



ESL Liquid Eggs




Are you ready?
Presented by
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& Egg Processing Workshop
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UC Riverside

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Definitions

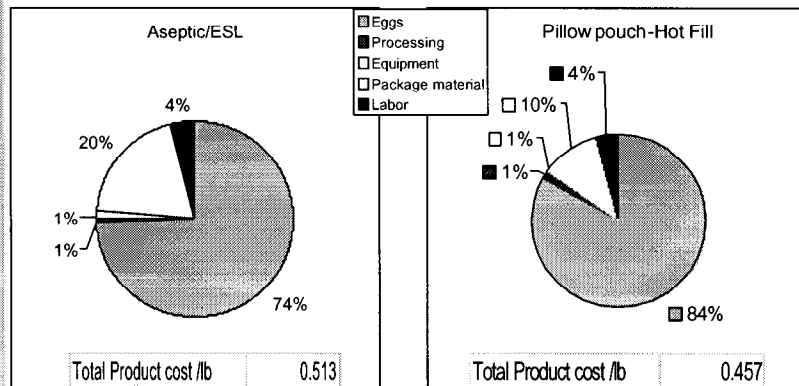


- ESL=Extended Shelf Life
- UHT=Ultra-high Temperature
- HTST=High-Temp. Short-Time
- Ultrapasteurization=Process which will result in an ESL product (milk or eggs)
- Aseptic (for eggs)=ESL
- IP Processing or HF=In-Package or Hot-Fill processing to produce ESL liquid eggs

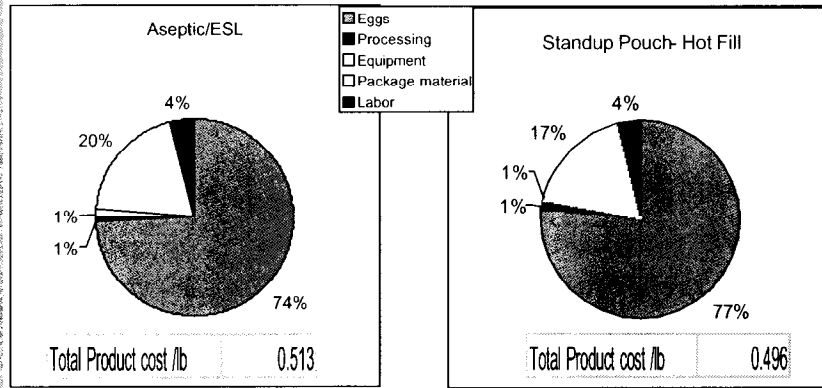
Patents

1. [5,024,999](#) Process for producing pasteurized liquid egg products
2. [5,670,199](#) Method for pasteurizing liquid whole egg products
3. [5,612,076](#) Method for the pasteurization of egg products using radio waves
4. [5,455,064](#) Egg pasteurization
5. [5,266,338](#) Egg pasteurization
6. [5,105,724](#) Apparatus for pasteurizing liquid whole egg products
7. [6,096,728](#) Egg pasteurization utilizing an organosulfur compound
8. [5,019,407](#) Method for pasteurizing liquid whole egg products
9. [5,363,590](#) Electroheating methods
10. [5,268,472](#) Apparatus and methods for rapid electroheating and cooling
11. [5,670,198](#) Method for rapidly cooling liquid egg
12. [5,636,317](#) Electroheating apparatus and methods
13. [5,609,900](#) Electroheating of food products using low frequency current
14. [5,607,613](#) Electroheating of food products using low frequency current
15. [5,583,960](#) Electroheating apparatus and methods
16. [5,533,441](#) Apparatus for rapidly cooling liquid egg
17. [5,415,882](#) Producing extended refrigerated shelf life food without high temperature heating
18. [5,290,535](#) Method of electroheating liquid egg and product thereof
19. [4,808,425](#) Method for the ultrapasteurization of liquid whole egg products

