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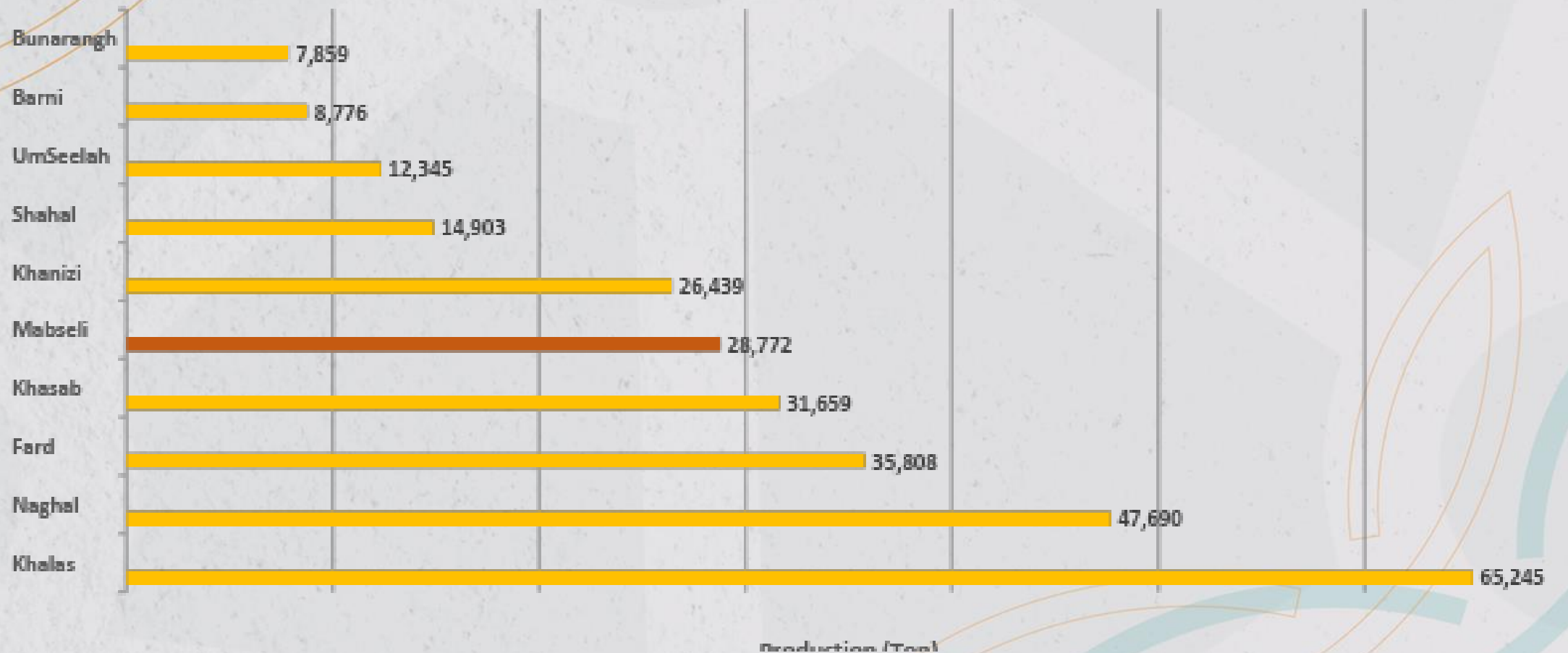
Production of Liquid Sugar from Unripe Mabseli

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Introduction:

The ten most productive varieties of dates in the Sultanate of Oman during the 2023 season



Source: Ministry of Agriculture Fisheries Wealth & Water Resources 2024

Harvesting Unripe Mabseli



[Source: National Geographic Magazine 2025](#)

Harvesting Unripe Mabseli



[Source: National Geographic Magazine 2025](#)

Harvesting Unripe Mabseli



Source: [National Geographic Magazine 2025](#)

Cooking the Unripe Mabseli



Cooking the Unripe Mabseli



Source: [National Geographic Magazine 2025](#)

Drying the cooked Mabseli



[Source: National Geographic Magazine 2025](#)

The dried Mabseli Besr (10% moisture)



- The price of 'Mabseli Besr' ranges from 350 to 380 OMR/ton, depending on quality.
- The government subsidizes Besr at a rate of 62 OMR/ton.
- Most of the Oman's Besr production is exported to Asian markets.

