

 **biotechlab**



Dr. Möller & Schmelz GmbH
Applied Microbiology Corporation



**Nutrient Media for Microbiological Quality Control
in the Food and Beverage Industry**

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Dr. Möller & Schmelz Applied Microbiology Corporation

For more than 30 years we have been a quality partner to the food and beverage industry.

The company was founded in 1986 by Dr. Otfried Möller and Klaus-Jürgen Schmelz.

In the very beginning they developed and manufactured their products with just one employee.

In 1990, production and administration had to move with further employees to a new facility due to the increased demand. The next big step followed in 2003 when the company moved into a new building with ideal factory conditions. In 2009, Michael Sawatzki joined the company as Marketing and Sales Manager and was appointed as a further General Manager in 2013.

We have grown through an enjoyment of our work and the increasing confidence of our customers.

Over the years the demands on quality assurance in both production and microbiological tests have changed dramatically. Technical progress has permitted increased production quantities and faster manufacturing processes. In-process and quality control procedures have to keep step with these innovative developments. The smallest of contaminations, especially in the microbiological range, could lead to immense economic damage.

Göttingen, the "City of Science", has inspired the progress of the firm of **Dr. Möller & Schmelz**.

Both contacts to and exchanges of experiences with several institutes at the University Göttingen have contributed to our success. Göttingen attracts well-trained employees. That's good for

Dr. Möller & Schmelz and their customers.



Graduate Biologist
Dr. Otfried Möller



Chemical Engineer
Klaus-Jürgen Schmelz



Graduate Biologist
Michael Sawatzki

Nutrient Pad Sets (NPS)

Introduction

Nutrient pad sets are sterile dehydrated nutrient culture media that are ready for immediate use after adding water. They are made of biologically inert cellulose cardboard that serves as a substrate for the nutrient solution. Since they do not bind the nutrient media either chemically or physically, the nutrient components are completely available for the growth of microorganisms.

The composition of the various nutrient solutions used for the various NPS comply with the formulas specified in the pertinent standards and regulations.

Nutrient pad sets have a number of advantages over conventional agar media:

- Storage at room temperature
- Shelf life of up to 2 years
- Ready for immediate use after moistening
- Easy to use

Quality assurance

Both the manufacturing process as well as the quality controls for the nutrient pad sets are integrated in our **M&S** quality management system according to DIN EN ISO 9001:2015 and are based on GMP guidelines and DIN EN ISO 11133:2015.

Each batch of **cellulose cardboard** that is used as a substrate for the NPS is tested for thickness (according to DIN EN ISO 20534), grammage (according to DIN EN ISO 536) and water absorption capacity (in-house test method). It is also tested for growth-inhibiting substances.

The **Petri dishes** in which the impregnated nutrient pads are placed are manufactured in clean room conditions and their sterility is checked regularly.

The **solutions are produced** using components from certified suppliers only. The weighed portions of the individual constituents of the formula are documented with their batch numbers to guarantee their traceability. The adjustment of the pH-value is also recorded. Processing continues as soon as the solutions have been produced, i.e. the cardboard pads are then impregnated.

The **drying phase** that follows impregnation takes place under controlled conditions

A service provider certified in accordance with EN ISO 13485:2003 and accredited by DAkkS performs the **sterilisation** of the NPS in a validated process. During the **final inspection** of the finished products, their sterility, recovery rates and if necessary any colour reactions with positive and negative bacilli are tested. The NPS only leave our premises if they satisfy all of the requirements.

The **M&S** batch-related quality certificate that accompanies every package confirms that our quality standards have been checked and met.



Instructions for the use of the NPS

As a general point, make sure that all devices are sterile and that the rules for sterile work are observed.

1. Cut open the pack of ten and remove the Petri dish containing the nutrient pad.
2. Moisten the nutrient pad in the Petri dish with 3-3.5 ml of sterile, distilled or demineralised water. If moistened ideally, there is a noticeable excess of fluid in the Petri dish between the NPS and edge of the dish.
3. Open the seal of the membrane filter package, remove the membrane with sterile tweezers, place on the frit of the filtration device and mount the filter funnel.
4. Filter the test material, rinse with sterile water or peptone water and carefully extract under vacuum until completely empty.
Note: Please refer to the manufacturer's operating instructions when using the filtration device.
5. Carefully remove the membrane filter from the frit with sterile tweezers, place on the prepared nutrient pad making sure that there are no air bubbles (see above) and incubate the Petri dish with the cover on top. The incubation conditions depend on the type of NPS.
Note: Growth and positive reaction to selective media are to be seen as suspicious. Further tests are necessary for a reliable identification.

Moistening the NPS

There are many possible ways of moistening the NPS with the ideal volume of liquid (3.0-3.5 ml). We can offer two of these in our product range.

The quick and easy solution is **ampoules** filled with 3.5 ml of sterile, deionised water (article number 6105). Simply twist the top off and pour the content onto the NPS.

The volume of the **self-filling syringe** (article number 6100) can be infinitely varied up to 5.0 ml. The pre-set, sterile volume is dosed exactly onto the NPS through a sterile syringe filter unit with a pore width of 0.2 µm. The syringe is then re-filled automatically with prepared, deionised or demineralised water from a reservoir.