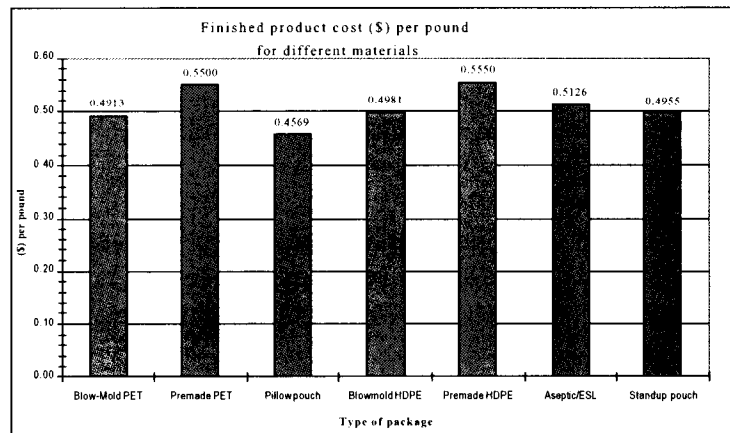
Cost Comparison



Cost Comparison



Cost Comparison...



Why Should You Consider ESL Eggs?

- Longer shelf-life than conventional liquid eggs
- No or low potential for post process contamination
- Tamper evident
- More options to the consumer
 - Easier to use
 - Potential for new retail products

How Much Longer Do We Have to Wait?

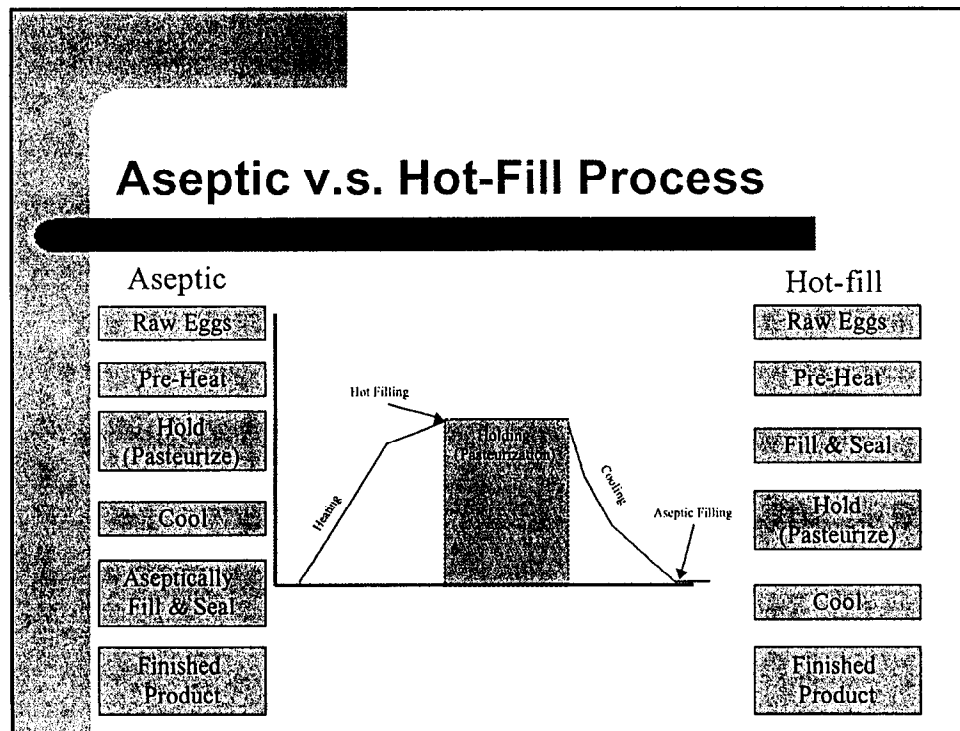
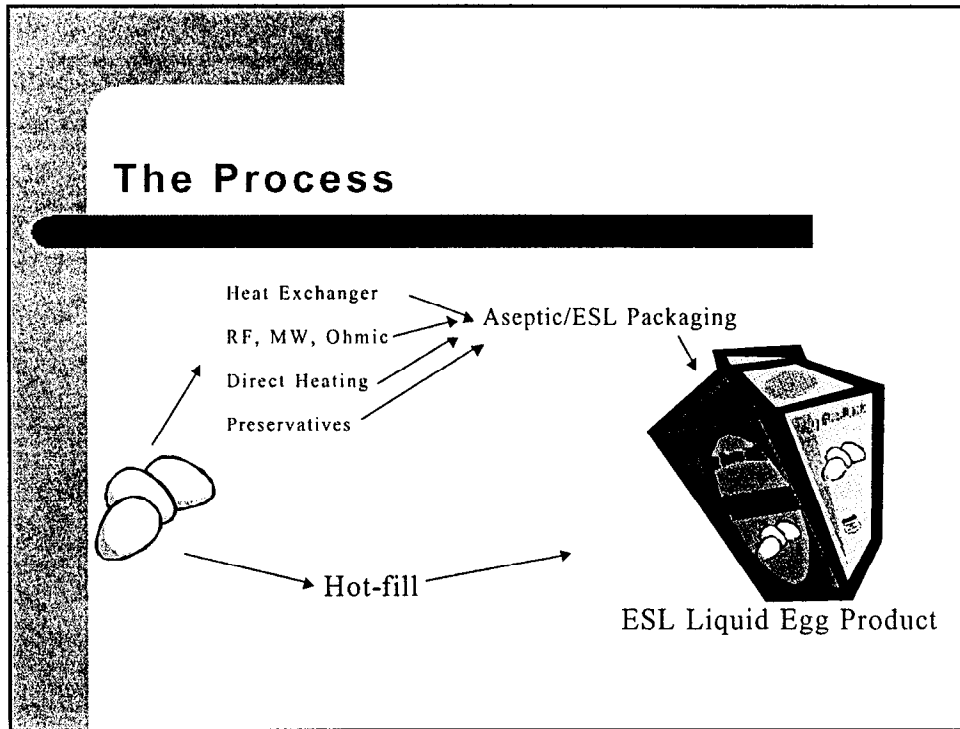
- Patent term is 20 years from filing date or 17 years from grant date whichever is later.
- First patent filed for ESL egg products was filed on September 8, 1986, and was granted on February 28, 1989.
- Therefore, for ESL/Aseptic packaging, September 8, 2006 is the expiration date.
- Extension on the patent term is possible (3 to 5 years)
- Hot-Fill is *available now*
- No infringement concerns