Usage of Liquid Sugar:

- **Beverages:** Liquid sugars are soluble, making them ideal for sweetening drinks like juices, sodas, and energy drinks.
- **Bakery Products:** Their moisture-retaining properties enhance the texture and shelf-life of baked goods.
- **Confectionery:** In candies and chocolates, liquid sugars help achieve the desired sweetness and consistency.
- **Sauces and Dressings:** They provide a balanced sweetness and viscosity in products like barbecue sauce, ketchup, and salad dressings.



NEW PRODUCT

DATE LIQUID SUGAR

AMAZING NATURAL SWEETENER

An additive-free and 100% natural alternative

Liquid Sugar Global Market:

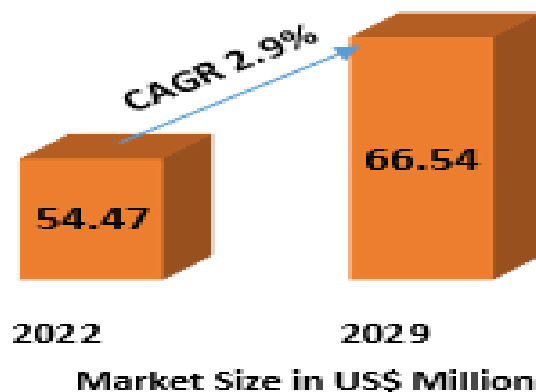
Liquid Sugar Market



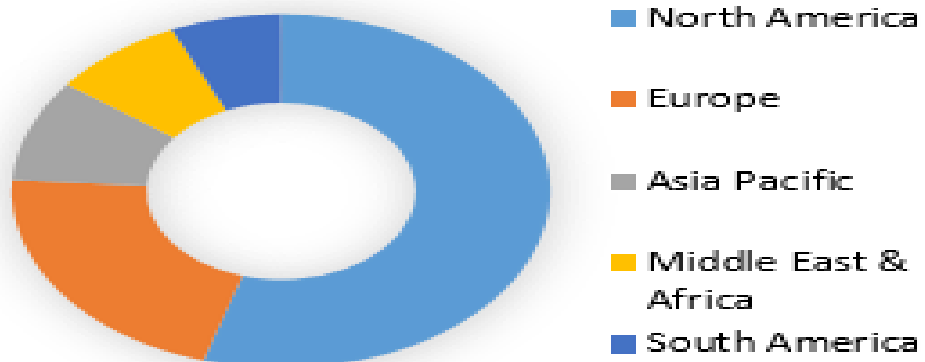
Key Players

Boettger Gruppe
 Tate & Lyle PLC
 Nordzucker AG
 Sugar Australia Company Ltd
 Zukán S.L.U.
 Banah,
 Südzucker
 Maui Brand Sugars

