RESEARCH AND DEVELOPMENT OF A NEW ALE TYPE BEER SORTIMENT IN BREWERY PILOT PLANT FROM UASVM CLUJ-NAPOCA

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INTRODUCTION

- CRAFT BEER IS GETTING MORE POPULAR IN ROMANIA, FOLLOWING THE TREND FROM OTHER COUNTRIES SUCH AS SWEDEN, NORWAY, DENMARK, ENGLAND, WHERE THIS PHENOMENON EXPLODED
- ALE TYPE BEER ALLOWS CRAFT BREWERS TO EXPERIMENT AND STAND OUT IN A MARKET FLOODED WITH PILSNER

OBJECTIVES

- TO OBTAIN AN ALE BEER RECIPE WITH SIMILAR CARACTERISTICS OF A COMMERCIAL BEER
- TO ENHANCE THE KNOWLEDGE ON MAKING BEER IN ARTISANAL REGIME
- DEVELOP SKILLS IN STUDENTS WITH ENTREPRENEURIAL SPIRIT
- TO OBTAIN A BEER WITH GREAT TASTE

MATERIALS AND METHODS

Ingredients	Quantity (specific consumption)
W Pale Ale Malt (EBC 5,5-7,5)	40.00 kg
WCaraMunich Malt (EBC 80-100)	3.756 kg
WCaraRed Malt (EBC 40-60)	2.355 kg
W Munich Malt (EBC 12 - 17)	2.735 kg
Special B Malt (EBC 350)	0.570 kg
Water	240 L
Hops	0.15 kg
Yeast	700 billion viable yeast cells

