous powder, which produces a light yellow clear solution after autoclaving at 121°C for 15 minutes.

Solubility in a 10% aqueous solution in deionised water at 40°C, a light yellow clear solution results. In a 1% solution at 20°C, Yeast Extract A dissolves completely within 1 minute.

pH: 7.0 ± 0.2

### Chemical Composition

Dry matter	94.0 - 98.0%
Total nitrogen	10.5 - 12.0%
Amino Nitrogen	4.7 - 5.7%
Proteins	62.6 - 68.6%
Carbohydrates	7.0 - 13.0%
Ash (excluding chloride)	12.0 - 15.0%
Sodium chloride	< 0.5%

### Vitamin Composition (ppm)

Thiamine	100 - 120
Riboflavin	60 - 90
Pantothenic Acid	120 - 160
Pyridoxine	60 - 80
Niacin	900 - 1100
Cyanobalamin	5 - 15 (ppb)

### Amino Acid Composition (g/100g of crude proteins)

Alanine	8.8	Lysine	8.0
Arginine	5.1	Methionine	1.4
Aspartic acid	9.9	Phenylalanine	3.7
Cystine	0.9	Proline	4.0
Glutamic acid	16.3	Serine	4.6
Glycine	4.8	Threonine	4.3
Histidine	2.1	Tyrosine	2.4
Isoleucine	5.5	Tryptohan	1.3
Leucine	7.6	Valine	5.9

### **Inorganic Materials Composition**

Potassium	6.0 - 7.0%
Sodium	0.15 - 0.25%
Magnesium	<0.1%
Calcium	<0.1%
Phosphorus	1.5 - 2.5%

### **Microbiological analysis (per gram)**

Aerobic plate count	< 5 x 10 <sup>3</sup>
<i>E.coli</i>	Absent
Coliform count	< 5
<i>Salmonella</i>	Absent (25g)
Yeasts	< 50
Clostridia (sulphite reducing spores)	< 10
Moulds	< 50
<i>S.aureus</i>	Absent

### **Storage and Packaging**

Store in a cool dry place away from the direct sunlight. Stored in this way in the original packaging, the product has a shelf life of 4 years from date of manufacture.

Available in 500g, 5kg, 10kg & 25kg sizes, alternative quantities available upon request. The packaging used is either plastic containers or drums, fibreboard drums (with tamper seal) or corrugated cardboard boxes, depending upon pack size and customer preference.

## Yeast Extract B

**Code: EX1001**

Prepared by autolysis of primary grown baker's yeast, this is a premium quality spray dried extract, rich in essential amino acids, peptides, vitamins and carbohydrates. It promotes the growth of microorganisms, making it an essential component of culture media for the growth of fastidious species. When used in fermentation applications good yields can be achieved due to the high nutrient content of this extract.

### Description

Yeast Extract B is a light beige free-flowing homogenous powder, which produces a light yellow clear solution after autoclaving at 121°C for 15 minutes.

pH: 5.6 ± 0.2

### Chemical Composition

Dry matter	95.0 - 98.0%
Total nitrogen	11.0%
Amino Nitrogen	5.0%
Proteins	67.0%
Carbohydrates	21.0%
Ash (excluding chloride)	10.0%
Moisture	2.0 - 5.0%
Sodium chloride	0.4%

### Vitamin Composition (ppm)

Thiamine	6
Riboflavin	71
Pantothenic Acid	122
Pyridoxine	9
Niacin	9
Cyanobalamin	2.1 (ppb)

### Amino Acid Composition (g/100g of product)

Alanine	3.9	Lysine	3.8
Arginine	2.5	Methionine	0.7
Aspartic acid	4.8	Phenylalanine	2.0
Cystine	0.2	Proline	2.0
Glutamic acid	9.5	Serine	2.6
Glycine	2.0	Threonine	2.4
Histidine	0.9	Tyrosine	1.8
Isoleucine	2.2	Tryptohan	1.1
Leucine	3.5	Valine	2.7

### Inorganic Materials Composition

Potassium	1.7%
Sodium	0.4%
Magnesium	1.5%
Calcium	0.6%
Phosphorus	2.5%

### **Microbiological analysis (per gram)**

Aerobic plate count	< 1 x 10 <sup>5</sup>
<i>E.coli</i>	Absent
<i>Salmonella</i>	Absent (25g)
<i>S.aureus</i>	< 1 x 10 <sup>2</sup>

### **Storage and Packaging**

Store in a cool dry place away from the direct sunlight. Stored in this way in the original packaging, the product has a shelf life of 4 years from date of manufacture.