Overview of grades

NPS to determine the number of heterotrophic, mesophilic bacteria

The number of mesophilic, heterotrophic growing bacteria provides an indication of the general hygiene status of samples. Different nutrient media are recommended or specified for their determination depending on various regulations, standards or internal standards.



| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|---------------------------|-------------------------|---|-----------------------------|---------------------------------------|--|---|
| Caso-NPS | 1030 / 1030-H | To determine the number of colonies in pharmaceutical and cosmetic test materials. | Acc. to EP and USP | Green with grid, pore size 0.45 µm | 1-3 days at 37 °C | Beige or coloured, if pigments are formed. |
| m-TGE-NPS | 1113 / 1113-H | To determine the number of colonies in water, foods and other test materials. | Acc. to APHA | Green with grid, pore size 0.45 µm | 1-3 days at 37 °C | Beige or coloured, if pigments are formed. |
| Plate Count-NPS | 1140 / 1140-H | To determine the number of colonies in water, milk and other foods. | Acc. to APHA | Green with grid, pore size 0.45 µm | 2-3 days at 30 °C | Beige or coloured, if pigments are formed. |
| R2A-NPS | 1155 / 1155-H | To determine the number of colonies in water and other test materials. The low-nutrient medium offers undemanding and stressed water bacteria optimum growth conditions at low temperatures over longer periods of incubation. | Acc. to EP, APHA | Green with grid, pore size 0.45 µm | 3-5 days at 20 °C or 1-3 days at 35 °C | Beige or coloured, if pigments are formed. |
| Standard-NPS | 1190 / 1190-H | To determine the number of colonies in water, waste water and beverages. | Acc. to DEV | Green with grid, pore size 0.45 µm | 2-3 days at 20 °C or 1-2 days at 30 °C | Beige or coloured, if pigments are formed. |
| Standard I-NPS | 1191 / 1191-H | To determine the number of colonies in water, waste water and beverages. | Acc. to DEV, modified | Green with grid, pore size 0.45 µm | 2-3 days at 20 °C or 1-2 days at 30 °C | Beige or coloured, if pigments are formed. |
| Standard TTC-NPS * | 1200 / 1200-H | To determine the number of colonies in water, waste water and beverages. | Acc. to DEV, modified | Green with grid, pore size 0.45 µm | 2-3 days at 20 °C or 1-2 days at 30 °C | Due to the addition of 2,3,5-Triphenyltetrazoliumchloride (TTC) all colonies appear reddish because of the formation of Formazan. This very much facilitate the optical analysis. |
| Yeast Extract-NPS | 1081 / 1081-H | To determine the number of colonies in water and waste water. | Acc. to EN ISO 6222:1999 | Green with grid, pore size 0.45 µm | 2-3 days at 30 °C | Beige or coloured, if pigments are formed. |

* 2,3,5-Triphenyltetrazoliumchloride

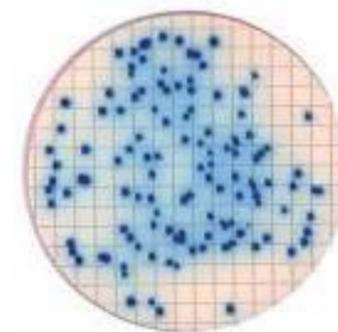
Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

NPS for the detection and identification of *E. coli* and coliform bacteria

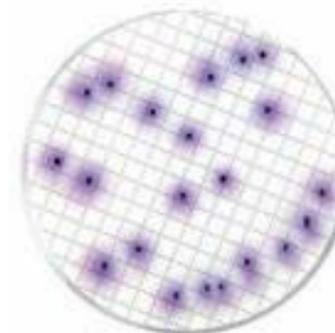
The presence of coliform bacilli and *E. coli* in particular is an indicator of faecal contamination.

Whereas the majority of these enterobacteria are quite harmless, some representatives of this group can cause serious health problems.

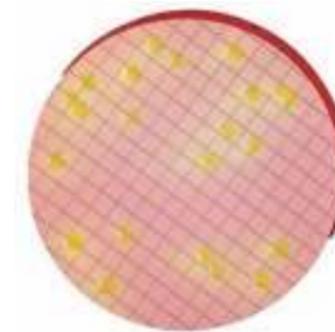
The test of food and beverages for the absence of these microorganisms prior to their release for trade is therefore regulated in guidelines, standards and laws.



