Bovine Colostrum as a Promising Source for Health Promoting Products

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Bovine colostrum: valuable but still partly unused by-product of milk production

Topics of the presentation

- Bovine colostrum
  - Content
  - Benefits
  - Resources
- Colostrum powder production in Estonia
  - Production chain
  - Products
- Use of colostrum powder
  - For production animals
  - For human consumption
- Safety and health claim issues
- Further possibilities in product development and cross-border co/operation

Bovine Colostrum - Definitions

- Colostrum is a thick, creamy-yellow, sticky cow´s milk which is milked during the very first day after calving
- 2nd - 5th day milk is called transition milk
- From the fifth day on it is considered as milk

Importance of Bovine Colostrum

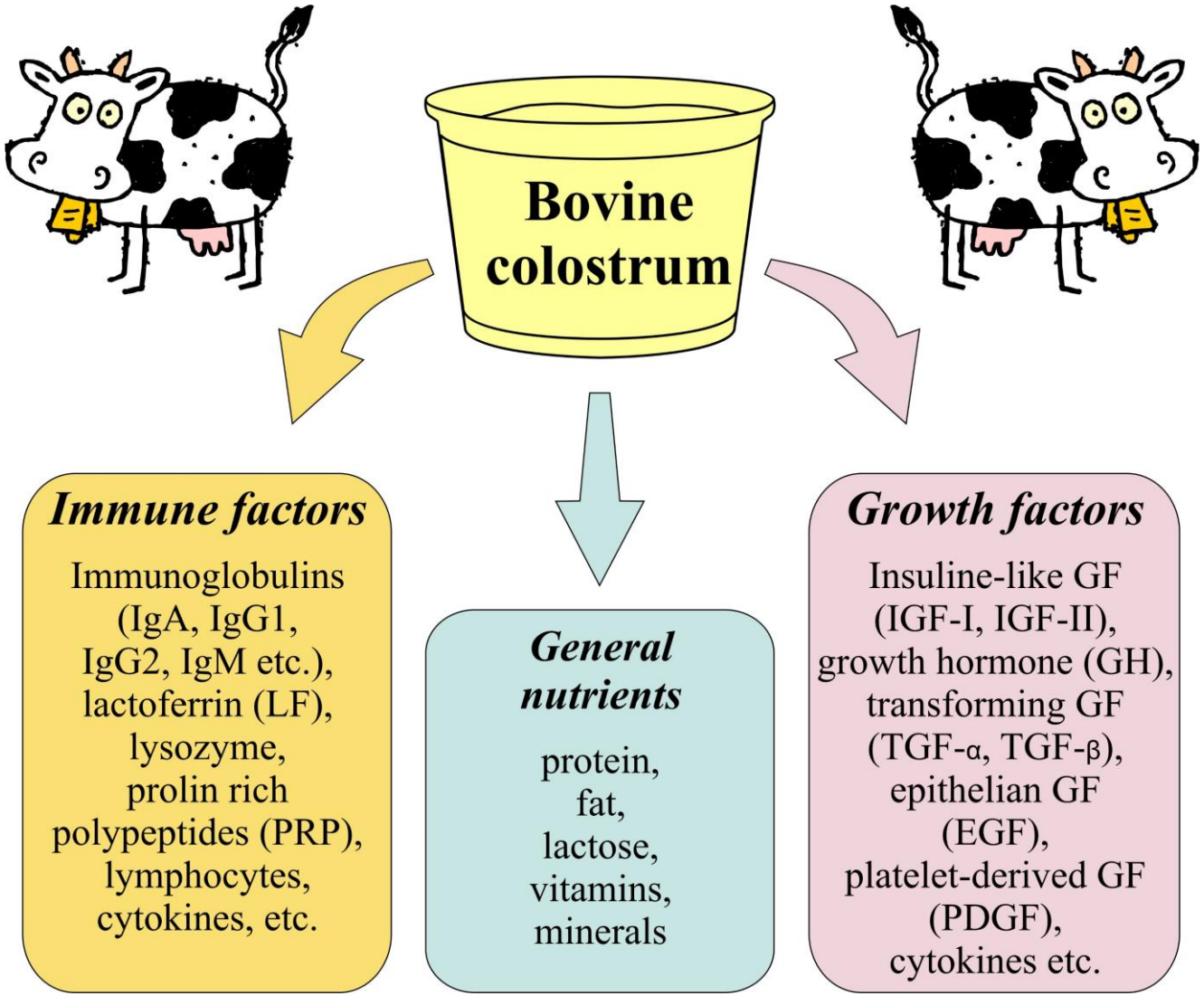
Why colostrum is vital for calf?

Because:

1. It is first feed containing all necessary nutrients
2. Guarantees resistance against infections
3. Promotes tissue growth