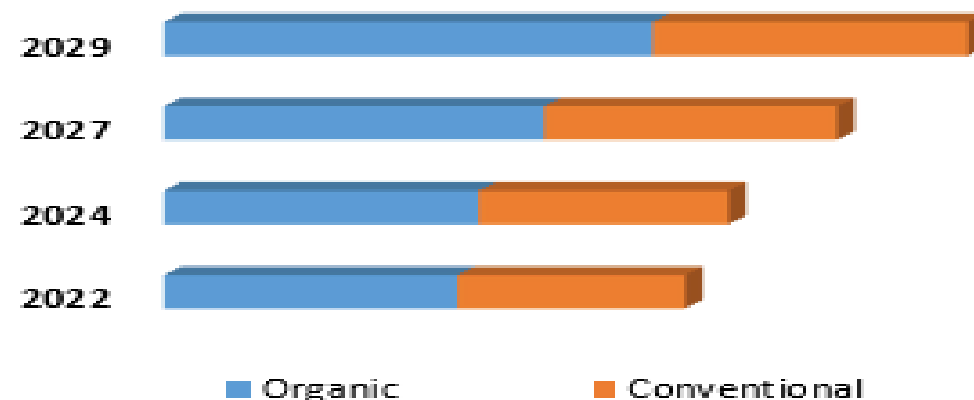
Natural Raw Liquid Sugar
 Eye kandy
 Da vinci gourmet and
 Monin
 Cargill Incorporated
 Archer Daniel Midland
 Raizen SA
 Sucroliq S.A.P.I DE C.V.
 Toyo Sugar Refining Co.



Regional Analysis in 2022 (%)



Form Segment Overview



Aims:

1. Utilize unripe Mabseli dates for the production of liquid sugar.
2. Evaluate the efficiency of enzymatic and acid hydrolysis methods for liquid sugar production from unripe Mabseli.
3. Investigate the effects of mixing and ultra-sonication extraction techniques on the recovery of soluble sugars.
4. Preserve the natural vitamins, antioxidants, and light color of unripe Mabseli dates by avoiding the drying process and utilizing them directly in liquid sugar production.

Materials & Methods:

- **Samples:** Unripe Mabseli from Nizwa production season 2024.
- **Enzyme Hydrolysis:** 1% Cellulase, Pectinase and Tannase.

Cellulose $\xrightarrow{\text{Cellulase}}$ Glucose

Pectins $\xrightarrow{\text{Pectinase}}$ Galacturonic + Sugars (Rhamnose, Arabinose, Galactose, Xylose)

Tannins $\xrightarrow{\text{Tannase}}$ Gallic Acid + Glucose + Ellagic Acid

- **Acid Hydrolysis:** Hydrochloric Acid (HCl) 0.5%.

Starch $\xrightarrow{\text{HCL}}$ Dextrins $\xrightarrow{\text{HCL}}$ Maltose + Glucose

Hemicelluloses and pectins $\xrightarrow{\text{HCL}}$ Oligo + Monosaccharides

- **Extraction process:**

1. Magnetic mixing for 30 min.
2. Ultra-sonication 40 kHz (25%) for 30 min.

- **Filtration:**

1. Coarse 50 μ m.
2. Fine 5 μ m.

- **Concentration:** Using rotary evaporator at 70°C.

- **Physical & Chemical analyses:** Fruit and seed weight, Fruit and seed dimension, TSS, Refractive Index, Density, Recovered Soluble Solids, pH, Moisture, Ash, Tannins, Pectins, Glucose, Fructose, Sucrose, Colour, Purity and Viscosity.

Production of Liquid Sugar

Unripe Mabseli

Enzyme Hydrolysis
1%, 50°C /4hrs

Mix Extraction
30 min

Ultrasonic Extraction
30 min

Filtration
(coarse & fine)