Available in 500g, 5kg, 10kg & 25kg sizes, alternative quantities available upon request. The packaging used is either plastic containers or drums, fibreboard drums (with tamper seal) or corrugated cardboard boxes, depending upon pack size and customer preference.

## **YEAST MORPHOLOGY AGAR**

**Code: KM5502**

Dissolve 33g in 1000ml of cold distilled water. Bring to boil with frequent agitation, distribute and sterilise by autoclaving at 121°C for 15 minutes. Cool to approximately 50°C and pour into sterile petri dishes. Allow the medium to dry in the dish 1 to 2 days before inoculating.

pH 5.8 +/- 0.1

Yeast Morphology Agar is a medium containing all the growth factors for yeasts. It is used for the yeast sensitivity test to study their culture characteristics, cellular morphology, formation of mycelia and pseudomycelia, according to the methods suggested by Wickerham and Van der Walt. The technique recommended for the inoculation is that of Dolman's: a light inoculum, taken from an actively growing pure culture must be smeared in a single line at an end of the plate and in two separate points at the opposite end; lay two sterile slides respectively on the central section of the smear and on one of the two inoculation points. After 3-4 days of incubation, take off the growth of the point inoculations and the smear, without slide, and observe under the microscope the morphology of the vegetative cells. After 3 - 4 days observe under the microscope (dry objective 3mm ocular x 10) the zone underlying the slides for the formation of mycelium or pseudomycelium and the morphology of the colonies.

## **YEAST NITROGEN BASE**

**Code: KM3552**

Dissolve 6.7g in 100ml of cold distilled water and sterilise by filtration. The solution will be 10 x strength: for use dilute 1:10 with a sterile solution of the chosen carbohydrates. Dissolve 0.5g of the carbohydrate in 90ml of distilled water, sterilise by filtration and aseptically add 4.5ml of this solution to 0.5ml of Yeast Nitrogen Base.

pH 5.6 +/- 0.2.

Yeast Nitrogen Base is suitable for the classification of the yeasts on the basis of the oxidative utilisation of the carbon containing compounds. Use a highly diluted inoculum and inoculate the tubes containing the carbohydrates and a control tube containing the medium diluted in sterile distilled water (1:10). Incubate for 20-24 days at 25-28°C keeping the tubes to obtain slants with a large surface exposed to oxygenation. Observe the growth of the yeasts by placing the tubes against a white card where black lines (thickness: 3-4mm) have been drawn. If the lines are poorly visible through the culture the test is positive. The yeast growth is often yellow because of the presence of riboflavin.

## **YEAST CARBON BASE**

**Code: KM5151**

Dissolve 11.7g in 100ml of cold distilled water and sterilise by filtration. The solution will be 10 x strength; for this use dilution factor 1:10 with a sterile solution of the chosen nitrogen containing compound. The most

frequently used compound is potassium nitrate. Dissolve 0.078g potassium nitrate in 90ml of freshly boiled distilled water and sterilise by filtration. To 0.5ml of Yeast Carbon Base in a 16mm tube add under aseptic conditions, 4.5ml of potassium nitrate solution.

pH 5.8 +/- 0.2.

Yeast Carbon Base is a medium containing all the growth factors for the yeasts, save the nitrogen sources, and use for the classification of the yeasts on the basis of their ability to assimilate nitrogen. Use a highly diluted inoculum and incubate the tubes for 7 days at 25 to 28°C.

Since nitrogen containing compounds may be transported with the inoculum and as the yeasts themselves carry a supply of nitrogen in form of proteins, a second inoculation must be performed in yeast Carbon Base prepared following the same procedure as for the first inoculum. Then incubate at 25 to 28 °C for 7 days.