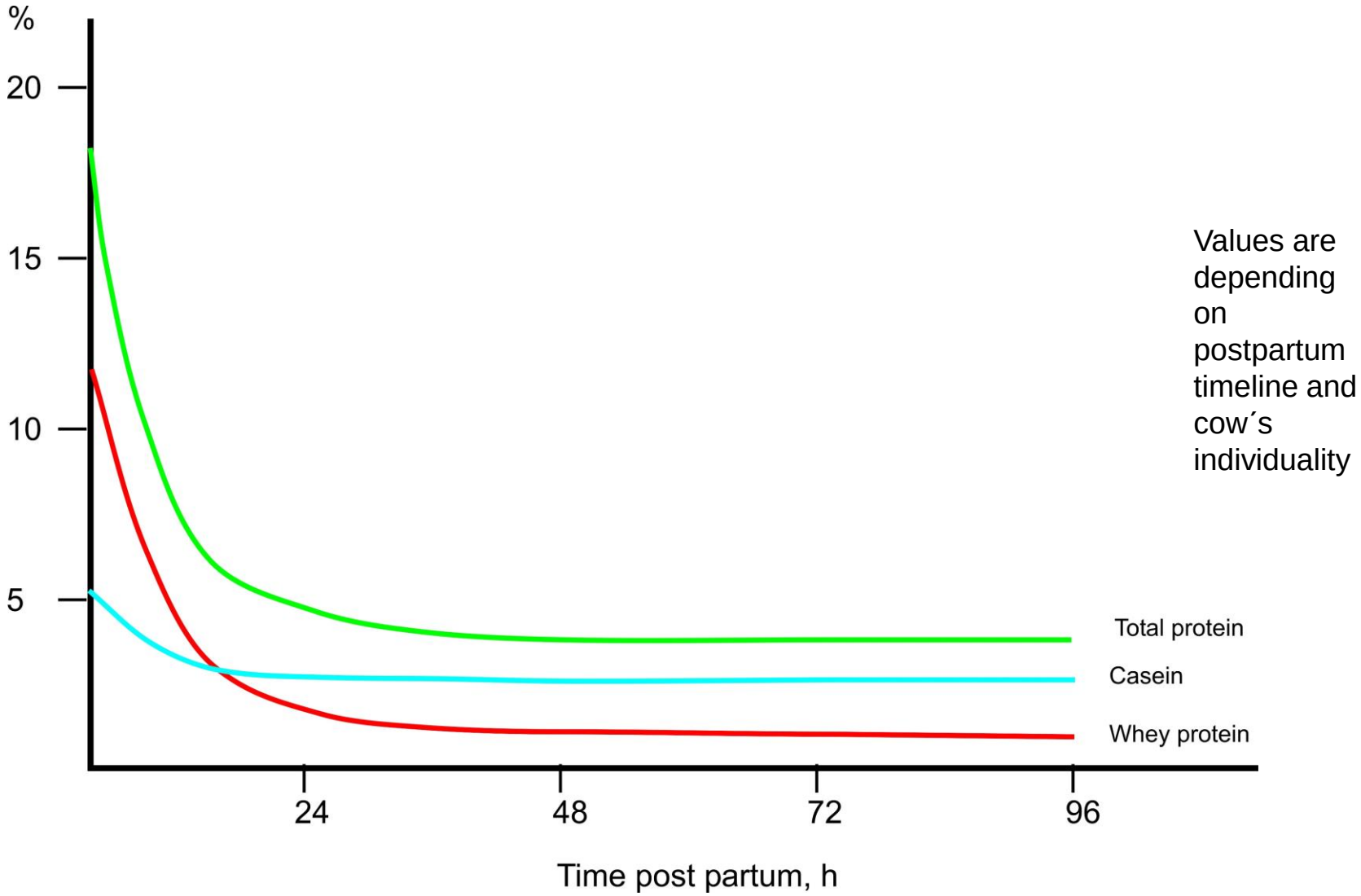
Colostrum was used against human infectious diseases before antibiotics had been invented.

Colostrum Contents



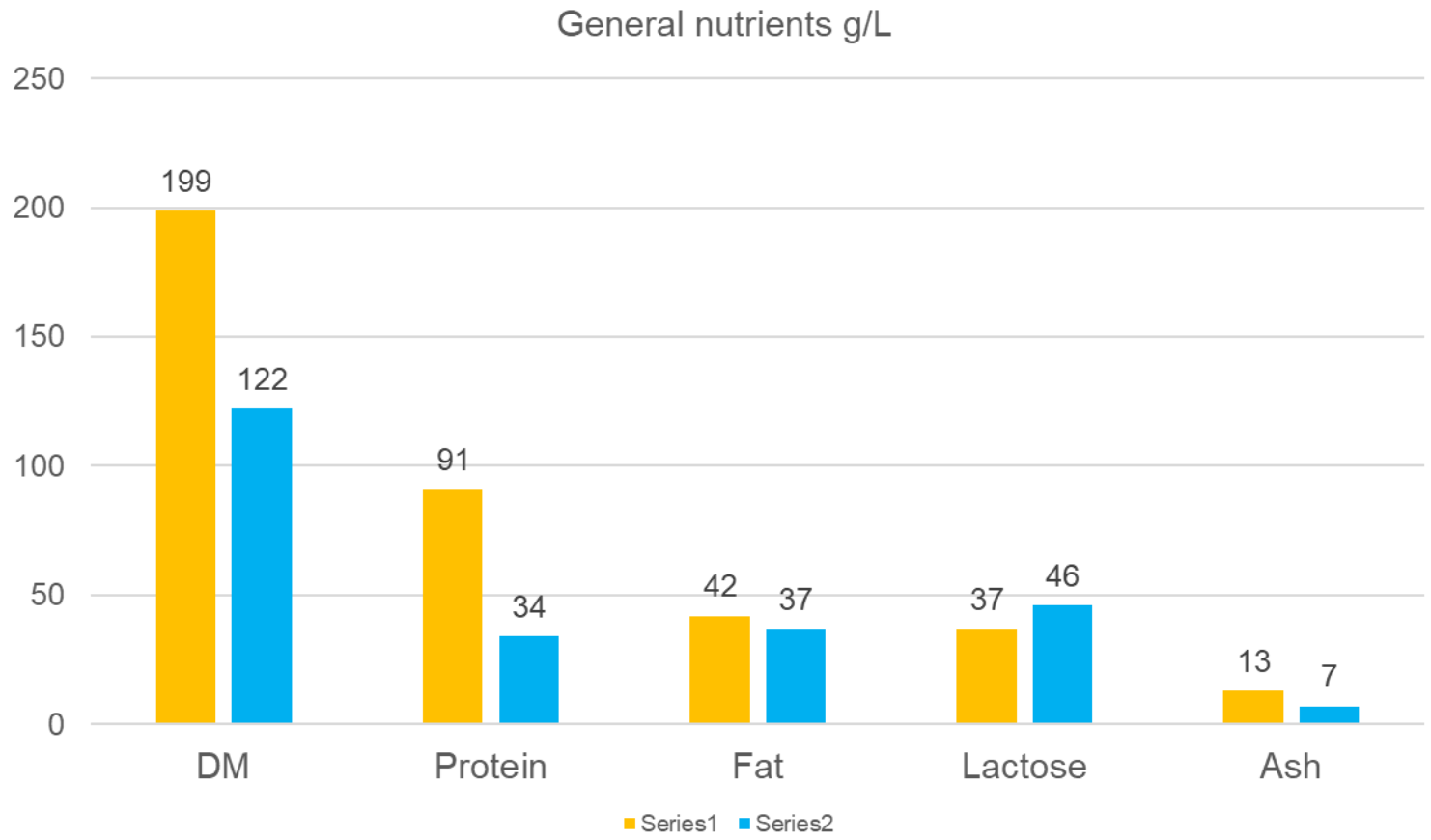
Colostrum is rich in immune factors, growth factors and nutrients