E. coli on m-FC-NPS



E. coli on Colichrom-NPS



E. coli on Teepol-NPS

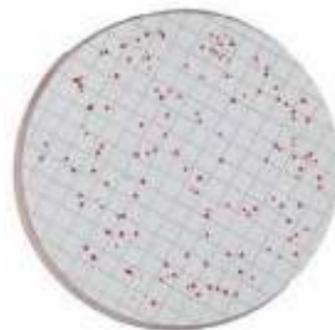
| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|----------------------------|-------------------------|--|---------------------------------------|------------------------------------|--------------------------------------|--|
| Colichrom-NPS | 1035 / 1035-H | For the selective and rapid quantitative detection and differentiation of <i>E. coli</i> , coliform and non-coliform bacteria in water, waste water and beverages. | Acc. to DIN EN ISO 9308-1:2014 | White with grid, pore size 0.45 µm | 16-24 hours at 37 °C | Due to chromogenic compounds, <i>E. coli</i> forms blue colonies, the other coliform bacteria red colonies and the non-coliform microorganisms beige ones. Secondary gram-positive bacteria are inhibited by bile salts. |
| ECD MUG-NPS * | 1080 / 1080-H | For the selective and direct quantitative detection of <i>E. coli</i> in water, waste water and beverages. | Acc. to Swiss Food Code | White with grid, pore size 0.45 µm | 18-24 hours at 44 °C | The higher incubation temperature of 44 °C supports the growth of <i>E. coli</i> and at the same time inhibits the development of secondary bacteria. Colonies of <i>E. coli</i> are fluorescent under UV light (366 nm) and turn cherry red after indole staining. Secondary gram-positive bacteria are inhibited by bile salts. According to the Swiss Food Code further identification is not required. |
| Endo-NPS | 1090 / 1090-H | To detect coliform bacteria in water, waste water and other test materials. | Acc. to APHA | White with grid, pore size 0.45 µm | 20-24 hours at 37 °C or 42-44 °C | Colonies of coliform bacteria display a red colour, caused by the presence of fuchsin. <i>E. coli</i> strains develop a more intensive colour, with some strains even developing a metallic sheen. On account of a higher incubation temperature the development of <i>E. coli</i> is enhanced and the growth of secondary bacteria inhibited at the same time. Secondary gram-positive bacteria are also inhibited by bile salts. |
| MacConkey-NPS | 1098 / 1098-H | For the selective detection and differentiation of enterobacteriaceae in waste water, foods and other test materials. | Acc. to EP and USP | White with grid, pore size 0.45 µm | 18-24 hours at 37 ± 1 °C | <i>E. coli</i> forms red colonies, other coliform bacteria pink-coloured colonies. The colonies of salmonellae and shigellae remain colourless. Secondary gram-positive bacteria are inhibited by bile salts. |
| m-FC-NPS | 1100 / 1100-H | To detect faecal, coliform bacteria in waste water and other test materials. | Acc. to Geldreich et al. (1965), APHA | White with grid, pore size 0.45 µm | 16-24 hours at 44 °C | The higher incubation temperature of 44 °C enhances the growth of <i>E. coli</i> and at the same time inhibits the development of secondary bacteria. <i>E. coli</i> usually forms blue colonies after 16 hours. Secondary gram-positive bacteria are inhibited by bile salts. |
| Teepol-NPS | 1210 / 1210-H | To detect coliform bacilli in water, waste water and other test materials. | Acc. to DEV | White with grid, pore size 0.45 µm | 18-24 hours at 44 °C | The higher incubation temperature of 44 °C enhances the growth of <i>E. coli</i> and at the same time inhibits the development of secondary bacteria. Sub-lethally damaged bacteria can also be detected through pre-incubation (6 hours at 25 °C). <i>E. coli</i> and coliform bacteria form yellow colonies. Secondary gram-positive bacteria are inhibited by bile salts and lauryl sulfate. |
| Tergitol TTC-NPS ** | 1220 / 1220-H | To detect coliform bacteria in water, waste water and other test materials. | Acc. to EN ISO 9308:2000, modified | White with grid, pore size 0.45 µm | 18-24 hours at 37 °C | The fermentation of lactose, which all coliform bacteria are able to do, produces acids that turn the pH-indicator yellow. <i>E. coli</i> forms small yellowish, after 12-16 hours and later larger yellow-orange colonies with a yellow halo. Secondary lactose-negative bacteria form red colonies, some with a bluish halo. The colour characteristic depends on the respective strain. Secondary gram-positive bacteria are inhibited by bile salts. |

* 4-Methylumbelliferyl-β-D-Glucuronide ** 2,3,5-Triphenyltetrazoliumchloride

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

NPS for the detection of enterococci

Enterococci, which were formerly classified as streptococci, play an important role in the intestinal tract of humans and animals and are also used in the production of food. However, some representatives of these bacteria can cause serious illnesses in people with weakened immune systems. Tests of drinking, mineral and table waters are thus compulsory.



Enterococcus faecalis on Azide-NPS

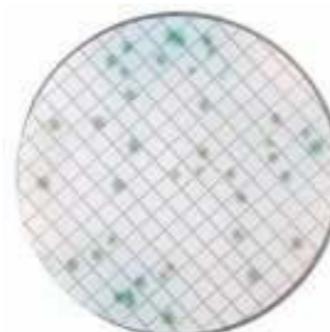


| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|-----------|-------------------------|---|--|------------------------------------|--------------------------------------|--|
| Azide-NPS | 1010 / 1010-H | For the detection of enterococci in water and other test materials. | According to Slanetz and Bartley (1957), EN ISO 7899-2 | White with grid, pore size 0.45 µm | 24-48 hours at 37 °C | Enterococci form small, dark-red colonies. The growth of secondary bacteria is inhibited by azide. |

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

NPS for the detection and identification of pseudomonads

Pseudomonads are ubiquitous. They can be found in water and soil as well as on and in plants and animals. Some representatives of these aerobic, gram-negative bacteria can be hazardous for humans. Tests of drinking, mineral, table and bathing water for pseudomonads is thus prescribed by law.