Pros and Cons

- Aseptic/ESL Packaging
 - Brick type or gabletop machines around \$1MM
 - Pasteurizer upgrade cost(?)
 - Production volume... tied to packaging machine speed
 - Bag-in-box fillers are cheaper, but do not offer small packages

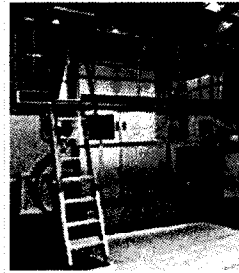
Pros and Cons

- Hot-fill Packaging
 - Can start at any production volume
 - Lower overall cost compared to Brick or Gabletop packaging
 - Less complicated than aseptic packaging
 - Larger than 10 lb packages need special equipment

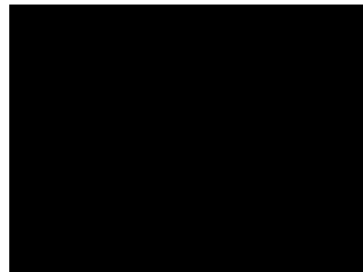
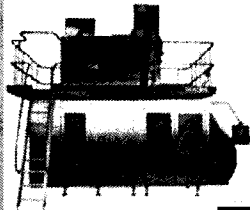


The Equipment - Aseptic

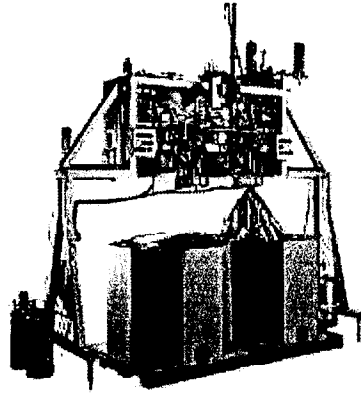
- Pasteurizer/Processor
 - APV
 - Feldmeier Equipment
 - FES International
 - Tetra-Laval
 - Many others...
- Filler
 - 250 ml to 1 liter
 - Tetra-Laval
 - Evergreen
 - Elo-Pak
 - Larger than 10 liter
 - Scholle
- No pouch type packages
- Between 1 liter to 10 liters package cost is very high
- Post-process contamination is not easily detected