Dynamics of Protein Content during Transition Period



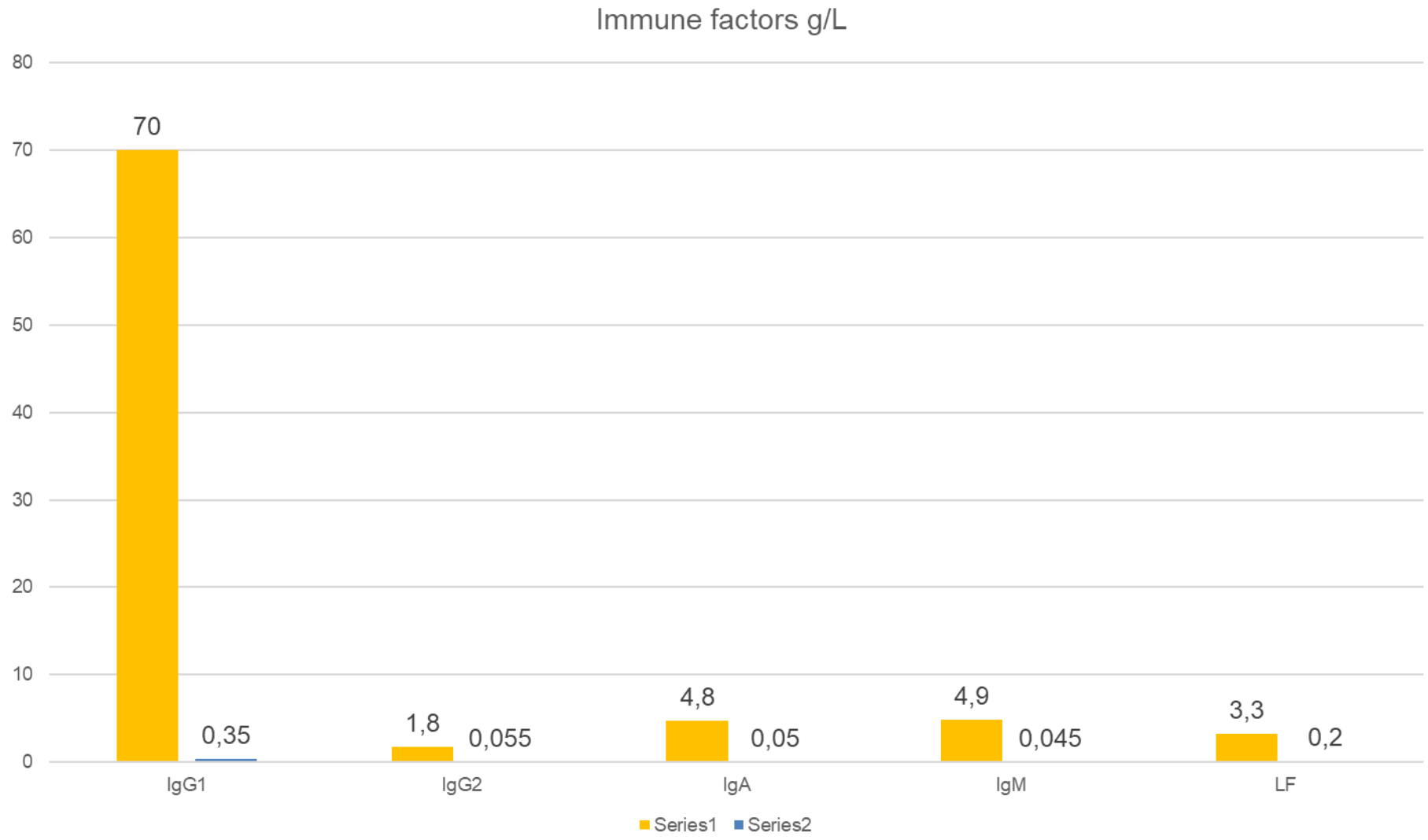
Values are depending on postpartum timeline and cow´s individuality