Concentration
70°C

Liquid Sugar
70 Brix

Acid Hydrolysis
0.5%, 60°C /30min

Mix Extraction
30 min

Ultrasonic Extraction
30 min

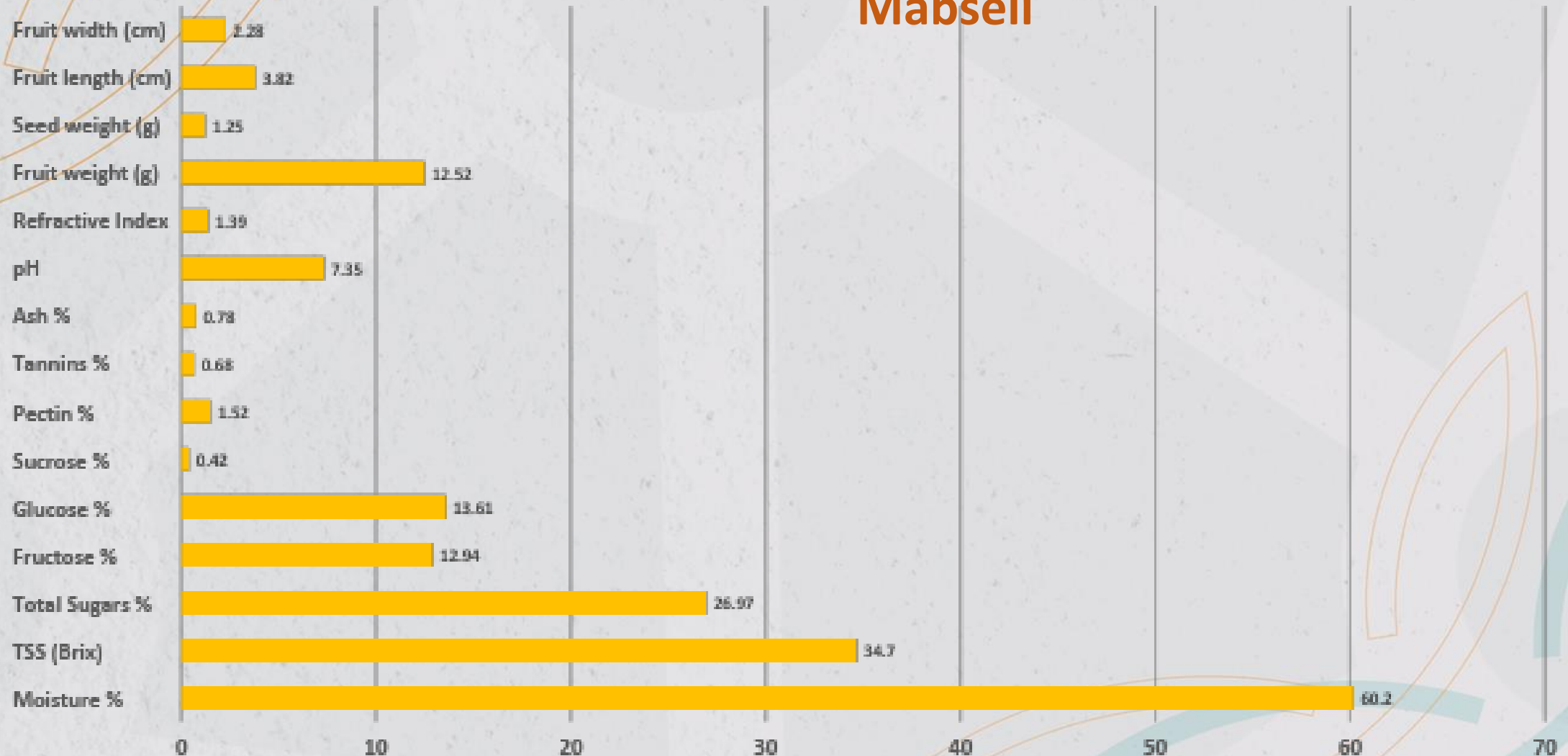
Filtration
(coarse & fine)

