

# Fermented food & supplements



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## 1. Introduction

By fermentation a substance is divided in simpler components until they reach their basic form. The process can stimulate vitamin and mineral absorption, can generate vitamins from B complex (including B<sub>12</sub>), vitamin K, enzymes, pre/pro/para/post biotics).

Fermented drinks are the most popular liquids that contain probiotics. For example, beer and wine (with alcohol), cider, hydromel, kombucha tea (without alcohol) contain yeasts which help the metabolization of the sugars from fruits to produce alcohol in its natural form.

## 2. Materials and Methods

Our range **3 x Biotics** contain: **herbs, bee products, medicinal mushrooms fermented in SCOBY cultures\***  
\* Symbiotic Culture of Bacteria & Yeasts

**Col-Kefir®** (bovine colostrum fermented with simple & enhanced kefir granules), is conditioned in powder by atomization and formulated as a tri-biotic product.  
<https://doi.org/10.3390/foods10122020>

**Amrita®** (polifloral pollen fermented in symbiotic bacteria and yeasts cultures) which can be found in all the Kombucell 3xBiotics products made by Pro-Natura).  
<https://doi.org/10.3390/foods10122020>

## 3. Results and Discussion

The aerobic and anaerobic fermentation in SCOBY cultures break down pollen particles, making a wide variety of proteins, oligopeptides and all essential amino acids, hundred enzymes, vitamins, SCFA, flavonoids, polyphenols, phytosterols, auxins and nucleic acids, organic silicon, minerals.

The fermented product contains low molecular weight (LMW) peptides that have been isolated and characterized,

Our study evaluated the potential of these peptides in the prevention of certain diseases so as to be considered active principles in formulas of some nutraceuticals and cosmeceuticals.

## 4. Figures and tables

Analyzed parameter	Col-Kefir®		
	Bovine colostrum	Colostrum fermented with kefir	Colostrum fermented with improved kefir
Protein content %	65	21.5	72.6
Lipid content %	2.7	21.96	12.33
Low molecular weight peptide content (3000–5000 Da) (mg/ml)	1.5	20	98.5
Carbohydrate content (reported to lactose) %	73.14	8.3	1.1
Carbohydrate content (reported to glucose) %	16.9	11.95	9.4
Free amino acids	0.32	0.55	3.12
Degree of angiotensin inhibition (ACE) by low molecular weight peptides %	7.24	20.5	40.2
Antioxidant activity (mM Trolox/mg protein)	1.18	2.41	9.39

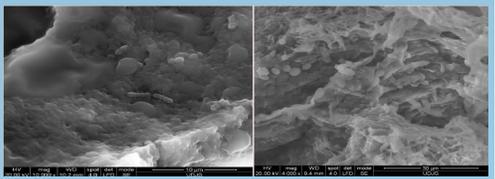


Fig. 1. SEM images of samples ultrastructure: fermented product (10000 x) (left) and in inner area of the kefir grains (4000 x) (right)

Sample	Antioxidant activity, mM TE/g		Antimicrobial activity, against <i>Bacillus subtilis</i> , mm
	Colostrum hydrolysis with yeast	Co-fermentation with kefir grains and commercial LAB	
1	1.95±0.10	3.15±0.23	5.0±0.15
2	1.95±0.17	2.10±0.11	3.0±0.22
3	1.26±0.04	3.15±0.17	2.5±0.17
4	1.26±0.22	4.47±0.01	4.5±0.20
5	1.26±0.20	2.37±0.23	7.0±0.25
6	1.26±0.01	3.19±0.16	4.0±0.17

Analysis	<10kDa	<3kDa
Antioxidant activity, mM	1.855	2.288
Trolox/ mg protein		
ACE (%)	53.36	61.12

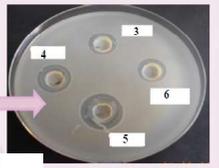
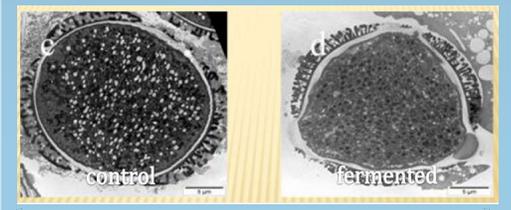
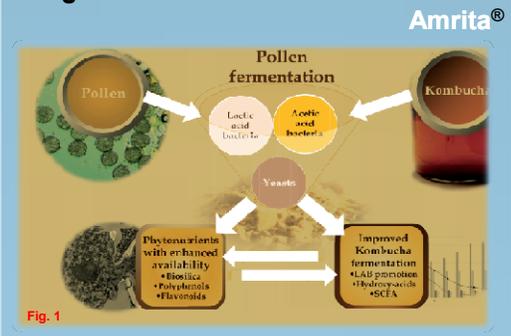


Table 4. Antioxidant activity and percentage of inhibition of ACE of fermented colostrum peptide fractions separated from sample 4

## 4. Figures and tables



In the case of classic counting, it has been noticed an increase of the lactic acid population from an average of **0.5 x 10<sup>6</sup> UFC/ml** in fermented polifloral pollen soup to **0.7 x 10<sup>6</sup> UFC/ml** after 5 days of maturation with the polifloral pollen (Fig.1 and Fig.2). It has not been noticed any significant difference of bacterial population level between first and last maturation day.

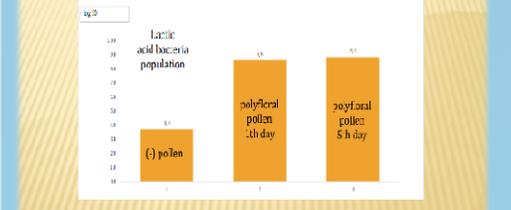


Fig. 2. Lactic acid bacteria levels in different samples:  
1- Bacterias and yeasts cells soup fermented 21 days;  
2- Mix of bacterias and yeasts cells soup and bee pollen in the first day of maturation;  
3- Mix of bacterias and yeasts cells soup and bee pollen after 5 days of maturation.

## 5. Conclusion

Due the fermentation, the products offer a variety of nutrients with veterinary and human therapeutical effects, while at the same time being a great pre/pro/post biotic complex for dermatocosmetics, food supplements.

Fermented drinks should be introduced in our daily diet and this change will bring a wide variety of benefits that include, but are not limited to: strengthening the immune system, helping with weight loss, lowering fatigue, maintaining bone, muscle, joint health (due to high vitamins, minerals, enzymes and probiotic contents).

## 6. References

Cotârleş M., Vasile A.M., Gaspar-Pintilieşcu A, Oancea A, Bahrim G.E., **Tribiotication strategy for the functionalization of bovine colostrum through the biochemical activities of artisanal and selected starter cultures**, CyTA - Journal of Food, 2020, 18(1):274–280  
<http://www.unicer.ugal.ro/index.php/en/about-tehnia>