The recipe for one batch of Ale Brew mash

MATERIALS AND METHODS

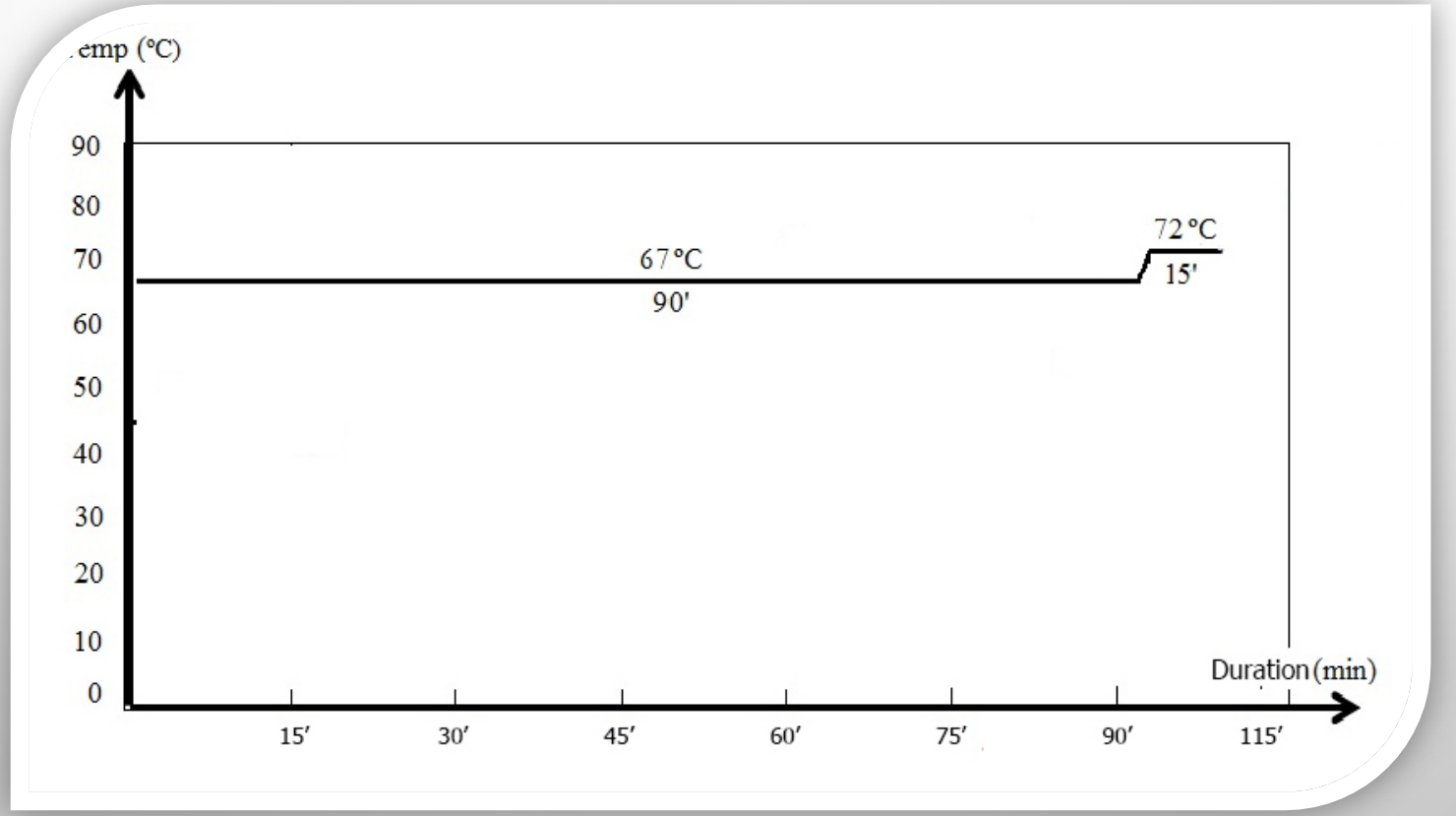


Fig. 1. The saccharification chart

HOPS

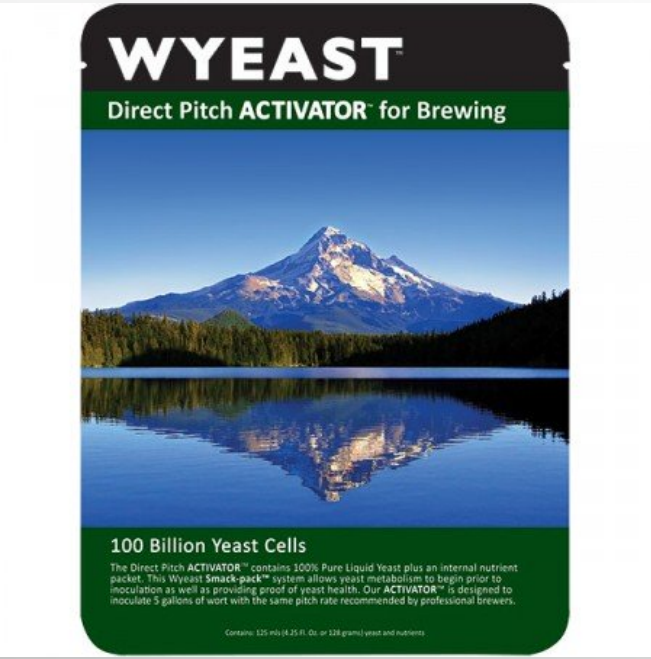
Cascade

Centenial

Columbus

Hop type	α acids percent	Addition time	Percent of total quantity
Columbus	11-16%	.@ 60 min.	100%
Centennial	8-11,5%	.@ 20 min.	33.33%
		.@ 15 min.	33.33%
		.@ 5 min.	33.34%
Cascade	4,5-7%		
		.@ 20 min.	33.33%
		.@ 15 min.	33.33%
		.@ 5 min.	33.34%

YEAST



Very clean, crisp flavor characteristics with low fruitiness and mild ester production. A very versatile yeast for styles that desire dominant malt and hop character. This strain makes a wonderful “House” strain. Mild citrus notes develop with cooler 60-66°F (15-19°C) fermentations. Normally requires filtration for bright beers.

Origin: America
Flocculation: Medium-Low
Attenuation: 73-77%
Temperature Range: 60-72F, 15-22C
Alcohol Tolerance: 11% ABV

RESULTS AND DISCUSSIONS

- THE TWO STAGE MASHING PROCESS WAS ACHIEVED FASTER BUT THE FILTRATION PROCESS WAS CONDUCTED INCOMPLETE AND TOOK LONGER THAN EXPECTED DUE TO THE INSUFFICIENT DEGRADATION OF STARCH.
- THIS CAUSED A DECREASE IN THE CONCENTRATION OF THE PRIMITIVE WORT. TO REMEDY THIS, WAS REALISED AN ADDITIONAL BOILING OF THE WORT FOR 20 MINUTES, WHICH LED TO A DECREASE IN THE FINAL VOLUME.