### **Storage**

Dehydrated media: 15-30°C

### **References**

Van der Walt, J P. (1971) - Criteria and methods used in classification. In: "The Yeasts" ed. Lodder, J. ch.2, pp.84-113. Amsterdam: North Holland.  
Wickerham, L.J. (1951) - The Taxonomy of Yeast. Tech . Bull . U .S. Dept. Agric., no. 1029.

## YERSINIA (CIN) SELECTIVE AGAR BASE

A selective medium for the isolation and enumeration of *Yersinia enterocolitica*.

**Code: KM1130**

Typical Formula	(g/l)
Peptone	20.00
Yeast Extract	2.00
Mannitol	20.00
Sodium Pyruvate	2.00
Sodium Chloride	1.00
Magnesium Sulphate	0.01
Sodium Desoxycholate	0.50
Neutral Red	0.030
Crystal Violet	0.001
Agar	12.00

pH 7.4 +/- 0.2

### Directions

Suspend 58g in 1000ml of cold distilled water, heat to boiling. **Do not** autoclave. Cool to 50°C and add, under aseptic conditions one vial of Yersinia Selective Supplement as required, reconstituted with 5ml of cold distilled water. Mix well and pour into sterile petri dishes.

### Description

Yersinia (C.I.N.) Agar is prepared by adding to CIN Agar Base the lyophilised selective supplement containing novobiocin, Irgasan and cefsulodin (Yersinia Selective Supplement). CIN Agar is a selective and differential medium used for isolation and enumeration of *Yersinia enterocolitica* from foods and from clinical and environmental specimens. The medium is prepared according to the original formula developed by Schiemann (1979) and to Schiemann's subsequent modifications (substitution of sodium desoxycholate for bile salts and reduction of novobiocin to 2.5mg/l to improve the growth of serogroup 0:8). Several plating media have been proposed for directly isolating *Y. enterocolitica* (SS Agar, MacConkey Agar), but Schiemann (1980) and Head (1982) found that CIN Agar provided a better inhibition of normal enteric flora and a better recovery of *Y. enterocolitica*. The differential properties of CIN Agar are based on fermentation of mannitol: *Y. enterocolitica* ferments the mannitol and produces an acidification around the colonies with a precipitation of sodium desoxycholate and absorption of neutral red. The medium is highly selective; Schiemann (1982) and Devenish (1981) observe that only a few strains of *Citrobacter freundli*, *Serratia liquefaciens*, and *Enterobacter agglomerans* are able to cultivate on CIN Agar and may mimic the colonial appearance of *Y. enterocolitica*. These bacteria should be differentiated by biochemical tests. *Yersinia frederiksenii*, *Yersinia kristensenii*, and *Yersinia intermedia* are not inhibited on CIN Agar.

## **Method**

For the isolation of *Y. enterocolitica* the following procedures are recommended:

### A -Direct plating

1. Pour plates and dry the surface of the medium.
2. Inoculate the specimen directly onto the surface and streak to produce single colonies
3. Incubate at 22-82°C
4. Examine for growth after 24 and 48 hours

### B Cold Enrichment

1. Prepare the sample suspension with a suitable diluent solution (e.g. Tryptone 1 g/ltr, NaCl 8.5 g/ltr)
2. Add the sample suspension to Yersinia PSB Broth to obtain a dilution 1:10
3. Add the sample suspension to Yersinia ITC Broth to obtain a dilution 1:100
4. Incubate the inoculated Yersinia PSB Broth at 22°C or 25°C for 2-3 days with agitation or for 5 days without agitation
5. Incubate the inoculated Yersinia ITC Broth at 25°C for 48 hours
6. Streak a loopful of the enrichment broths onto CIN Agar plates to obtain well-isolated colonies and incubate at 30°C for 24 hours
7. Add 0.5 ml of Yersinia PSB Broth to 4.5 ml of KOH (0.25 g in 100 ml of saline solution) with this treated broth streak a plate of CIN Agar and incubate at 30°C for 24 hours
8. The typical colonies on CIN Agar must be confirmed by serological and biochemical tests.

**Quality assurance** (30°C-24hrs)

### Productivity control

*Y. enterocolitica* ATCC 9610\*: good growth, pink colonies with deep red centre (bull eye)

### Selectivity control

*E. coli* ATCC 25922: inhibited

*P. aeruginosa* ATCC 27853: inhibited

*E. faecalis* ATCC 29212: inhibited

## **Storage**

Dehydrated medium: 15-30°C

User prepared plates: 7 days at 2-8°C

## **References**

Devenish J.A. and Schiemann D.A. (1981), *Can. J. Microbiol.*, 27, 937-941.

