

Lab Pasteurized Count (LPC)

Fabian Y Bernal M.S., P.A.S

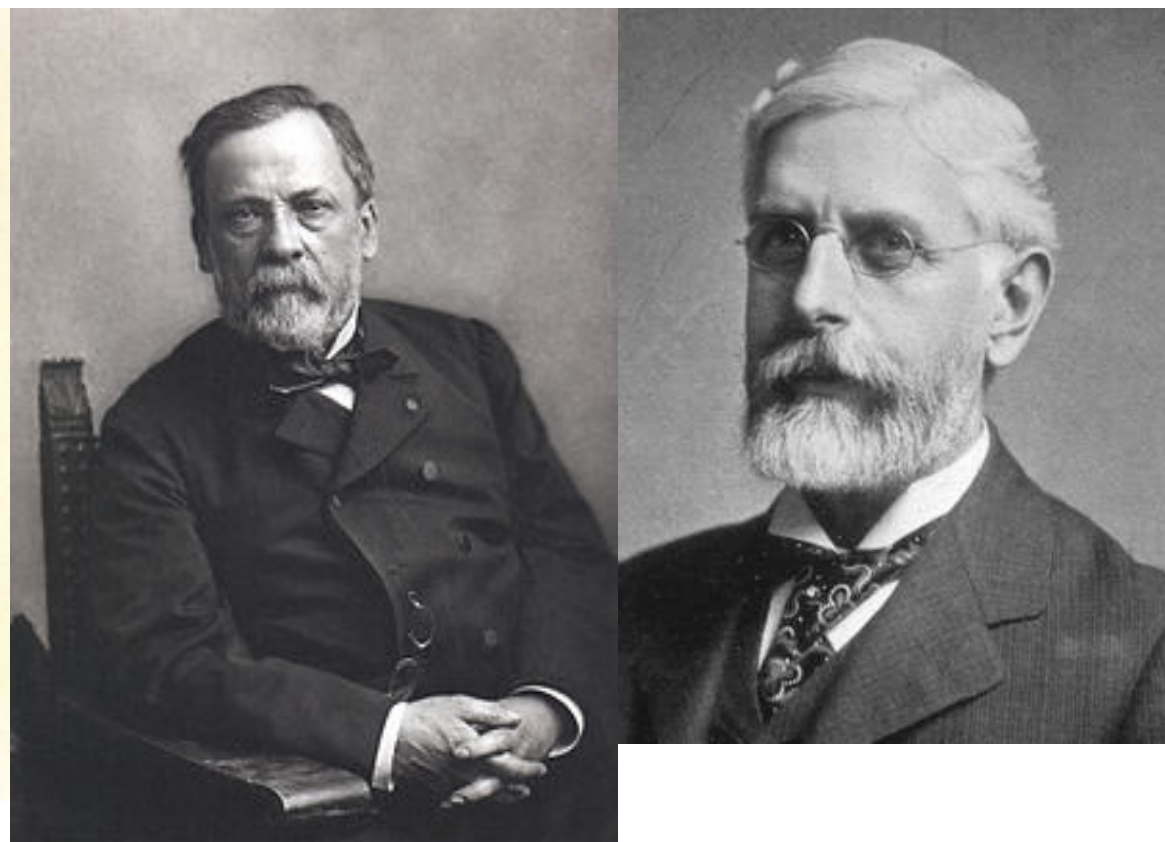
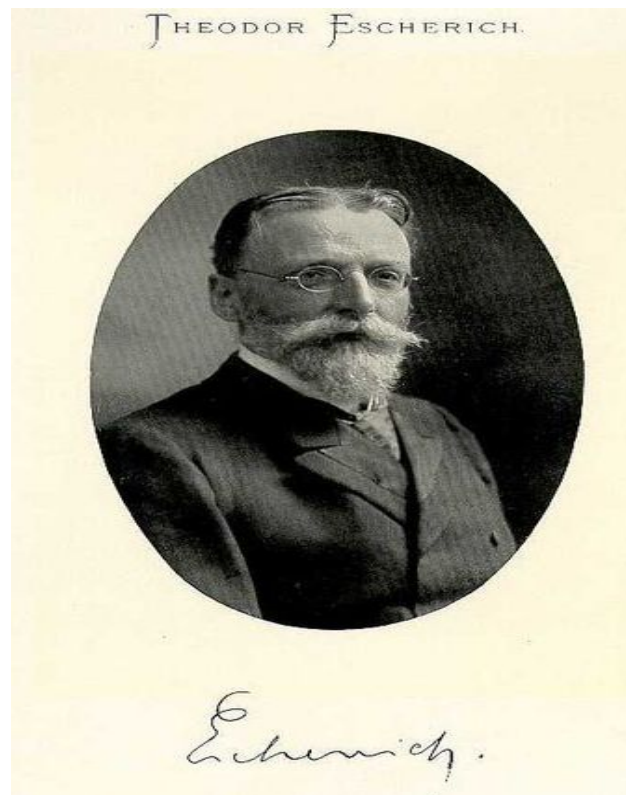