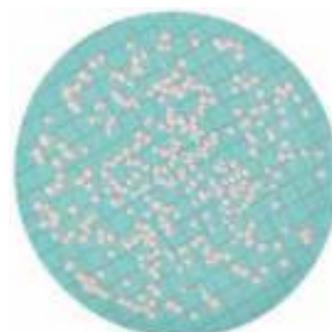
Pseudomonas aeruginosa on Cetrimide-NPS

| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|--------------------|-------------------------|--|----------------------|------------------------------------|--------------------------------------|---|
| Cetrimide-NPS | 1040 / 1040-H | For the detection of <i>Ps. aeruginosa</i> in water, pharmaceutical and cosmetic products and other materials. | Acc. to EP and USP | White with grid, pore size 0.45 µm | 24-48 hours at 37 °C | <i>Ps. aeruginosa</i> form blue-green colonies with a blue halo. The growth of secondary bacteria is inhibited by cetrimide. |
| Pseudomonas CN-NPS | 1145 / 1145-H | For the detection of <i>Ps. aeruginosa</i> in water, waste water and other materials. | Acc. to EN ISO 16266 | White with grid, pore size 0.45 µm | 24-48 hours at 37 °C | <i>Ps. aeruginosa</i> form blue-green colonies with a blue-green halo. The colour characteristic may differ and depends on the strain. The growth of secondary bacteria is inhibited by cetrimide and nalidixic acid. |

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

NPS for the detection of yeasts and moulds

Just like certain bacteria, yeasts and moulds play an important role in the production of food, e. g. beer, wine, cheese and bakery products. However, some representatives are unwanted in certain production processes since they lead to off-flavours, have a negative effect on the shelf life of the food or can even cause serious health problems for consumers. Production processes thus have to be monitored with respect to these microorganisms.



Zygosaccharomyces rouxii
on Malt-NPS



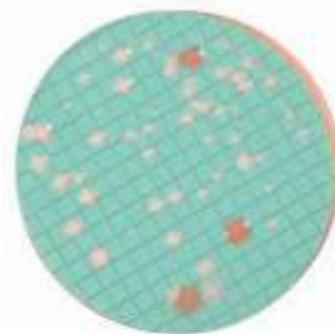
| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|--------------------------------------|-------------------------|--|--|---------------------------------------|--------------------------------------|---|
| Brettanomyces-NPS | 1025 / 1025-H | For the detection of brettanomyces yeasts in wine, beer and beverages containing fruit juice. | M&S | Green with grid, pore size 0.45 µm | 3-5 days at 30 °C | Brettanomyces yeasts form yellow to yellow-orange colonies with a yellow halo and are thus easy to differentiate from the generally white to cream-coloured colonies of other yeasts, which are also largely inhibited by actidione. |
| Lysine-NPS | 1095 / 1095-H | For the selective detection of "wild yeasts" in breweries. | Acc. to Morris and Eddy (1957), modified | Green with grid, pore size 0.8 µm | 2-5 days at 25-30 °C | Only wild yeasts can use lysine as a sole source of nitrogen. They generally form white to cream-coloured, but occasionally also reddish colonies. Culture yeasts and some yeasts saccharomyces do not grow. |
| Malt Extract-NPS | 1099 / 1099-H | For the selective detection of yeasts and moulds in beverages, food and other test materials. | Acc. to Reiss (1972), modified | Black with grid, pore size 0.6 µm | 2-5 days at 25-30 °C | Yeasts form white to cream-coloured, occasionally also reddish colonies. The colonies of moulds are initially white with clearly visible aerial mycelium (velvety) and become yellowish, greenish or even brownish to black when forming conidia. The low pH-value inhibits the growth of most bacteria. Acid-tolerant bacteria, may occasionally appear. |
| m-Green Yeast & Mould-NPS | 1105 / 1105-H | For the detection of yeasts and moulds in sugar and beverages containing sugar. | Acc. to APHA | Green with grid, pore size 0.8 µm | 2-3 days at 25-30 °C | The acid produced by the fermentation of sugar through yeasts and moulds turns the pH-indicator from blue-green to yellow and leads to yellowish colonies, some with a yellow halo. Non-acid-formers are blue-green. The low pH-value of the medium inhibits the growth of most bacteria and enhances the development of yeasts and moulds. |
| OGY-NPS | 1115 / 1115-H | For the selective detection of yeasts and moulds in food, fruit juices and pharmaceutical materials. | Acc. to Mossel et al. (1970), modified | Black with grid, pore size 0.6 µm | 2-5 days at 25-30 °C | Yeasts form white to cream-coloured, occasionally reddish colonies. The colonies of moulds are initially white with clearly visible aerial mycelium (velvety) and become yellowish, greenish or even brownish to black when forming conidia. The low pH-value and the presence of oxytetracycline largely inhibit the growth of secondary bacteria. |
| Osmophile-NPS | 1130 / 1130-H | For the detection of osmophilic and osmo-tolerant yeasts and moulds in sugar, sweets and sweet food. | Acc. to ICUMSA | Green with grid, pore size 0.8 µm | 5-7 days at 25 °C | Yeasts form whitish to cream-coloured colonies. The colonies of moulds are initially white with clearly visible aerial mycelium (velvety) and become yellowish, greenish or even brownish to black when forming conidia. The high sugar content inhibits the growth of secondary bacteria. |
| Sabouraud-NPS | 1160 / 1160-H | For the detection of yeasts and moulds in pharmaceutical and cosmetic products and packaging material and for the isolation of dermatophytes and pure culture. | Acc. to EP and USP | Green with grid, pore size 0.8 µm | 2-5 days at 25-30 °C | Yeasts form white to cream-coloured, occasionally reddish colonies. The colonies of moulds are initially white with clearly visible aerial mycelium (velvety) and become yellowish, greenish or even brownish to black when forming conidia. The low pH-value of the medium inhibits the growth of most bacteria and enhances the development of yeasts and moulds. |
| Schaufus Pottinger-NPS | 1180 / 1180-H | For the detection of yeasts and moulds in sugar and beverages containing sugar. | Acc. to Schaufus and Pottinger, modified | Green with grid, pore size 0.8 µm | 2-3 days at 25-30 °C | The acid produced by the fermentation of sugar through yeasts and moulds turns the pH-indicator from blue-green to yellow and leads to yellowish colonies, some with a yellow halo. Non-acid-formers are blue-green. The low pH-value of the medium inhibits the growth of most bacteria and enhances the development of yeasts and moulds. |
| Wort-NPS | 1260 / 1260-H | For the detection of yeasts and moulds in beverages, food and other test materials. | Acc. to Rapp (1974) | Black with grid, pore size 0.6 µm | 2-5 days at 25-30 °C | Yeasts form white to cream-coloured, occasionally reddish colonies. The colonies of moulds are initially white with clearly visible aerial mycelium (velvety) and become yellowish, greenish or even brownish to black when forming conidia. The low pH-value of the medium inhibits the growth of most bacteria and enhances the development of yeasts and moulds. |