Colostrum vs Milk

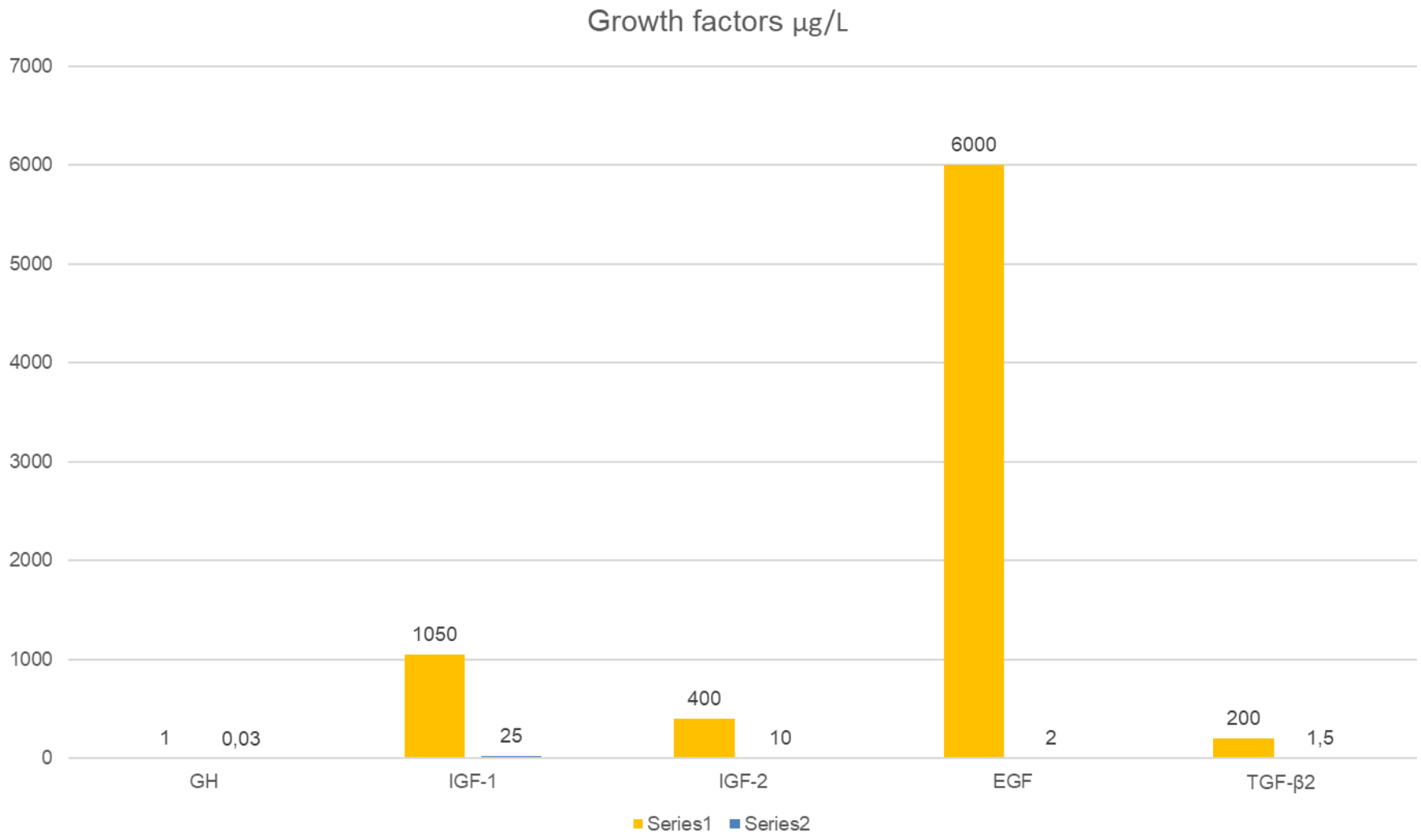


Colostrum´s total solid and protein content is considerably higher compared to normal milk.

Colostrum vs Milk



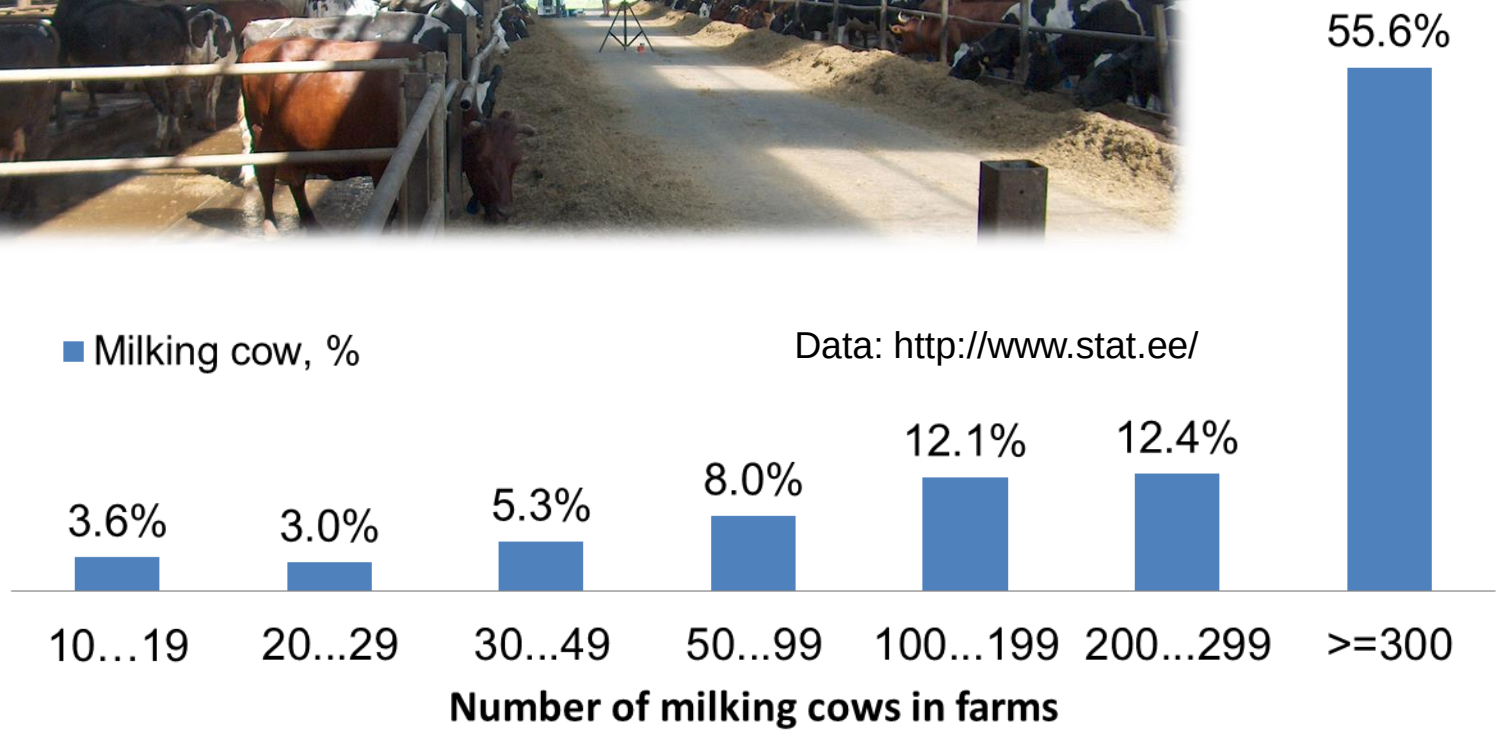
Colostrum vs Milk



Colostrum Production in Estonia

- About 0.1% of cow´s annual milk production forms colostrum.
- About 1.6 tons of colostrum is produced in Estonia daily
- After feeding of calves about 800 kg of colostrum remains unused daily.
- Estimated daily production of transition milk in Estonia is about 10-15 tons

Milk Production Farms in Estonia



Nearly 2/3 of milk (and therefore colostrum) is produced in farms with more than 300 cows.