More Cooperative.



Theodore Escherich
“father” of E. coli

Daniel Salmon DVM
“father” of salmonella



Louis Pasteur

More Cooperative.



You see something like this....

PICKUP DATE	PICKUP TIME	TICKET	PICKUP ID	TANK	WEIGHT	BFT	PRO	LAC	SNF	OSOL	SCC (X 1000)	COLI	LPC	PI COUNT (X 1000)	SPC (X 1000)	MUN	FRZP	TEMP	AB	FFA	TEST CODE
2015-10-07	11:00:00	21908396	911	02	7273	3.40	3.15	4.83	8.90	5.75	140	0	0	0	0	9.1	0.550	40		4.38	DFA
2015-10-07	11:00:00	21908396	911	02	7273	0.00	0.00	0.00	0.00	0.00	0	0	690	6	3	0.0	0.000	38			RCK
2015-10-07	10:30:00	21908396	120	01	43124	3.68	3.09	4.89	8.89	5.80	160	0	0	0	0	9.0	0.449	38		4.59	DFA
2015-10-07	10:30:00	21908396	120	01	43124	0.00	0.00	0.00	0.00	0.00	0	0	440	3	3	0.0	0.000	38			RCK
2015-10-06	11:15:00	21417900	910	02	6468	0.00	0.00	0.00	0.00	0.00	0	0	1050	5	3	0.0	0.000	38			RCK
2015-10-06	11:15:00	21417900	910	02	6468	3.45	3.18	4.76	8.86	5.68	200	0	0	0	0	10.5	0.545	38		10.62	DFA
2015-10-06	10:30:00	21417900	119	01	43608	3.61	3.10	4.86	8.87	5.77	170	0	0	0	0	8.1	0.545	36		9.89	DFA
2015-10-06	10:30:00	21417900	119	01	43608	0.00	0.00	0.00	0.00	0.00	0	0	690	4	2	0.0	0.000	38			RCK
2015-10-05	11:20:00	21908394	909	02	7086	3.39	3.17	4.82	8.91	5.74	0	0	0	0	0	0.0	0.000	39			DFA
2015-10-05	10:30:00	21908394	118	01	43306	3.75	3.15	4.90	8.97	5.82	0	0	0	0	0	0.0	0.000	35			DFA
2015-10-05	00:01:00	21908394	118	01	43306	0.00	0.00	0.00	0.00	0.00	170	0	340	3	2	0.0	0.000	37	N		HDT
2015-10-05	00:01:00	21908394	909	02	7086	0.00	0.00	0.00	0.00	0.00	140	0	690	2	2	0.0	0.000	37	N		HDT

More Cooperative.