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

Detection of special microorganisms or groups of microorganisms



Staphylococcus aureus
on Chapman-NPS



Yeast mixed culture
on Orange Serum-NPS



| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|------------------------------|-------------------------|---|---|---------------------------------------|---|---|
| BAT-NPS | 1015 / 1015-H | For the selective detection of <i>Alicyclobacillus sp.</i> in beverages containing sugar. | Acc. to Cerny et al. | White with grid, pore size 0.45 µm | 2-5 days at 43-45 °C | <i>Alicyclobacillus sp.</i> form cream-coloured colonies. The growth of secondary bacteria is inhibited by the low pH-value and the high incubation temperature. |
| Bismuth Sulfite-NPS | 1250 / 1250-H | For the selective detection of salmonellae in water, food and other materials. | Acc. to Wilson and Blair (1927), modified | White with grid, pore size 0.45 µm | 24-48 hours at 37 °C | Salmonellae form dark-brown to black colonies, usually with a light rim and black halo ("fish eye"). |
| Chapman-NPS | 1050 / 1050-H | For the selective detection of pathogenic staphylococci in food, pharmaceutical and cosmetic materials. | Acc. to Chapman (1946), modified | White with grid, pore size 0.45 µm | 24-48 hours at 37 °C | <i>Staphylococcus aureus</i> forms yellow colonies with a yellow halo. The high concentration of sodium chloride inhibits the growth of secondary bacteria. |
| Chinablue-NPS | 1060 / 1060-H | To determine the number of colonies and differentiate between acid-producers and non-acid-producers in milk and dairy products. | Acc. to Brandl and Sobeck-Skal (1963) | White with grid, pore size 0.45 µm | 24-48 hours at 30 °C | The production of acid from lactose is indicated by blue colonies. |
| Dextrose Tryptone-NPS | 1070 / 1070-H | To determine the number of colonies of mesophilic microorganisms and to detect thermophilic spore-forming bacteria in sugar and food. | Acc. to ICUMSA | White with grid, pore size 0.45 µm | 2-3 days at 30 °C (mesophilic) or 1-2 days at 55 °C (thermophilic) | "Flat-sour" colonies (<i>Bacillus coagulans</i>) are greenish-yellow with a yellow halo. |
| Orange Serum-NPS | 1120 / 1120-H | To detect acidophilic and acidotolerant bacteria in beverages and food. | Acc. to Hays (1951) | Green with grid, pore size 0.45 µm | 2-3 days at 30 °C | Based on the formulation and the low pH-value, both yeasts and moulds as well as acidotolerant bacteria can develop. Demanding lactobacilli can also develop under anaerobic incubation conditions. |
| VRBD-NPS | 1225 / 1225-H | For the selective detection and determination of the number of colonies of enterobacteriaceae in food, water and beverages. | Acc. to Mossel et al. (1962), modified | White with grid, pore size 0.45 µm | 16-24 hours at 37 °C | Representatives of the enterobacteriaceae family form red colonies, occasionally with a red halo. Unspecific secondary bacteria grow creamy coloured to light pink. |
| Weman-NPS | 1240 / 1240-H | To detect mucilaginous bacteria on sugar, beverages containing sugar and food. | Acc. to ICUMSA | Green with grid, pore size 0.45 µm | 2-3 days at 30 °C | Slime-forming microorganisms (<i>e.g. Leuconostoc sp.</i>) form colourless, water drop-like colonies. |

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

NPS for the detection of lactic acid bacteria

Lactic acid bacteria are a heterogeneous group of anaerobic, but usually aerotolerant bacteria, all able to ferment glucose to lactic acid.