Concentration
70°C

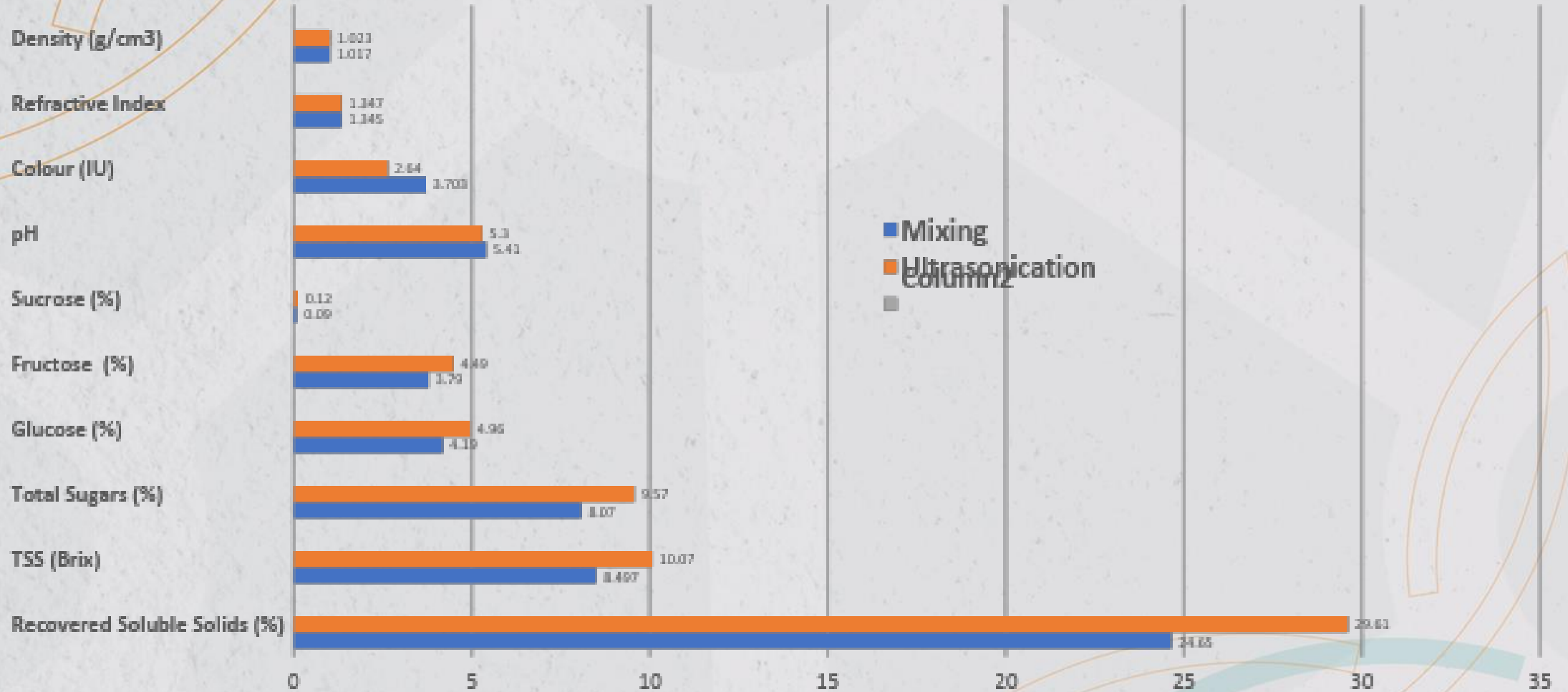
Liquid Sugar
70 Brix

Results & Discussion:

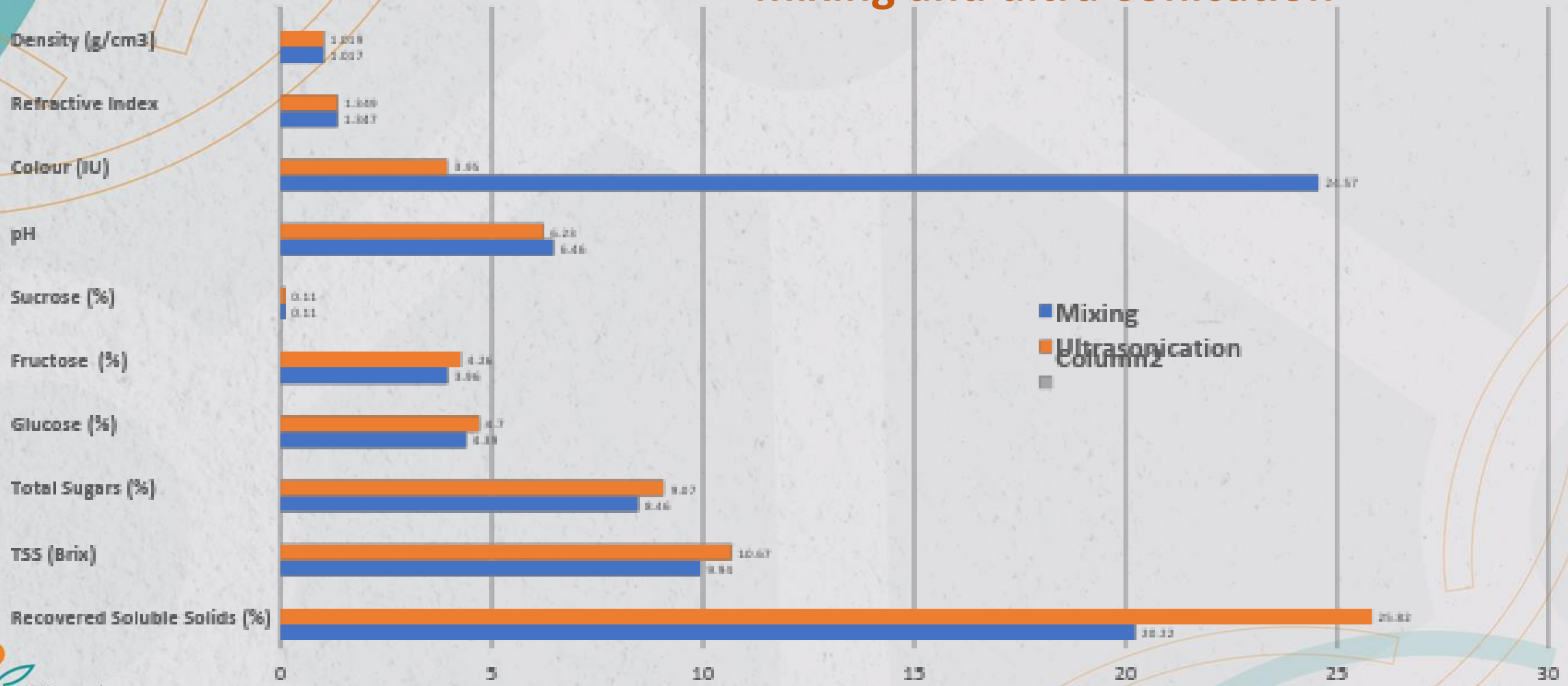
Physiochemical composition of unripe Mabseli