Colostrum Powder

Freezed dried colostrum powder is the best possibility for long time preservation. As a product it has several advantages:

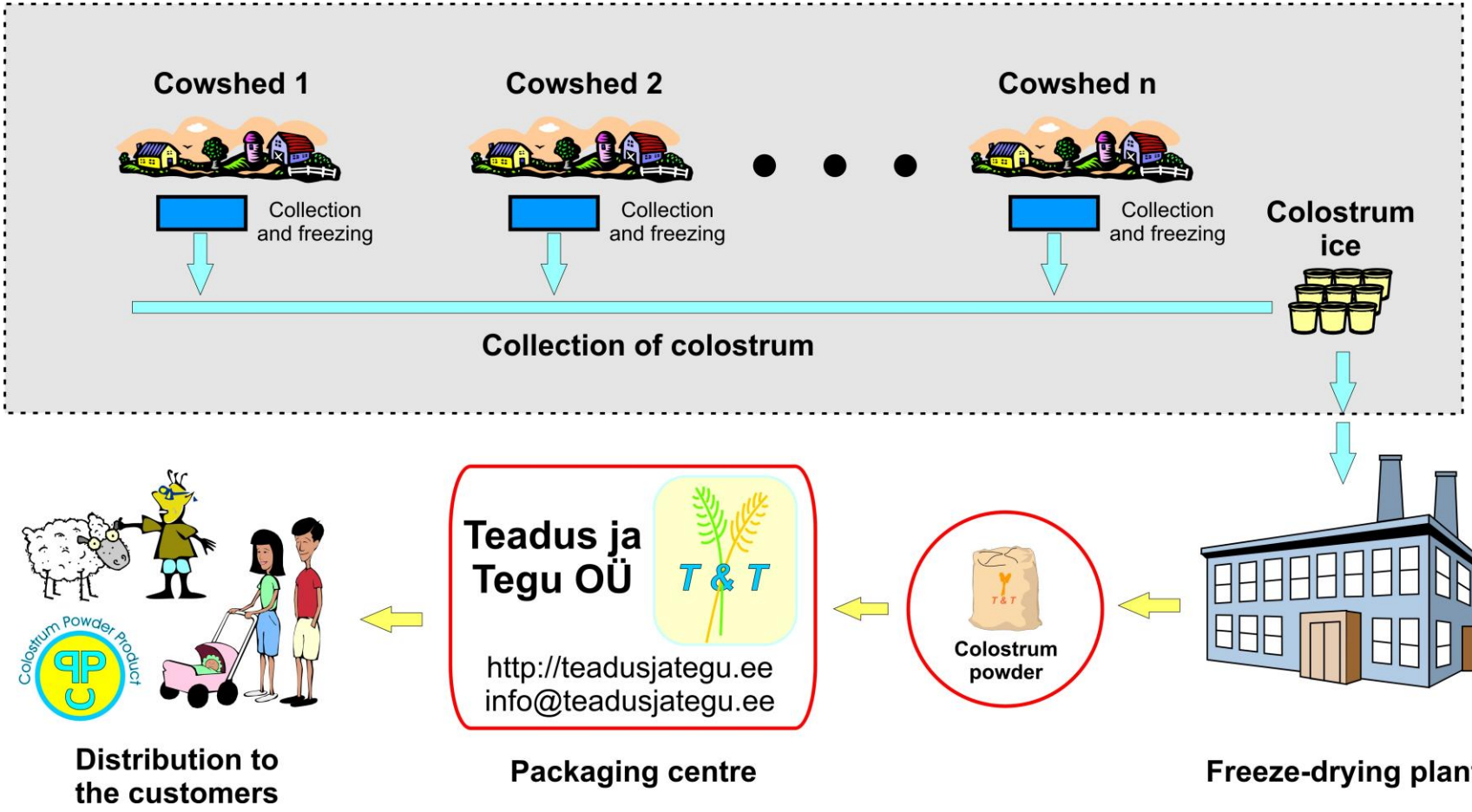
- It can easily be preserved for two years
- It is easy to handle during regeneration of colostrum
- In many cases it could be used in powder form
- It could serve as raw material for production of diferent bioactive preparations

Colostrum Powder Products

Estonian SME „Teadus ja Tegu OÜ“ is the only producer of colostrum powder products in Estonia (and Baltics)

- It started production of freeze dried colostrum powder quite recently
  - As feed for production animals at the end of 2016
  - As food for human consumption in the spring of 2017

Colostrum Powder Production Chain



Production Chain in Pictures

Packaging

Delivery to the customers

Use of Colostrum Powder

- By now colostrum powder is used:
  - In animal husbadry
  - For human consumption

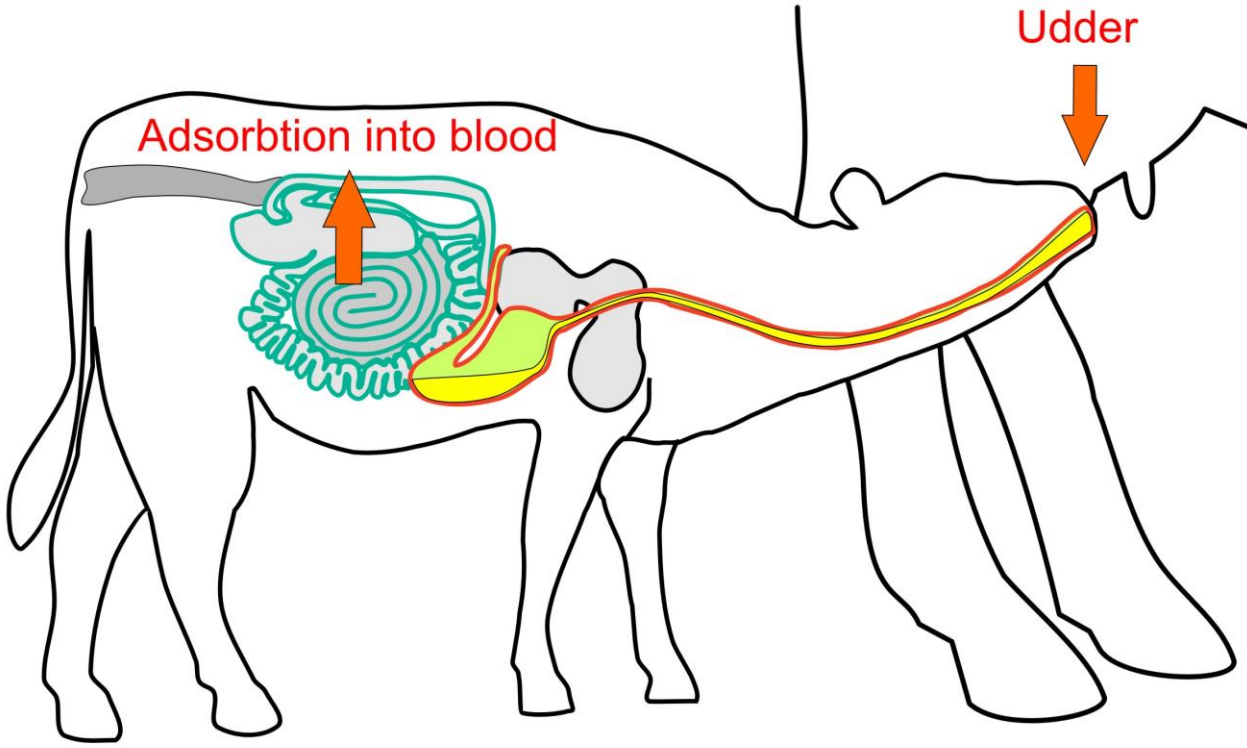
- Further perspective:
  - Cosmetics
  - Farmacy
  - etc