Head C.B.; D.A. Whitty and Ratnam, S. (1982), *J. Clin. Microbiol.*, 16, 615-621.

Highsmith, A.K., Feeley J.C. and Morris, G.K. (1977), *HLth. Lab. Sci.*, 14, 253-260.

ISO 10273 Microbiologie-Directive générales pour la recherche des *Yersinia enterocolitica* presumées pathogènes.

## Yeast Extract Agar

A nutritious agar for the plate count of micro-organisms in water and dairy products. This agar can also be useful for teaching purposes using non-fastidious organisms.

**Code: KM1129**

Typical formula	(g/l)
Yeast Extract	3.0
Balanced Peptone	5.0
Agar	15.0

pH: 7.2 ± 0.2

### Directions

Suspend 23g of powder, disperse in 1 litre of deionised water. Free steam or boil to dissolve. Mix well, and dispense into containers. Sterilise for 15 minutes at 121°C.

**Q.C. organisms:**     *E. coli*  
                              *S. epidermidis*

**Storage:** Plates up to 7 days at 2-8°C in the dark. Container: up to 3 months at 15-20°C in the dark.

**Inoculation:** Pour plate technique or surface spreading.

**Incubation:** 55°C aerobically for 48 hours for aerobic thermophil count. 30°C aerobically for 48 hours for aerobic mesophil count. 6°C aerobically for 10 days for aerobic psychrotroph count.

### References

British Standard 4285: Methods of Microbiological Examination for Dairy Purposes. Ministry of Health, Public Health Laboratory Service Water Committee 1969.  
The Bacteriological Examination of Water Supplies, 4th Edn. report No. 71. H.M.S.O., London.

## YEAST EXTRACT DEXTROSE (YED) CHLORAMPHENICOL AGAR

For the selective isolation and counting of yeasts and moulds in foodstuffs

**Code: KM8892**

<b>Typical formula</b>	<b>(g/l)</b>
Yeast Extract	5.0
Dextrose	20.0
Chloramphenicol	0.1
Agar	15.0

pH 6.6 ± 0.2

### **Directions**

Suspend 40g in 1000 ml of cold distilled water, heat to boiling with agitation until complete dissolution. Sterilise in the autoclave at 121°C for 15 minutes.

### **Description**

YED Chloramphenicol Agar is prepared according to the typical formulation recommended by the International Dairy Federation and the International Organisation of Standardisation (ISO) and is used for the selective isolation and counting of yeasts and moulds in milk, milk products and other foodstuffs. Yeast extract and dextrose stimulate the growth of yeasts and moulds, while chloramphenicol suppresses the contaminating Gram-negative bacteria.

### **Method**

Prepare the sample suspension and the further decimal dilutions with Maximum Recovery Diluent. Transfer by means of a sterile pipette 1 ml of the test sample if liquid, or 1 of the initial suspension in the case of other products, to each of two petri dishes. Add to each plate 15ml of medium cooled to 45°. Mix the inoculum well with melted agar and leave to solidify. Incubate at 25°C and enumerate the colonies after 3-4-5 days

**Quality assurance** (25°C-3 days)

#### Productivity control

*C.albicans* ATCC 10231: good growth  
*A.niger* ATCC 16404: good growth  
*P.cyclopium* ATCC 16025: good growth  
*S.cerevisiae* ATCC 9763: good growth

#### Selectivity control

*E.coli* ATCC 25922: inhibited  
*B.subtilis* ATCC 6633: inhibited

### **Storage**

Dehydrated medium: 15-30°C  
User prepared flasks: 1 month at 2-8°C

### **References**

ISO 6611: Milk and milk products-Enumeration of yeasts and moulds. Colony count technique at 25°C.1992-02-01.  
ISO 7954: Microbiology-General Guidance for enumeration of yeasts and moulds. Colony count technique at 25°C. 1987-11-01.  
ISO 7696: Cereals, pulses and derived products. Enumeration of bacteria, yeasts and moulds. 1990-05-11

## Yeast Extract ND

**Code: EX2000**

Prepared by autolysis of *Saccharomyces cerevisiae* grown on sugar beet molasses medium. This spray-dried extract is microgranulated to give a non-dusting powder with improved handling.