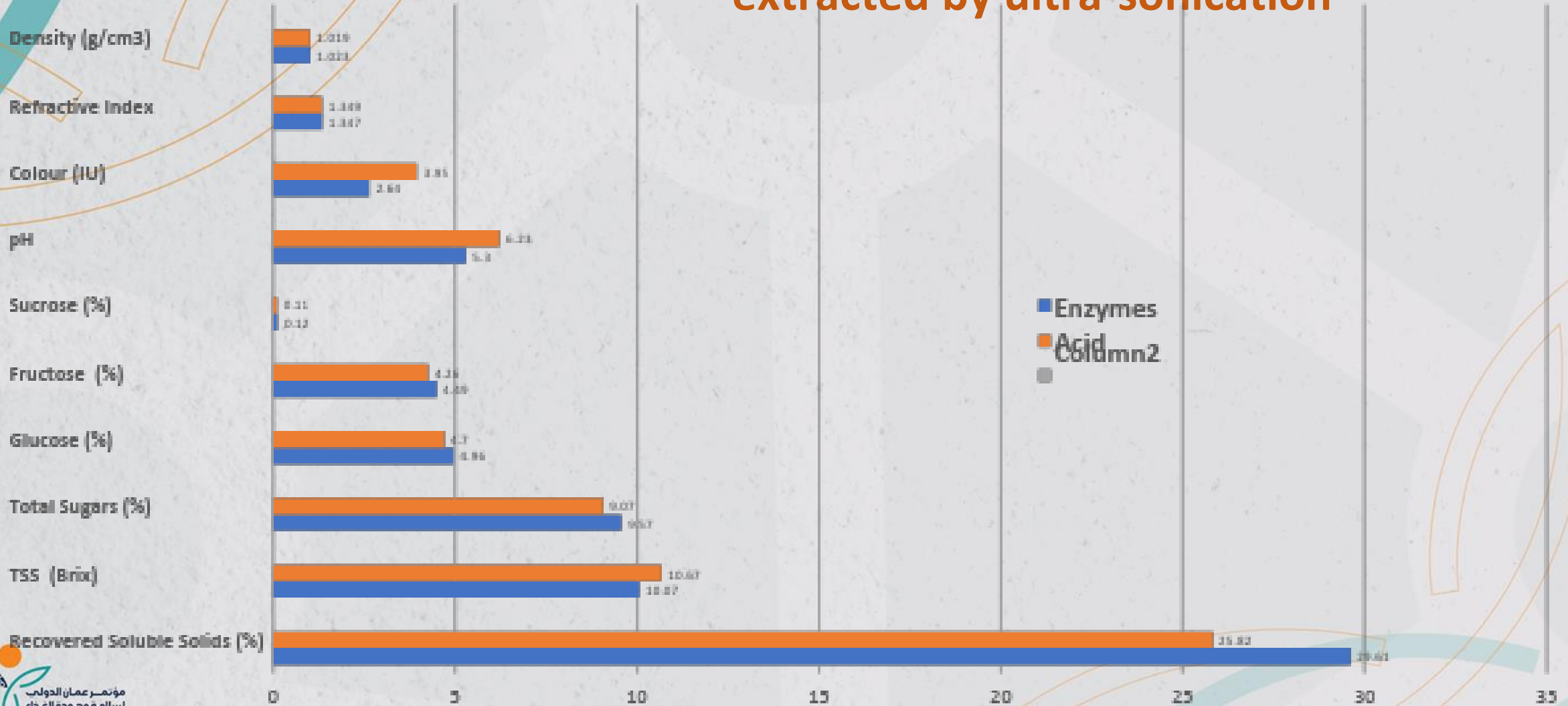
Physiochemical composition of juice produced by enzymes and extracted by mixing and ultra-sonication