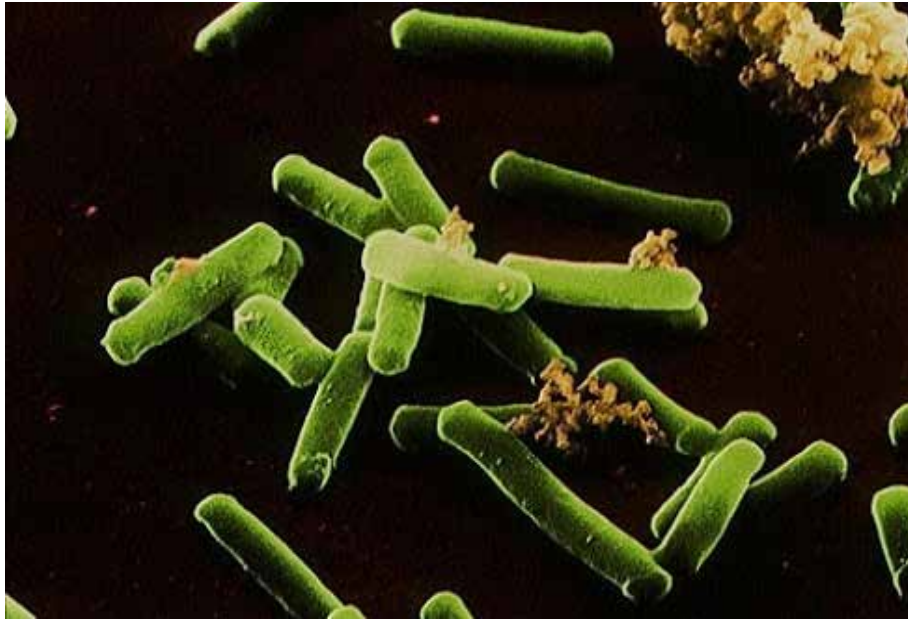
Or something like this...

PICKUP DATE	PICKUP TIME	TICKET	PICKUP ID	TANK	WEIGHT	BFT	PRO	LAC	SNF	OSOL	SCC (X 1000)	COLI	LPC	PI COUNT (X 1000)	SPC (X 1000)	MUN	FRZP	TEMP	AB	FFA	TEST CODE
2015-10-14	19:09:00	21686243	885	01	50734	3.46	3.15	4.77	8.84	5.69	320	0	0	0	0	0.9	0.546	37		5.04	DFA
2015-10-14	19:09:00	21686243	885	01	50734	0.00	0.00	0.00	0.00	0.00	0	16	140	2000	23	0.0	0.000	38			RCK
2015-10-13	14:20:00	21686242	884	01	50640	3.62	3.06	4.76	8.73	5.67	300	0	0	0	0	9.5	0.544	37		9.90	DFA
2015-10-13	07:02:00	21686241	883	01	49060	0.00	0.00	0.00	0.00	0.00	0	2000	20	251	16	0.0	0.000	38			RCK
2015-10-13	07:02:00	21686241	883	01	49060	3.28	2.93	4.82	8.65	5.72	270	0	0	0	0	9.3	0.539	37		2.71	DFA
2015-10-12	09:14:00	21686240	882	01	50327	0.00	0.00	0.00	0.00	0.00	0	92	10	1339	23	0.0	0.000	38			RCK
2015-10-12	09:14:00	21686240	882	01	50327	3.74	3.02	4.79	8.72	5.70	290	0	0	0	0	8.9	0.543	37		4.83	DFA
2015-10-11	11:36:00	21686239	881	01	50020	0.00	0.00	0.00	0.00	0.00	0	3	10	2000	509	0.0	0.000	38			RCK
2015-10-11	11:36:00	21686239	881	01	50020	3.69	3.00	4.80	8.71	5.71	310	0	0	0	0	8.6	0.543	37		4.33	DFA
2015-10-10	17:04:00	21597018	880	01	50060	3.62	3.03	4.66	8.60	5.57	330	0	10	2000	122	10.5	0.531	38		3.79	DFA
2015-10-09	18:21:00	21686238	302	02	49840	3.61	S 3.13	S 4.72	S 8.76	S 5.63	S 350	S 0	0	0	0	12.4	0.000	37		9.87	DFA
2015-10-08	23:49:00	21686237	878	01	49802	3.64	3.10	4.80	8.81	5.71	280	0	0	0	0	12.2	0.545	37		3.38	DFA
2015-10-08	03:10:00	21686236	877	01	50361	3.59	C 3.17	C 4.75	C 8.84	C 5.67	C 0	0	0	0	0	0.0	0.000	37			DFA
2015-10-07	09:25:00	21686235	876	01	50232	3.59	S 3.17	S 4.75	S 8.84	S 5.67	S 350	S 0	0	0	0	8.4	0.000	37		5.21	DFA
2015-10-07	09:25:00	21686235	876	01	50232	0.00	0.00	0.00	0.00	0.00	0	2000	2000	2000	2000	0.0	0.000	38			RCK
Total/Avgs			10		501076	3.58	3.08	4.76	8.75	5.67	311					10.1					