### Description

A light beige, free flowing powder. A 10% solution in deionised water at 40°C is a light yellow colour.

pH: 7.0 ± 0.2

### Chemical Composition

Dry matter	94.0 - 98.0%
Total nitrogen	10.0 - 11.8%
Amino Nitrogen	4.8 - 6.3%
Proteins	62.5 - 73.8%
Carbohydrates	7.0 - 13.0%
Ash (excluding chloride)	11.5 - 15.5%
Sodium chloride	< 0.5%

### Vitamin Composition (ppm)

Thiamine	100 - 120
Riboflavin	80 - 120
Pantothenic Acid	120 - 200
Pyridoxine	60 - 80
Niacin	900 - 1100
Cyanobalamin	5 - 15 (ppb)

### Amino Acid Composition (g/100g of product)

Alanine	8.8	Lysine	8.0
Arginine	5.1	Methionine	1.4
Aspartic acid	9.9	Phenylalanine	3.7
Cystine	0.9	Proline	4.0
Glutamic acid	16.3	Serine	4.6
Glycine	4.8	Threonine	4.3
Histidine	2.1	Tyrosine	2.4
Isoleucine	5.5	Tryptohan	1.3
Leucine	7.6	Valine	5.9

### Inorganic Materials Composition

Potassium	4.8 - 6.8%
Sodium	< 0.4%

Magnesium	< 0.1%
Calcium	< 0.1%
Phosphorus	1.2 - 2.7%

#### **Microbiological analysis (per gram)**

Aerobic plate count	< 1 x 10 <sup>5</sup>
<i>E.coli</i>	Absent
<i>Salmonella</i>	Absent (25g)
<i>S.aureus</i>	Absent

#### **Storage and Packaging**

Store in a cool dry place away from the direct sunlight. Stored in this way in the original packaging, the product has a shelf life of at least 4 years from date of manufacture.

## Yeast Extract Paste

**Code: EX503**

Prepared by autolysis of primary grown baker's yeast, Yeast Extract Paste is not subjected to any drying processes and thus weight for weight contains lower concentration of nutrients than the other extracts in the range. Again this product is better suited to large-scale use where economy is important.

### Description

Yeast Extract Paste is a dark brown viscous paste which forms a light brown solution following autoclaving at 121°C for 15 minutes.

pH: 5.6 ± 0.2

### Chemical Composition

Dry matter	70.0 - 72.0%
Total nitrogen	10.0%
Amino Nitrogen	5.0%
Proteins	47.0%
Carbohydrates	14.0%
Ash (excluding chloride)	9.0%
Sodium chloride	0.4%

### Vitamin Composition (ppm)

Thiamine	1.7
Riboflavin	46
Pantothenic Acid	40
Pyridoxine	7
Niacin	15
Cyanobalamin	0.4 (ppb)

### Amino Acid Composition (g/100g of product)

Alanine	2.8	Lysine	2.8
Arginine	1.9	Methionine	0.5
Aspartic acid	3.8	Phenylalanine	1.5
Cystine	0.1	Proline	1.2
Glutamic acid	6.5	Serine	1.7
Glycine	1.5	Threonine	1.6
Histidine	0.5	Tyrosine	1.2
Isoleucine	1.7	Tryptohan	0.5
Leucine	2.5	Valine	2.0

### **Inorganic Materials Composition**

Potassium	2.0%
Sodium	0.4%
Magnesium	1.5%
Calcium	0.6%
Phosphorus	2.5%

### **Microbiological analysis (per gram)**

Aerobic plate count	< 1 x 10 <sup>5</sup>
<i>E.coli</i>	Absent
<i>Salmonella</i>	Absent (25g)
<i>S.aureus</i>	< 1 x 10 <sup>2</sup>

### **Storage and Packaging**

Store in a cool dry place away from the direct sunlight. Stored in this way in the original packaging, the product has a shelf life of 2 months from date of manufacture.

Available in 25kg sizes, packed in plastic containers.