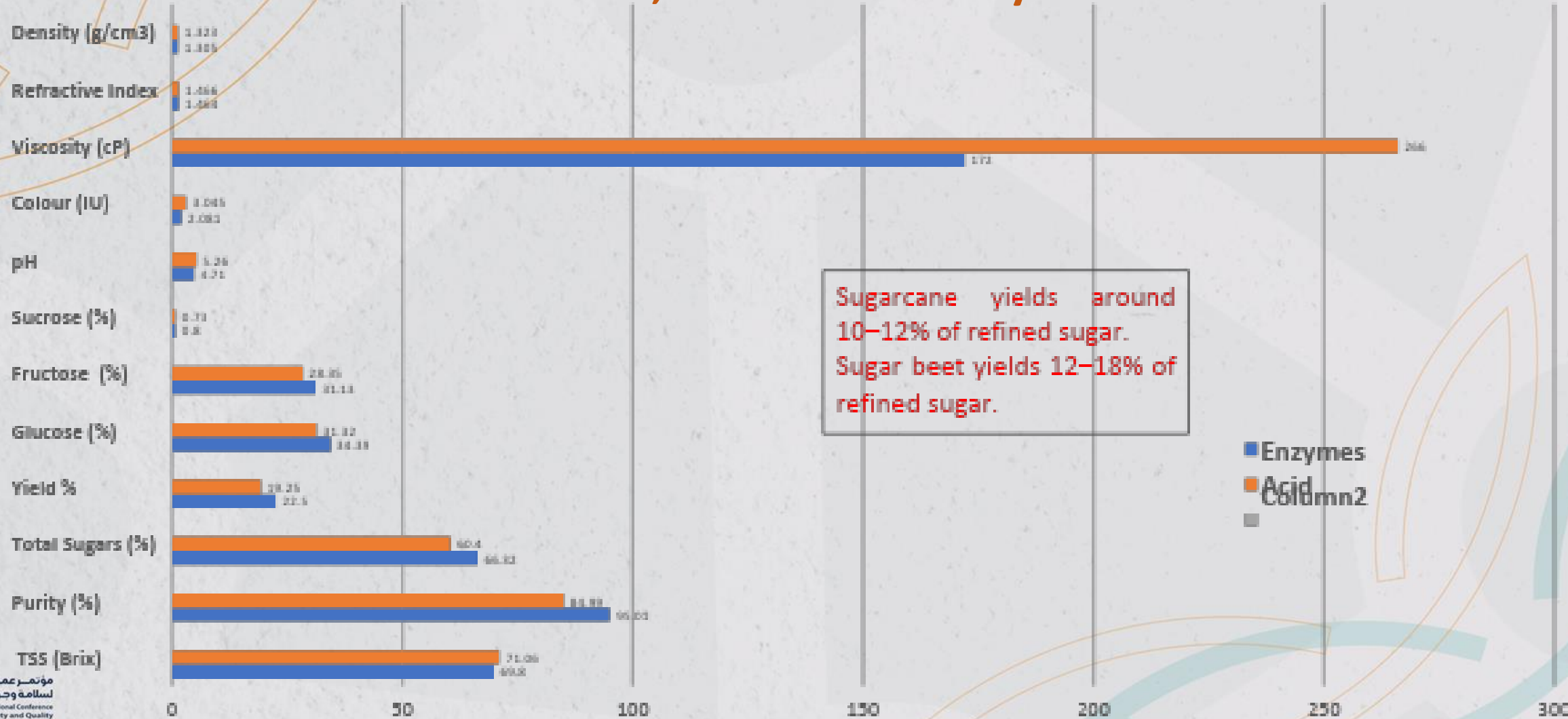
Composition of juice produced by acid and extracted by mixing and ultra-sonication



Composition of juice produced by enzymes and acid, and extracted by ultra-sonication



Composition of liquid sugar produced by enzymes and acid, and extracted by ultra-sonication



Liquid Sugar produced by enzymatic and acid hydrolyses and extracted by ultra-sonication

Comparison of Returns per 1 Ton of Unripe Mabseli

Unrip Mabseli	Products	Revenue (OMR)	Processing Cost (OMR)	Net Return (OMR)
1 ton	Dried dates (500 kg)	150	30	120
1 ton	Liquid sugar (200 kg)	300	80	220

Conclusions:

1. Unripe Mabseli dates can be effectively utilized for producing high-value liquid sugar.
2. Enzymatic hydrolysis outperformed acid hydrolysis in sugar yield and composition.
3. Ultrasonication extraction proved more efficient than magnetic mixing in recovering soluble sugars.
4. The resulting liquid sugar had favorable properties, suitable for food industry applications.
5. This process enhances the economic value of unripe Mabseli and supports Oman's agro-industrial potential.

New

PgD / MSc in Food Safety Program

University of Nizwa Launching new postgraduate program in Food Safety. m

The Postgraduate Diploma consists of 2 semesters with 24 academic credits, while the MSc extends to a third semester for a research project and thesis valued 6 credits.

An exceptional aspect of this program is the opportunity for students to earn four internationally recognized ISO certifications upon successfully passing the final exams administered by the Gulf Accreditation Center, these certifications include:

- Risk Management ISO 31000,
- Testing & Calibration Labs ISO 17025,
- Accreditation of Inspection body ISO 17020,
- Food Safety Management ISO 22000.

Thank You ...



**مؤتمر عمان الدولي
لسلامة وجودة الغذاء**
Oman International Conference
on Food Safety and Quality
7th Edition **النسخة السابعة**