Lab pasteurized count (LPC)

- The Lab Pasteurized Count is the number of bacteria per ml of milk which survive laboratory pasteurization at 62.8° C (145° F) for 30 minutes.
- This procedure kills the usual mastitis-causing bacteria leaving only those organisms from the environment which can survive elevated temperatures.
- These types of organisms will grow and multiply in the milk handling equipment if cleaning and sanitation procedures are inadequate.

Spore-forming bacteria



Reiter, Superior, Brewster, etc...



More Cooperative.



Bacteria count measurements:

Ü Laboratory Pasteurized Count (LPC)

- Ü **Defined:** Measures the number of bacteria surviving pasteurization at 145°F for 30 minutes.
 - Ü ID thermotolerant
 - Ü Causes milk spoilage
- Ü Milk quality indicator
- Ü Critical for public health due to equipment and/or improper sanitation

Too basic !!!

The Laboratory Pasteurization Count - Thermoduric Bacteria in Raw Milk -

- While most thermoduric bacteria are not capable of growing at refrigerator temperatures, the ones that do can cause milk spoilage.
- Commonly found thermoduric bacteria in milk include species of *Micrococcus*, *Streptococcus*, *Lactobacillus*, *Bacillus*, *Paenibacillus* and occasionally gram-negative rods.
- The LPC is primarily a means of detecting sources of organisms responsible for high counts in the final product and determining level of on farm sanitation.

Psychrotrophic thermodurics



Psychrotrophic thermodurics:

- Most thermoduric strains of bacteria are not capable of reproducing in pasteurized milk under conditions of refrigerated storage.
- Other milk defects that have been associated with *Bacillus* and other psychrotrophic spore-formers include **bitter, yeasty, unclean, and rancid off flavors as well as coagulation of the milk proteins.** Psychrotrophic Gram-positive organisms other than *Bacillus spp.* also may be responsible for limiting the shelf-life of pasteurized milk.
- In addition to being spore-forming bacteria, they can produce **proteolytic enzymes** that degrade protein and fat in milk.