Use of Colostrum Powder as an Additive to Colostrum

- Improves passive immunity of new-born calves by raising the content of IgG in blood seerum
- Lessens the mortality of calves
- Improves the growth rate of calves (and other production animals)

Factors Affecting Passive Immunity of Calves

Calf should get at least 100 g of immunoglobulins during the first intake of colostrum



Limiting factors

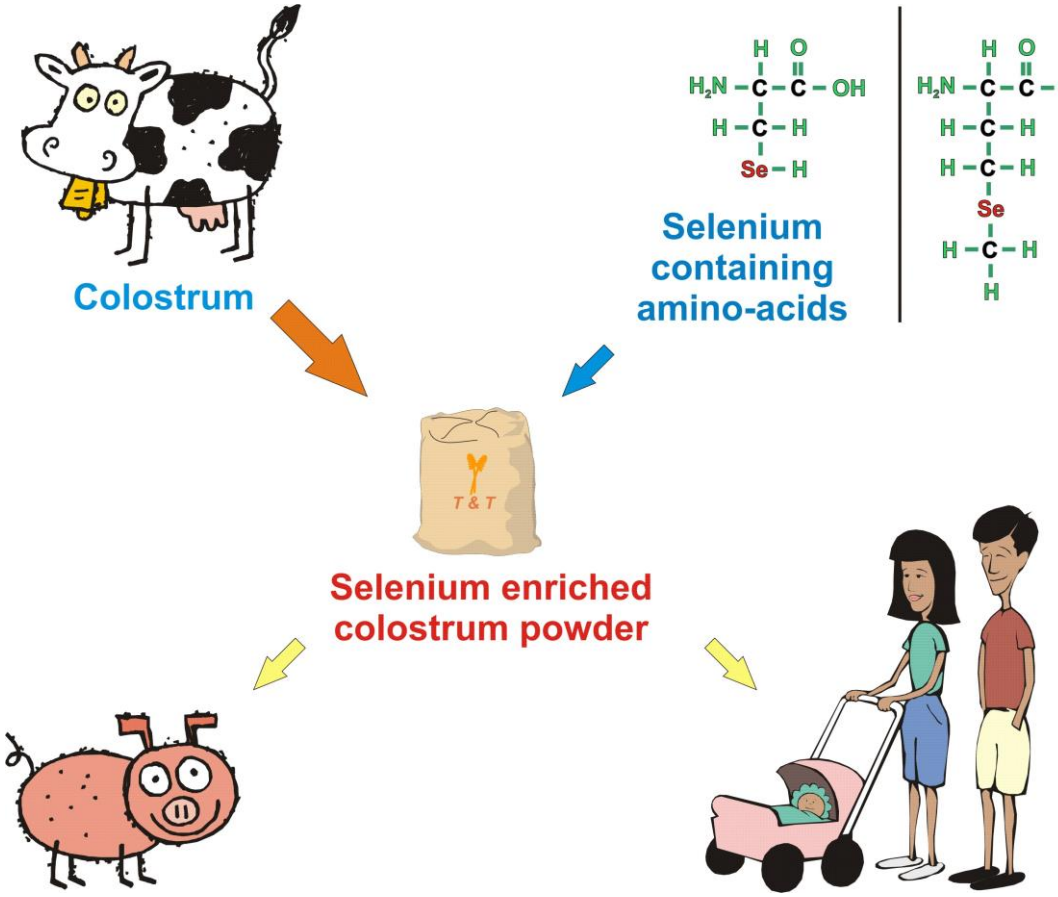
Volume of stomach (about 2-3 L)

Content of immunoglobulines in colostrum (2-7%)

Adsorption of immunoglobulines into blood (depends on time of intake)

Beef Cattle

Selenium Enriched Colostrum Powder



Lack of selenium may be covered by organic selenium enriched dietary supplements. Special selenium-rich functional food additive (*e.g.* colostrum powder blended with organic selenium) is one possibility.

ColSelAct - a selenium enriched preparation for production animals that contains prebiotics also

Colostrum Powder for Human Consumption

Colostrum powder can be used as:

- Protein rich and bioactive food for direct intake
- Additive for different foods (for example ice cream),
- Component of food for catering
- etc.

Target Group:
Children and Young Mothers

Less infection diseases in nursery schools

In many cases less allergic reactions

Better qrowth

Target Group: Elderly People

Less infection diseases

Less fatigue

Better recovery from insuries

Etc.