Although lactic acid bacteria play an important role in the production of foods, the metabolites of some representatives are unwanted in products from the beverages industry since they lead to off-flavours and spoilage. Routine tests for lactic acid bacteria in the production processes thus play an important role.



Lactobacillus on MRS-NPS



| NPS Type | Item-No 50 / 100 Pcs | Application | Formulation | Recommended Membrane Filter | Recommended Incubation Conditions | Growth |
|----------|-------------------------|--|--|------------------------------------|--|---|
| Beer-NPS | 1020 / 1020-H | To detect beer-spoiling bacteria, including the genera Lactobacillus, Pediococcus and Zymomonas. | Acc. to Konzulis and Page (1968), modified | Green with grid, pore size 0.45 µm | 2-5 days at 30 °C under anaerobic conditions | The growth of yeasts can be suppressed by Actidion. |
| MRS-NPS | 1110 / 1110-H | For the detection of lactic acid bacteria in soft drinks, food and other test materials. | Acc. to De Man, Rogosa and Sharpe (1960), modified | Green with grid, pore size 0.45 µm | 3-5 days at 30 °C under anaerobic conditions | The growth of yeasts can be suppressed by Actidion. |
| Wine-NPS | 1230 / 1230-H | For the selective detection of wine-spoiling bacteria, including the genera Leuconostoc, Lactobacillus und Pediococcus. Acetobacter can also be detected under anaerobic conditions. | Optimised tomato juice medium | Green with grid, pore size 0.45 µm | 2-5 days at 30 °C under anaerobic conditions | The growth of yeasts can be suppressed by Actidion. |

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

We at **Dr. Möller & Schmelz** are involved in quality assurance in the food and beverages industry.

Our customers value us as a fast and reliable supplier of high quality nutrient media for microbiological quality control and as a consultant for microbiological questions.



Ordering information

The nutrient pads are offered as a complete set in 2 different package sizes with 50 or 100 units. The packaging units contain the sterile nutrient pads in sterile Petri dishes and sterile, individually packed membrane filters, as explained in the description on the previous pages, in a diameter of 50 mm.

We can cater for your wishes with respect to the colour and pore size of the membrane filters or an alternative diameter of 47 mm.

Membrane filters for the most common membrane dispenser systems are also available.

Please feel free to contact us.

| NPS Type | 50 Units | 100 Units |
|-----------------------|----------|-----------|
| Azide-NPS | 1010 | 1010-H |
| BAT-NPS | 1015 | 1015-H |
| Beer-NPS | 1020 | 1020-H |
| Bismuth Sulfite-NPS | 1250 | 1250-H |
| Brettanomyces-NPS | 1025 | 1025-H |
| Caso-NPS | 1030 | 1030-H |
| Colichrom-NPS | 1035 | 1035-H |
| Cetrimide-NPS | 1040 | 1040-H |
| Chapman-NPS | 1050 | 1050-H |
| Chinablue-NPS | 1060 | 1060-H |
| Dextrose Tryptone-NPS | 1070 | 1070-H |
| ECD MUG-NPS * | 1080 | 1080-H |
| Endo-NPS | 1090 | 1090-H |
| Lysine-NPS | 1095 | 1095-H |
| MacConkey-NPS | 1098 | 1098-H |
| Malt Extract-NPS | 1099 | 1099-H |
| m-FC-NPS | 1100 | 1100-H |
| MRS-NPS | 1110 | 1110-H |
| m-TGE-NPS | 1113 | 1113-H |



| NPS Type | 50 Units | 100 Units |
|---------------------------|----------|-----------|
| m-Green Yeast & Mould-NPS | 1105 | 1105-H |
| OGY-NPS | 1115 | 1115-H |
| Orange Serum-NPS | 1120 | 1120-H |
| Osmophile-NPS | 1130 | 1130-H |
| Plate Count-NPS | 1140 | 1140-H |
| Pseudomonas CN-NPS | 1145 | 1145-H |
| R2A-NPS | 1155 | 1155-H |
| Sabouraud-NPS | 1160 | 1160-H |
| Schaufus Pottinger-NPS | 1180 | 1180-H |
| Standard-NPS | 1190 | 1190-H |
| Standard I-NPS | 1191 | 1191-H |
| Standard TTC-NPS ** | 1200 | 1200-H |
| Teepol-NPS | 1210 | 1210-H |
| Tergitol TTC-NPS ** | 1220 | 1220-H |
| VRBD-NPS | 1225 | 1225-H |
| Wine-NPS | 1230 | 1230-H |
| Weman-NPS | 1240 | 1240-H |
| Wort-NPS | 1260 | 1260-H |
| Yeast Extract-NPS | 1081 | 1081-H |

* 4-Methylumbelliferyl-β-D-Glucuronide ** 2,3,5-Triphenyltetrazoliumchloride

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de



Ready-to-use agar media and broth

Introduction

M&S ready-to-use agar media are filled in autoclavable and break-proof polycarbonate bottles (50 ml and 250 ml) or glass tubes (20 ml) under sterile conditions. The formulation of the various nutrient media, like the NPS, complies with the formula specified in standards and regulations.