Aseptic Packaging Equipment



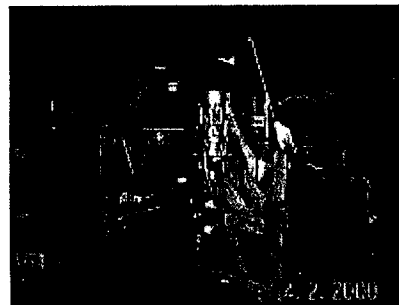
Aseptic Packaging Equipment



- Bag-in-box type filler
- Manual or automatic
- Sizes up to 300 gallons
- Weak points
 - Self-sterilization process not reliable 100%
 - Bags and spouts must be chosen carefully
 - Operator/maintenance people essential in assuring product integrity

The Equipment – Hot-Fill

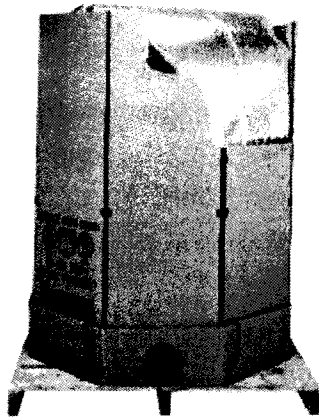
- Pre-heater
 - APV
 - Feldmeier Equipment
 - FES International
 - Tetra-Laval
 - Your existing pasteurizer
 - Many other companies
- Pasteurizer & Cooler
 - Lyco Manufacturing
 - I & H Equipment
 - FES International
 - Heat & Control
 - Many others
- Filler - Many choices
- Sizes larger than 5 liters need special equipment.



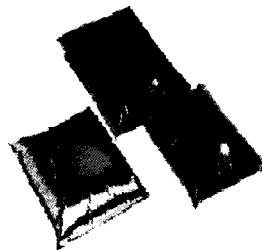
Types of Packages



Types of Packages



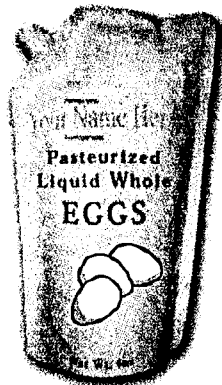
- Bag-in-Box
- 20 lbs-2500 lbs
- Suited to volume users



Gabletop (ESL) and Aseptic Brick-Type Packages

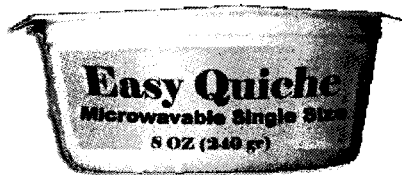


Packages for Hot Fill - Pouches



- Features
- Recyclable
- Resealable or with spout
- Pre-made or from roll stock
- Stand-up or pillow type
- Variety of shapes
- Any size up to ~ 10 lbs.

New Product Possibilities



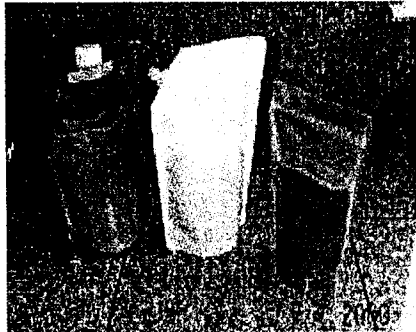
- Hot-fill allows for new product development such as quiches containing particulates.

New Products



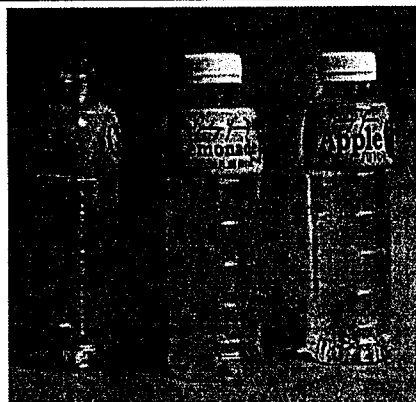
- Ready mixes for home use
- Whole eggs, low-yolk eggs, egg whites
- French toast mixes
- Quiche mixes
- Mixes with particulates
- Cake mixes
- Custard mixes

Expanding the Possibilities for Packaging



- Pouch type packages are low cost, and easy to use
- Same machine can fill many different sizes
- Many options are available for bags such as zip-lock, spouts, tear-notch, pull-thread.