Target Group:
Physically Active People (inc. Athlets)

Better recovery after competition or heavy training

Less infections

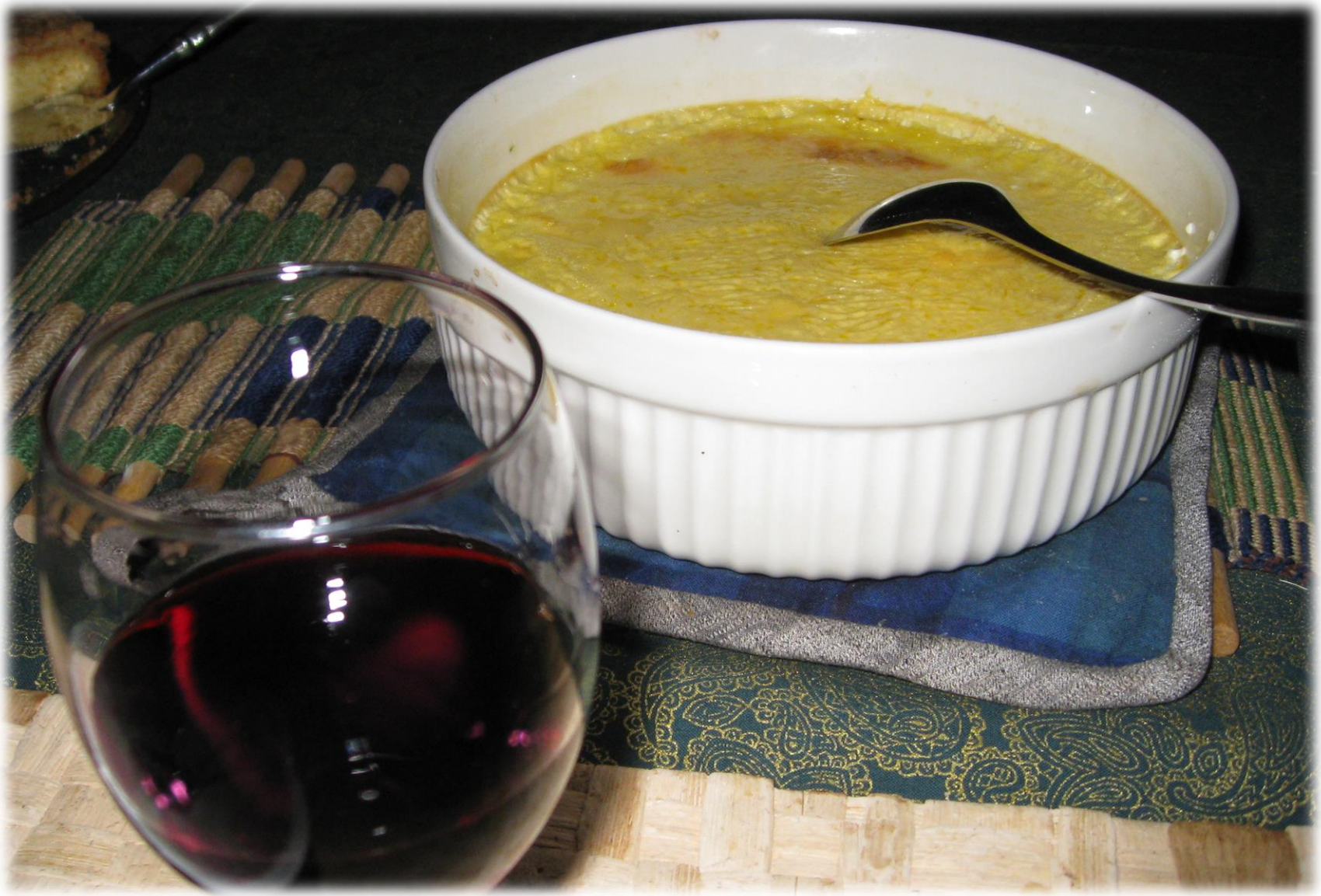
Better performance

Colostrum Powder as Addition to Food

- Adding it into ready made foods for flavouring
- Using it as an additional component for cooking
- Blending it into ice-creame, yogurts
- Etc.

Colostrum Powder use in Catering

Classical Sweet Cheese (Uunijuusto)

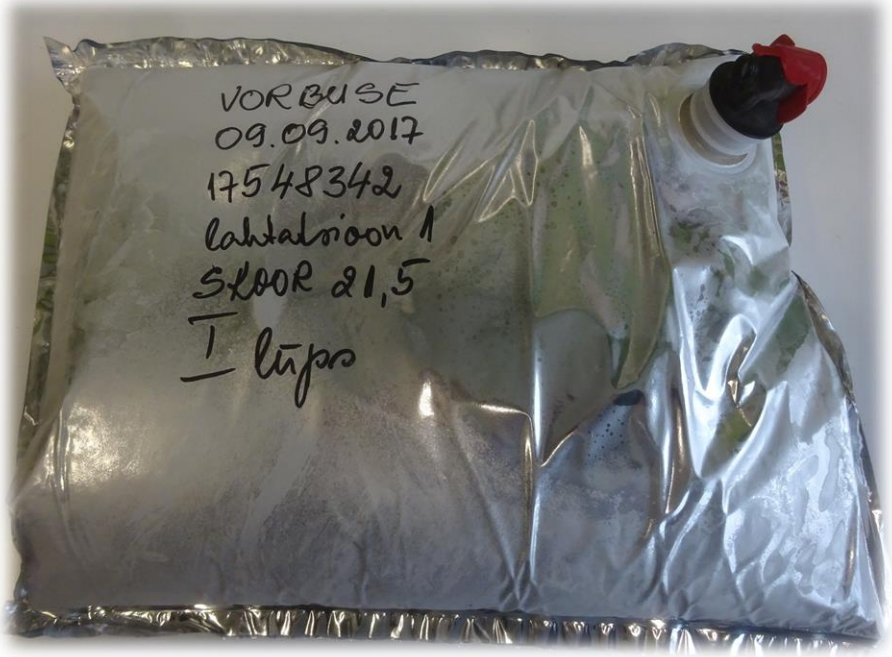


Health Claim of Colostrum Powder

EU Register on nutrition and health claims

Claim type	Nutrient, substance, food or food category	Claim in accordance with health relationship	EFSA opinion reference	Commission regulation
Art.13(1)	Protein	Protein contributes to growth or maintenance of muscle mass. According to SOURCE OF PROTEIN as listed in the Annex to Regulation (EC) No 1924/2006.	2010;8(10) :1811, 2011;9(6): 2203	Commission Regulation (EU) 432/2012 of 16/05/2012
Art.13(1)	Protein	Protein contributes to the maintenance of normal bones. According to SOURCE OF PROTEIN as listed in the Annex to Regulation (EC) No 1924/2006.	2010;8(10) :1811, 2011;9(6): 2203	Commission Regulation (EU) 432/2012 of 16/05/2012

For colostrum powder novel health claims should be initiated, especially concerning immunoglobulins' ability to fight bacterial and viral infections.