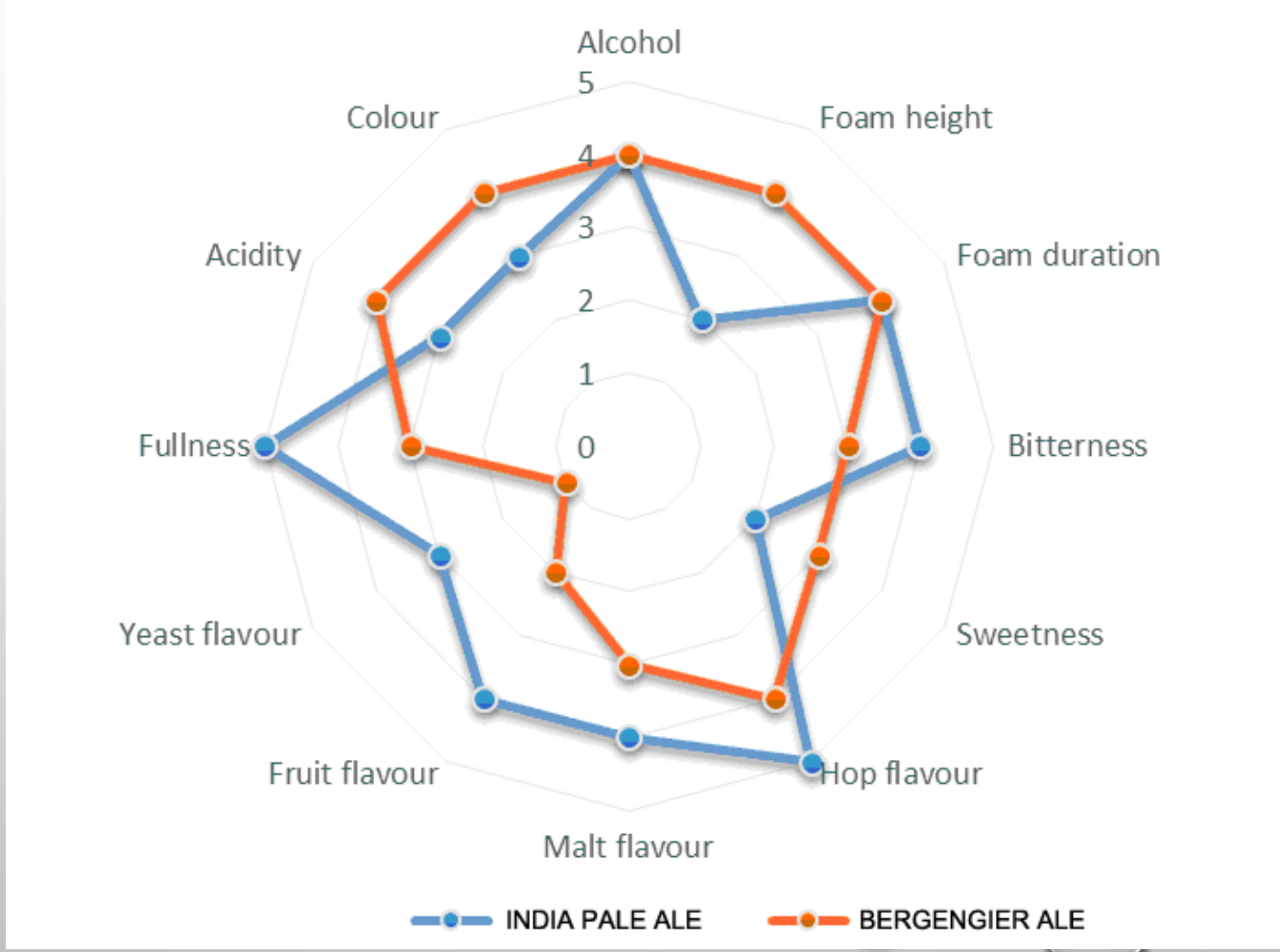
- THE BEER WORT WAS FERMENTED USING A SPECIFIC HIGH TEMPERATURE FERMENTATION YEAST AT 18°C FOR 7 DAYS, BOTTLED WITHOUT FILTRATION OR PASTEURIZATION AND KEPT FOR FERMENTATION AT 5°C FOR ANOTHER TWO WEEKS, RESULTING IN AN INDIA PALE ALE BEER.
- THE FINAL PRODUCT ACHIEVED A DEGREE OF FERMENTATION OF 76.97%,, WAS ACHIEVED A FINAL PRODUCT WITH AN ALCOHOL OF 5.17% BY VOLUME, 4.05% BY MASS, A TOTAL EXTRACT OF 5.07%, APPARENT EXTRACT 2.99%, DENSITY 1.0082 G/ML.

COMPARISON CHART

Beer type / Parameter	Bergenbier Ale	India Pale Ale Beer
Colour	Golden amber	Golden to copper.
Foam	Rich 4 cm foam collar, which leaves a laced trail on glass walls, with a long duration.	Slightly rich 2.5 cm foam collar that leaves a smooth glass walls that resist with a long duration.
Alcohol	5.5%	5.17%
Aroma	Medium flavor profile: mainly hops and corn, fine yeast flavor.	Full flavor profile: dominates hops and malt character with a medium fruitiness, citrus like, medium yeast flavor due to high ester concentration.
Taste	Slightly sweet taste with a slightly bitter aftertaste and with fine notes of corn.	Strong taste of hops and malt with a pronounced bitterness both before and after.

Table 3. Main characteristics of the India Pale Ale beer and the Bergenbier Ale beer

ALE BEER
COMPARATIVE SENSORY PROFILE



CONCLUSION

- AN INDIA PALE ALE BEER RECIPE AND METHOD USING THE EQUIPMENT FROM THE BREWERY PILOT PLANT WAS OBTAINED.
- THE FERMENTATION PROCESS, BEING MORE COMPLEX THAN THE TRADITIONAL TECHNOLOGY, DUE TO VARIOUS PARAMETERS (DEGREE OF FERMENTATION, FLAVOR, FOAMING, YEAST VITALITY) LED TO INSUFFICIENT DEGREE OF FERMENTATION.
- A BEER WITH A FRESH FLAVOR WAS OBTAINED, SUBJECTED TO THE SENSORY ANALYSES WITH OVERALL FAVOURABLE RESULTS.

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THANK YOU