Expanding the Possibilities for Packaging

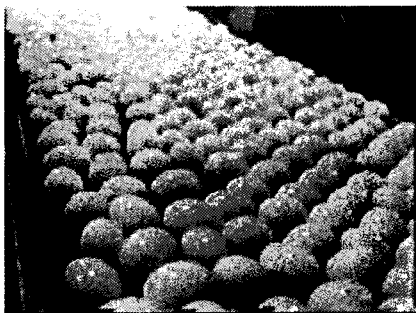


- PET and HDPE packages
- Retail Consumer oriented packages
- Greater package shape varieties
- More size options

Secrets of a Successful ESL Product- *Planning*

- Choose the right equipment and process conditions
- Choose the right packaging machine
- Work closely with FSIS to iron out problems early
- Start training your key personnel early and get them involved in the planning
- Start a comprehensive CGMP and HACCP early
- Start a quality assurance program, including QC
- Plan for success; not failure

Secrets of a Successful ESL Product – *Raw Product*



Good quality shell eggs

Fresh

Clean

=Low initial bacteria counts

In-line operations result in
lower bacteria counts.

Secretes of a Successful ESL Product- *System and Processing*

a- Aseptic Processing

- Sterilization validation of the system
- Maintaining the sterility of the system
- Proper CIP and sanitation

b- Hot fill

- Proper processing and quality control
- Sanitation
- Process control

Secretes of a Successful ESL Product- *Packaging Machine*

a- Aseptic Machines

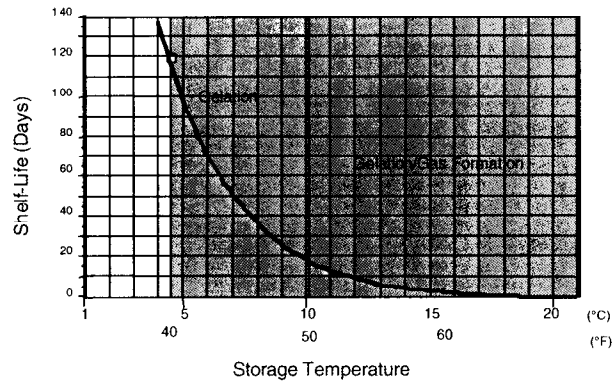
- High degree of maintenance and upkeep
- Self-sterilization validation
- High degree of operator knowledge and oversight
- Package seal integrity testing

b- Hot fill

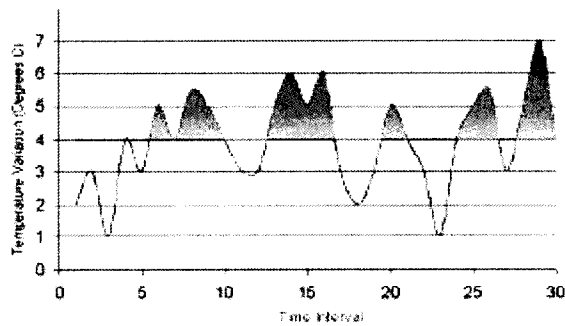
- Package seal integrity

Secretes of a Successful ESL Product-Post Processing

- Storage temperature

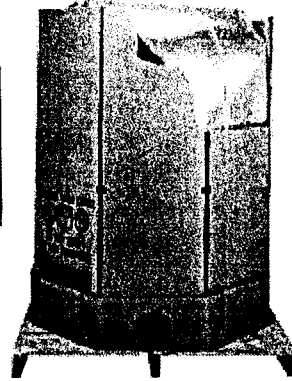


Storage Temperature Fluctuations



Secrets of a Successful ESL Product-Post Processing

- No damage to packages
- Stress cracking
- Hydraulic shock
- Pressure damage from other packages
- One leaking package contaminating other packages
- Head-space pressure change for gabletop packages



Secretes of a Successful ESL Product-Post Processing

- Educate your consumers
 - About the differences between ESL eggs and shell eggs, or frozen eggs
 - To handle the product correctly during storage and use
 - About product spoilage
- Customer satisfaction
 - Investigate each and every spoilage case
 - Respond to consumers rapidly

Please visit:

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For more information

Thank You!

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