68109 Nickels and Leesment *ChromoSelect* Medium

Nickels and Leesment *ChromoSelect* Medium is used for the enumeration of citrate-fermenting lactic acid bacteria from milk, milk products and mesophilic starter cultures.

Composition:**

Ingredients	Grams/Litre
Casein enzymic hydrolysate	18.0
Yeast extract	4.5
Gelatine	2.25
Glucose	4.5
Lactose	4.5
Sodium chloride	3.6
Trisodium citrate dihydrate	1.8
Calcium lactate pentahydrate	8.0
Tricalcium dicitrate tetrahydrate	6.65
Carboxymethyl cellulose (CMC)	0.4
Chromogenic substrate (X-gal)	0.2
Agar	15.0
Final pH 7.0 ± 0.2 at 25°C	

**Formula adjusted, standardized to suit performance parameters

Store at 2-8°C and the prepared medium at 2-8°C. Use before expiry date on the label.

Appearance:	Faint beige, homogeneous, free flowing powder.
Gelling:	Firm
Color and Clarity:	White coloured, opaque gel containing white precipitate forms in Petri plates.

Directions:
Suspend 66.0 grams of dehydrated medium in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes. If desired, add rehydrated contents of 2 vials of Nickels and Leesment *ChromoSelect* Selective Supplement (Cat. No. 40952).

Principle and Interpretation:
Lactic acid bacteria are widespread in nature and are best known for their activities in major food such as dairy, meat and vegetable products (1).
Testing for lactic acid bacteria in dairy products may be useful for various reasons like evaluating lactic starter cultures; determining the cause of acid defects in milk products, controlling the quality of cured cheese, cultured milks and uncultured products containing added cultures (2).
Nickels and Leesment *ChromoSelect* Medium is a modification of Modified Nickels and Leesment Medium formulated as per APHA (1) and is used for the enumeration of citrate-fermenting lactic acid bacteria using colony count technique at 25°C.
Casein enzymic hydrolysate and yeast extract serve as carbon and nitrogen sources. Lactose and glucose are the carbohydrate source in the medium. X-gal differentiates between *Lactococcus lactis* subsp. *lactis* and *Leuconostoc* species. Carboxymethyl cellulose must be added to prevent the insoluble calcium citrate from settling.

Lactococcus lactis subsp*. lactis biovar diacetylactis* colonies are white with a clear zone. *Lactococcus lactis* subsp.*lactis* and *Lactococcus lactis* subsp. *cremoris* colonies are white without a clear zone. *Leuconostoc* species are blue, with or without a clear zone. Nickels and Leesment *ChromoSelect* Medium with the addition of Nickels and Leesment *ChromoSelect* Supplement can be used for enumeration of *Leuconostoc* (1). Vancomycin acts as a supplement for the selective isolation of *Leuconostoc* from a mix flora of lactic acid bacteria. Sodium chloride maintains osmotic equilibrium and various salts provides essential ions.

Cultural characteristics after 48-72 hours at 25-30°C.

Organisms (ATCC)	Growth	Growth with Supplement	Colony appearance
L. lactis biovar diacetylactis	+++	-	white with a clear zone
L. lactis subsp lactis (19435)	+++	-	white without a clear zone
L. lactis subsp cremoris (19257)	+++	-	white without a clear zone
Leuconostoc mesenteroides (9135)	+++	+++	blue without clear zone

References:

1. Downes F.P. and Ito K., (Eds) 2001, Compendium of Methods for the Microbiological Examination of Foods, 4th Ed., APHA Washington D.C.
2. Marshall R.T., 1992, Standard Methods for the Examination of Dairy products, 16th Ed., American Public Health Association, Washington D.C.
3. Nickels C., and H. Leesment. 1964. Method for the differentiation and qualitative determination of starter
bacteria. Milchwissenschaft 19:374-378.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.