Arid conditions

Heat

UV Radiation

Chemicals



Acid

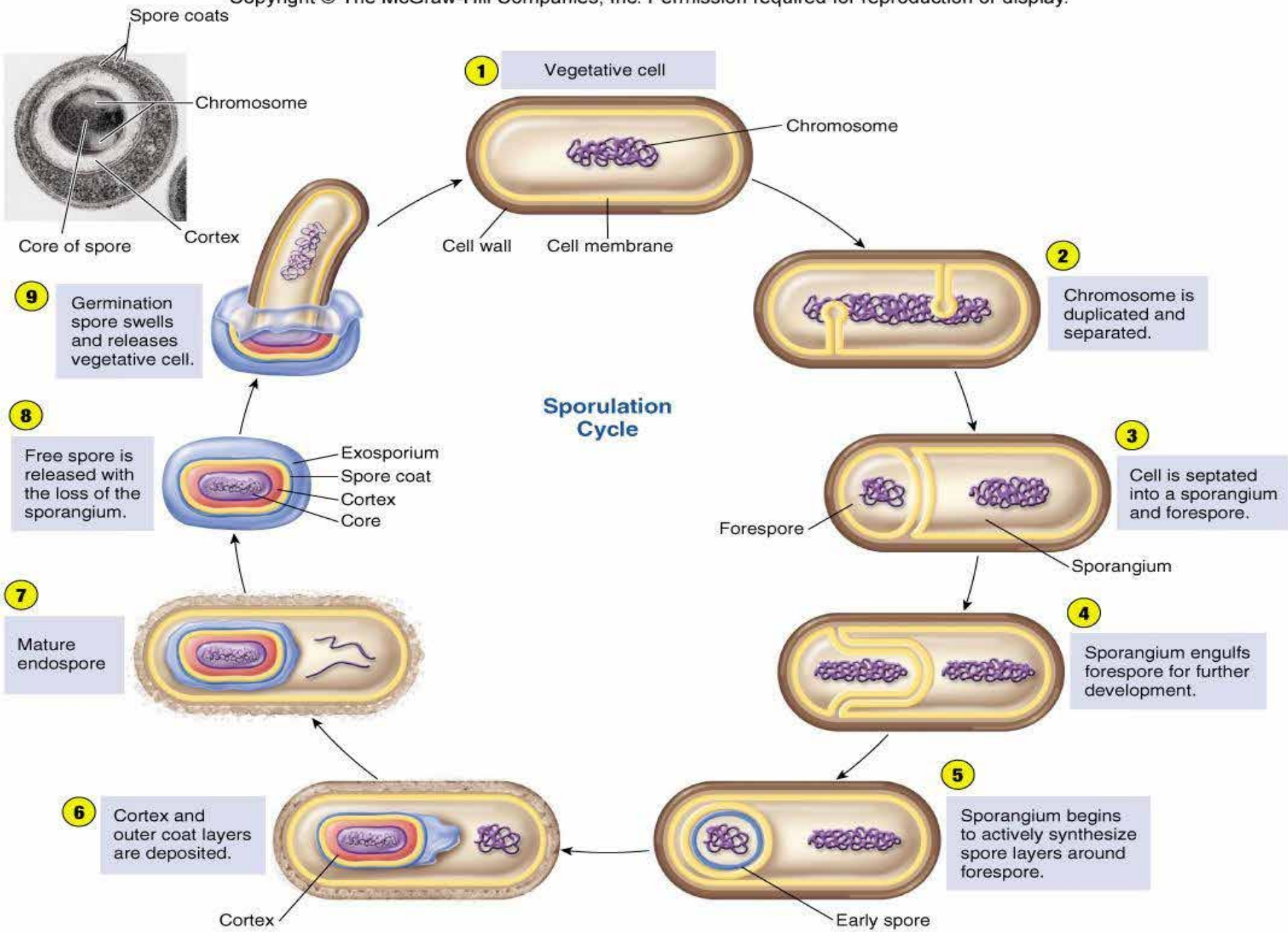
No nutrients

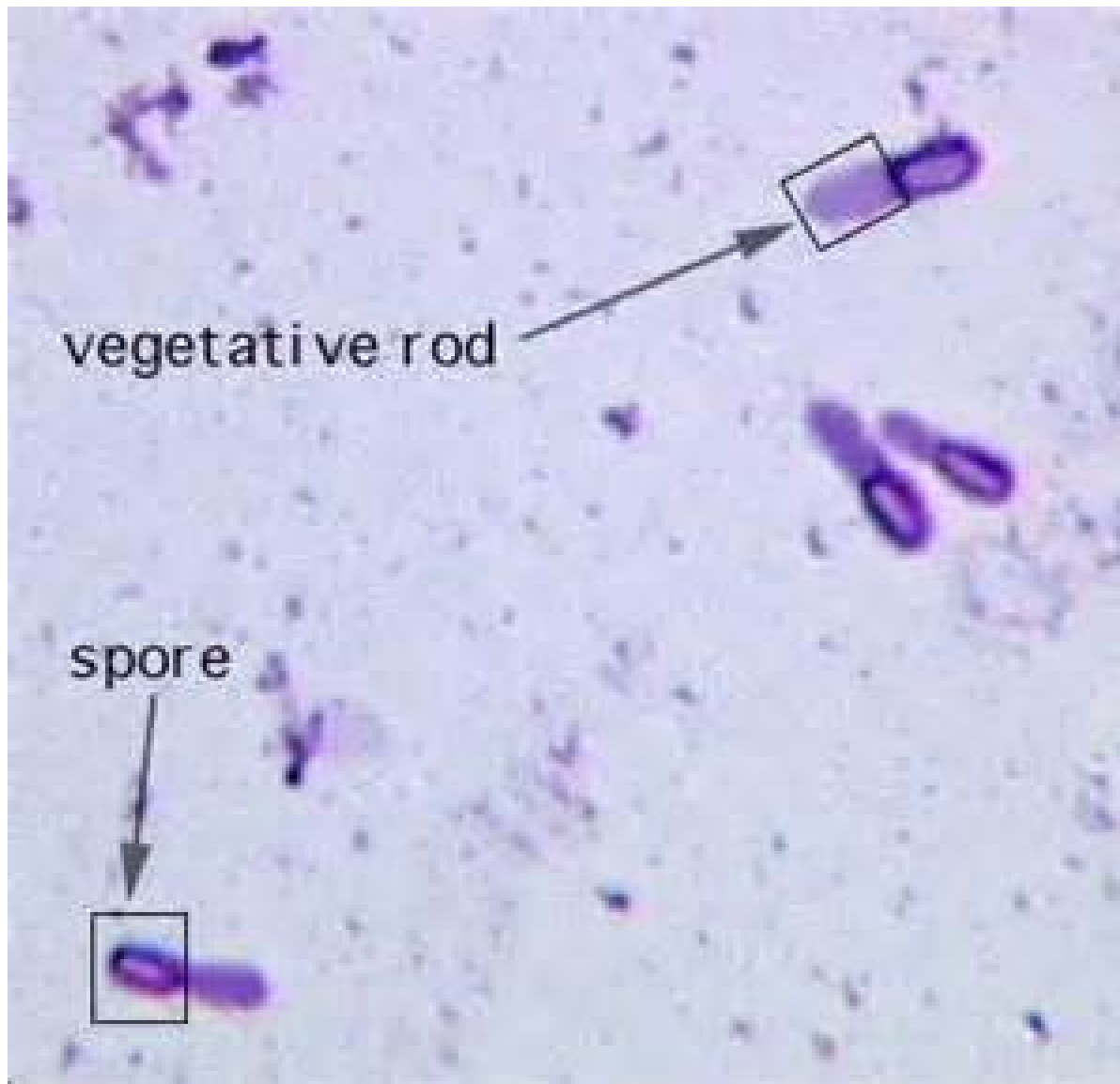
Cold

Pressure

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vegetative rod

spore

More Cooperative.



High LPC's

- Often associated with chronic/persistent cleaning failures within the milking system.
- Common causes of high LPC's might include leaky pumps, old and leaky pipe-line gaskets, old, cracked inflations and other rubber parts and milk stone deposits.
- Biofilms...
- Is that all???





Think through and consider other counts

		Coliform Count	
		Low	High
* L P C	Low	No Problem	Teat Hygiene/ Environment
	High	Machine Hygiene	Teat Hygiene/ Machine Hygiene/ Incubation

* Laboratory Pasteurized Count

A 2x2 table of Coliform Count and LPC can be used to localize the source of a high SPC.



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Other tests of quality

“sediment”

- ü Required test but frequency of testing is undefined
- ü Acceptable levels are <1.5mg per gal
- ü Excessive udder hair + bedding materials + poor pre-milking hygiene





Cows and their environment



More Cooperative.





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Reality checks

Investigations many times include individuals searching for a single cause of the problem.

“While driving to the farm, many times we hope and pray we’ll find something wrong so we can fix it.”

Unfortunately this leads to a band-aid approach and seldom treats the cause of the problem.

A complete evaluation of the system should be done. This is not an difficult process, just follow good husbandry practices. Get used to do this type of evaluation, because these tests are going to be here forever.

Questions? Comments?



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- **We are happy to help you!**

*Special tanks to GEA Farm technologies for all their help with this presentation.

**Portions excerpted from David Bray Troubleshooting LPCs University of Florida Dairy Update, Vol. 10, No. 3