Safety

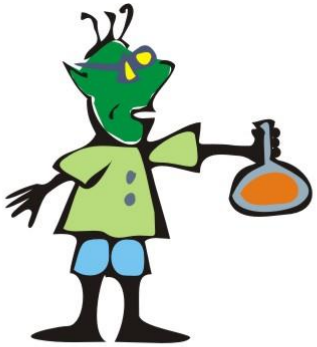
HACCP system in cowshed (tracing of individual cows)

HACCP system in freeze-drying plant

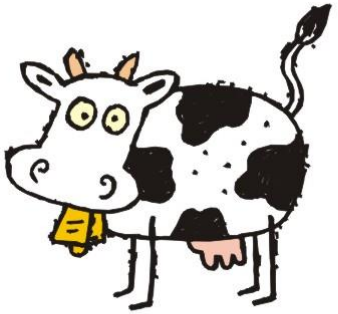
HACCP system in Teadus ja Tegu OÜ

Because of complexity, Teadus ja Tegu has taken the responsibility of the whole production chain.

Use of Hyperimmune Colostrum (proposed by Prof. Mart Ustav)

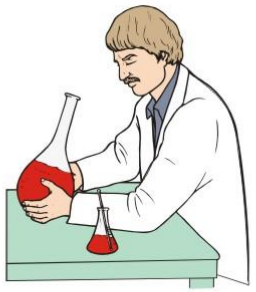


Preparation of specific antigens



Vaccination (immunization) of dry cow

Hyperimmune colostrum



Isolation and purification of antibodies

Barrier building preparations against infections

Prevention of infections

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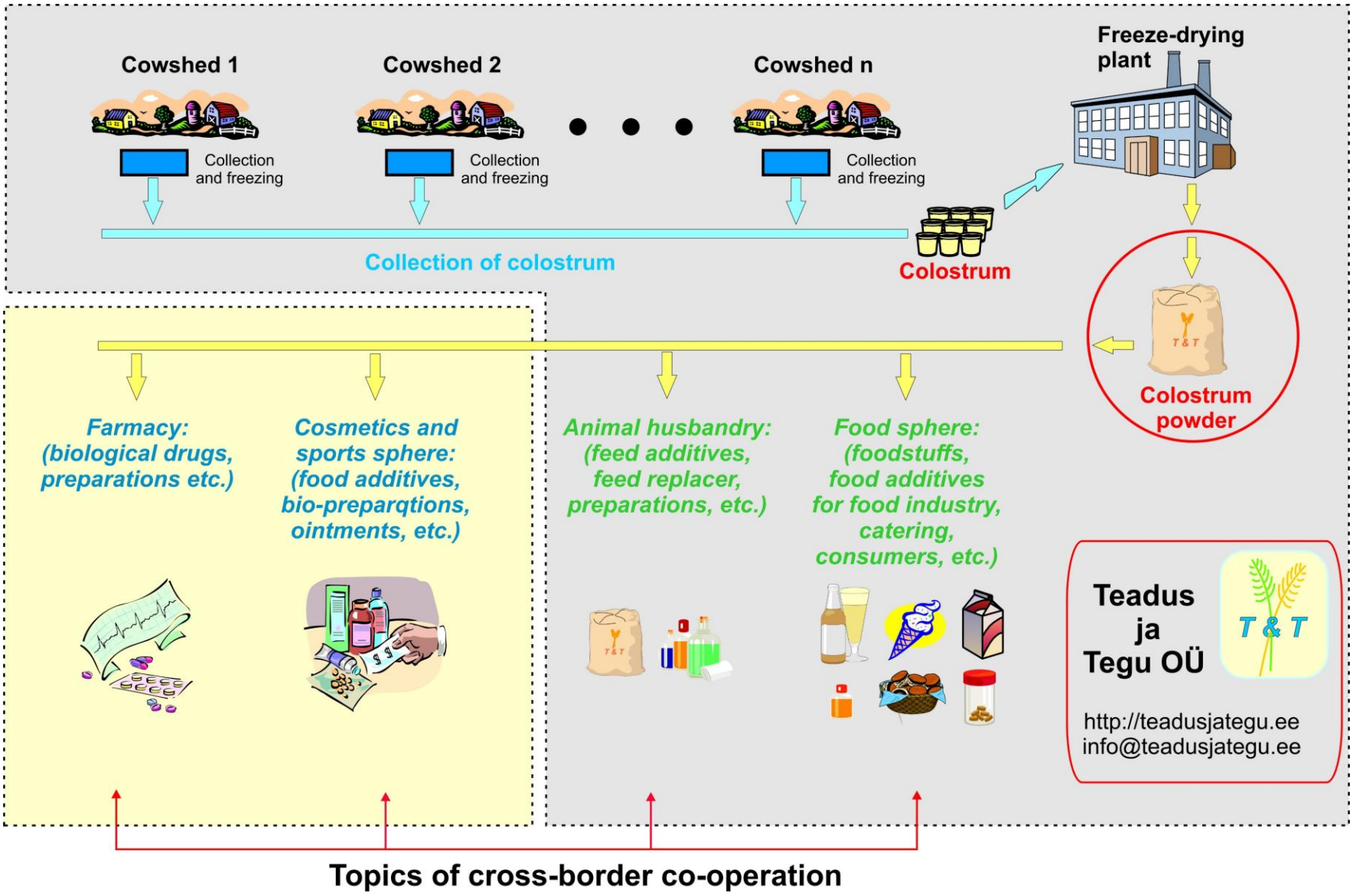
Concluding Utilization Possibilities of Colostrum



Possible Topics of Co-operation

Development of products containing colostrum or its ingredients for:

- Cosmetics
- Health care
- Human food
- Feed for Production Animals

Investigation projects about the influence of colostrum

New health claims concerning colostrum immune factors and growth factors

Thank You for Attention!