Whereas the liquid media can be used immediately, the agar media first have to be melted again in a water bath at 90-100 °C. Once they have cooled down to around 50 °C you can pour agar plates in different sizes and thicknesses to meet your individual demands.

The shelf life of the ready-to-use agar media in unopened containers is 3-9 months, depending on the grade. Details are provided in the individual technical data sheets.

In general **M&S** ready-to-use nutrient media are offered in different pack sizes. However, not all grades of nutrient media are available in all sizes. Please refer to the overview on the following pages.

Other pack sizes are possible on request or for larger order quantities.

Please feel free to contact us.

Quality assurance

Just like the nutrient pad sets, the production processes and quality controls for **M&S** ready-to-use nutrient media are integrated in our quality management system and are based on the GMP guidelines and DIN EN ISO 11133:2015.

The solutions and agar media are produced using components from certified suppliers only. The weighed portions of the individual components are documented with their batch numbers to guarantee their traceability and the adjustment of the pH-value is also recorded. Careful filling and sterilisation ensures that the quality of the individual nutrient media batches remain unaffected.

During the final inspection of the finished products, their sterility, recovery rates and if necessary any colour reactions with positive and negative bacilli are tested. The nutrient media only leave our premises if they satisfy all of the requirements.

The batch-related quality certificate that is enclosed in each package confirms that **M&S** products have been checked according to **M&S** quality standards and satisfy these.



Making agar plates with ready-to-use agar

1. Remove the bottle or tube from the packaging.
2. Loosen the cap to allow the pressure that builds up during heating to escape. However, do not remove the cap fully!
3. Place the bottle or tube in a pre-heated water bath (90-100 °C).
4. Incubate until the agar is completely fluid.
5. Remove the bottle or tube from the water bath and leave to cool down to around 50 °C.
6. Pour the agar into sterile Petri dishes. Approximate values are 15-20 ml for a 90 mm dish and 10 ml for a 60 mm dish.
7. Leave the agar to solidify.
8. Poured plates should be stored in the dark at 4-18 °C for a maximum of 7-10 days depending on the type of nutrient medium. To prevent the plate from drying out, we recommend to keep them in plastic bags.

Custom-made products are also possible for small quantities

The range of **M&S** ready-to-use nutrient media is aligned to the needs of the food and beverages industry.

If you

- cannot find the nutrient medium you are looking for in our standard range
- need a special composition or a special pH-value for an existing nutrient medium
- would prefer a pack size that is more convenient for your needs

then simply contact us.

We will check the feasibility of your requirements and will prepare a non-committal offer.

Ordering information



Lactose broth single concentration, with Durham tubes (article 5130), from left to right:

Positive result

1. *Escherichia coli*: change of colour and pea-sized gas bubble
2. *Enterobacter aerogenes*: change of colour and marked formation of gas

Negative result

3. Growth, but no change of colour
4. Growth with a change of colour, but no formation of gas
5. Uninoculated control

| Nutrient Medium | Standard | 25 x 20 ml | 25 x 50 ml | 4 x 250 ml |
|---|---|---------------------------------------|------------|--------------------------------------|
| Azide-glucose-broth, single concentration * | Min/TafelWV ** | | 5140 | |
| Azide-glucose-broth, double concentration | Min/TafelWV ** | | | 5010 (4 x 100 ml) |
| BAT agar * | | 4012 (24 x 10 ml) | | 5012 (4 x 125 ml) |
| Beer agar | | | | 5015 |
| Bile esculin azide agar | Min/TafelWV ** EN ISO 7899:2000 | 5250 | | 5251 |
| Casein-peptone-bile agar | | 5230 | | 5231 |
| Caso agar | TrinkwV *** DIN EN ISO 9308-1:2014 | 4020 | | 5020 |
| Caso broth | | 4021 | | 5023 |
| Cetrimide agar | | 4025 | | 5021 |
| Colichrom agar | TrinkwV *** DIN EN ISO 9308-1:2014 | 4028 und 4028-100 (100 x 20 ml) | | 5025 und 5025-24 (24 x 250 ml) |
| Crystal violet agar | | 4051 | | 5038 |
| DRCM broth, dehydrated | Min/TafelWV ** | 4030 | 5160 | |
| Endo agar | Min/TafelWV ** | 4040 | | 5030 |
| Enterococci selective agar, acc. to Slanetz and Bartley | Min/TafelWV ** EN ISO 7899:2000 | 5240 | | 5241 |
| Gelatine agar | Min/TafelWV ** TrinkwV *** | 4045 und 4045-100 (100 x 20 ml) | 5170 | 5035 und 5035-24 (24 x 250 ml) |
| King A agar | Min/TafelWV ** | 5268 | | 5269 |
| King B agar | Min/TafelWV ** DIN EN ISO 16266:2008 | 5270 | | 5271 |

| Nutrient Medium | Standard | 25 x 20 ml | 25 x 50 ml | 4 x 250 ml |
|---|--|---------------------------------------|------------|--|
| Lactose broth, single concentration * | | | 5130 | |
| Lactose broth, double concentration | Min/TafelWV ** | | | 5040 (4 x 100 ml) |
| Lactose broth, 6-fold concentration | | | | 5044 und 5044-24 (24 x 250 ml) |
| Lactose TTC tergitol agar | DIN EN ISO 9308-1:2000 | 5200 | | 5201 |
| Lysine agar | | 4055 | | 5042 |
| Malachite green broth, single concentration * | Min/TafelWV ** | | 5150 | |
| Malachite green broth, double concentration | Min/TafelWV ** | | | 5050 (4 x 100 ml) 5050-24 (24 x 100 ml) |
| Malt extract agar | | 4060 und 4060-100 (100 x 20 ml) | | 5060 und 5060-24 (24 x 250 ml) |
| MRS agar | | 4061 und 4061-100 (100 x 20 ml) | | 5061 und 5061-24 (24 x 250 ml) |
| MRS broth | | 4062 | | 5062 |
| MRS broth with indicator | | | | 5063 |
| Nutrient agar | Min/TafelWV ** TrinkwV *** DIN EN ISO 16266:2008 | 4080 und 4080-100 (100 x 20 ml) | | 5080 und 5080-24 (24 x 250 ml) |
| Nutrient broth | | 4090 | | 5081 |
| Orange serum agar | | 4095 | | 5085 und 5085-24 (24 x 250 ml) |
| Plate count agar | APHA | 4100 | | 5090 und 5090-24 (24 x 250 ml) |
| Pseudomonas CN agar | TrinkwV *** DIN EN ISO 16266:2008 | 5280 | | 5281 |
| R2A agar | EP, USP **** | 4125 | | 5095 |
| Sabouraud agar | EP, USP **** | 4130 | | 5100 |
| Standard agar | | 4135 | | 5101 und 5101-24 (24 x 250 ml) |
| Tryptophane peptone water | Min/TafelWV ** DIN EN ISO 9308-1:2000 | 5220 (25 x 10 ml) | | |
| Wort agar | | 4150 | | 5110 und 5110-24 (24 x 250 ml) |
| Yeast extract agar | TrinkwV *** DIN EN ISO 6222:1999 | 4047 | | 5036 |

* with membrane filter ** German Mineral- and Table Water Directive *** German Drinking Water Directive
**** European Pharmacopeia, United States Pharmacopeia

Detailed technical data sheets can be downloaded at www.moeller-schmelz.de

Filtration devices and accessories

Filtration devices

The **M&S** range of filtration devices and accessories is tailored to routine work in microbiology laboratories to facilitate your daily work.

For example, our stainless steel filtration devices have a self-sealing funnel. This means that there is no need to lock the funnel and base of the filtration device. This not only saves time but also minimises the risk of damage to the filtration membrane due to shearing forces. The funnel volume of 100 ml is sufficient for the majority of applications.

A 2-way Teflon tap is used to turn the vacuum on and off. Furthermore, the filtration devices can be completely dismantled.

This greatly facilitates cleaning and sterilisation.



In addition to the single-place filtration device we can also offer stainless steel filtration manifolds. These are ideal for work in benches on account of their compact dimensions.

A 3-place filtration manifold can be extended to a 6-place manifold quickly and easily by connecting a second unit for work with a large quantity of samples.

The filtration manifolds can of course be completely dismantled for cleaning and sterilisation.

For laboratories with only few samples or for those wanting to start their own microbiological quality control we have put together a complete filtration workplace.

This consists of a filtration device with suction flask and stopper, a Woulff's bottle with manometer and control valve, a small vacuum pump and all necessary vacuum hoses and connectors.

If you have to deal with a larger number of samples, we can offer workplaces to meet your needs, e.g. with filtration manifolds, larger suction flasks or more powerful vacuum pumps.

Please feel free to contact us and let us know your requirements.



Accessories

A very useful accessory is our special **M&S tweezers**. These can be used to roll up membrane filters after filtration to easily transfer them into liquid media in narrow-neck bottles.

An ideal complement to the nutrient pads are the **ampoules with 3.5ml of sterile water**. They contain exactly the right amount of water for an optimum moistening of the nutrient pads. The visible excess liquid is necessary to compensate the water that evaporates during incubation and keep the nutrient pads wet. This ensures that the dissolved nutrients are provided on the surface of the membranes for the growth of the cells.

Another way of moistening the NPS with sterile water is the use of a **self-filling syringe**. Its volume is infinitely adjustable up to a maximum of 5 ml. The syringe has a Luer-Lock connection to fit a sterile syringe filter unit. Per each pass the pre-set volume of sterile water is dispensed onto the nutrient pad and the syringe is refilled with water from a reservoir via a hose. This is ideal for large numbers of samples.

Petri dishes with a diameter of 60mm for pouring agar plates, **autoclavable bottles** and **tubes** as well as a **handy UV lamp for the fluorescent test**, e.g. with the ECD-MUG NPS or Cetrimide agar complete the range of the **M&S** accessories.



