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PP-268 [Beekeeping Technology and Quality]

EUROHONIG®
Innovative Beekeeping Solutions

SyrupMaster

INVERTOFIX

A practical, simple and cost-effective methodology for preparing inverted syrup from table sugar

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Keywords: practical beekeeping technologies, sustainable beekeeping, improved invert sugar preparation, efficient feeding

Background

Sustainability and economic profitability are key challenges for beekeepers worldwide due to environmental and market challenges. Prices of honey are under increasing pressure from other sweeteners while factors like global warming, reduced biodiversity and intensive agriculture have led to a significant decline of natural forage and less resilient honeybee colonies. Therefore, efficient feeding is exceptionally important for smaller to medium sized beekeepers. Inverted sugar syrup in many ways would be an ideal feed. However, the readymade solutions offered on the market are often expensive, require large storage capabilities and transport of large volumes of liquid.

Problem Description

We set out to develop a methodology which allows beekeepers to produce their own invert syrup in a reproducible, simple and cost-effective manner from table sugar.

SyrupMaster – A semiautomatic system for producing your (Invert) syrup to feed your bees

- Clean-no mess in the production area
- No other equipment required
- Works while you sleep
- Use your own recipe
- Produce syrup for others
- Cost efficient !

INVERTOFIX is the first ready-to-use product for beekeepers for inversion of table sugar into invert syrup.

- Fresh syrup, HMF free
- No crystallization in combs over winter. No danger of colony loss
- Better control over feed quality - no impurities or low quality sugar
- No crystallization in combs over winter. No danger of colony loss
- Ideal pH for bees Maintains gut health
- Flexibility to make invert feed when you need it

How SyrupMaster and INVERTOFIX work together

3 models for producing 3:2 syrup from 50 kg, 200 kg and 400 kg sugar

Pannel for control Of dissolving and inversion process: optimal temperature and flow of water.

Submersible pump for powerful water circulation in the tank, ensuring rapid sugar dissolution.

The tank is filled with tap water up to the recommended level to obtain the desired syrup concentration.

The heating phase of the fabrication process ends when the water reaches 45 °C.

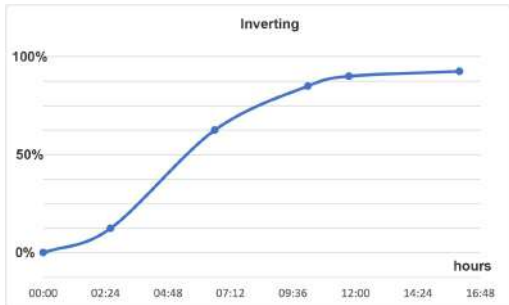
During the dissolution phase, sugar is gradually added into the tank.

At the end of this phase, a viscous syrup solution is obtained with a composition of 3 kg of sugar to 2 l of water.

When the sugar is completely dissolved, add the required amount of INVERTOFIX (5 ml/l syrup).

The controlled inverting phase lasts less than 10 hours.

The use of SyrupMaster decreased significantly the inverting time with INVERTOFIX of the 3:2 sugar syrup from 24 hours to 10 hours



SyrupMaster is the first automated system which allows beekeepers and/or associations to produce their own (inverted) feed, in a clean, convenient, reproducible and economic way.

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Background
Sustainability and economic profitability are key challenges for beekeepers worldwide due to environmental and market challenges. Prices of honey are under increasing pressure from other sweeteners while factors like global warming, reduced biodiversity and intensive agriculture have led to a significant decline of natural forage and less resilient honeybee colonies. Therefore, efficient feeding is exceptionally important for smaller to medium sized beekeepers. Inverted sugar syrup in many ways would be an ideal feed. However, the readymade solutions offered on the market are often expensive, require large storage capabilities and transport of large volumes of liquid.

Problem Description
We set out to develop a methodology which allows beekeepers to produce their own invert syrup in a reproducible, simple and cost-effective manner from table sugar.

Methodology
Our developed solution for beekeepers is based on two components:
(I) a long shelf-life liquid formulation of a yeast extract with high invertase activity, called INVERTOFIX which efficiently converts a solution of table sugar into inverted syrup.
(II) a simple, cost-efficient, smart-tank system, called SyrupMaster, which consists of a food grade plastic tank, with a pumping and electronic regulation system which allows fast and efficient dissolution of sugar and provides the mixing for effective enzymatic conversion. The enzyme formula was optimized considering parameters like time, dosage, temperature and sugar concentration.

Results and conclusions
Adding INVERTOFIX at a fixed dose-to-sugar ratio reliably converts a solution of table sugar into invert sugar. The reaction proceeds at temperatures above 15°C to completion within 24h. SyrupMaster, is the only piece of hardware which is required for beekeepers to prepare their own invert syrup in scales of 65- 500L/batch in 24h. The herein described method reduces the costs of feeding by more than 50% compared to commercial inverted syrups, ensures flexibility, quality and freshness of feed (no HMF buildup). Feed generated with this methodology was successfully tested in apiaries in Austria, Italy and Romania.

Practical Implications for Beekeepers
INVERTOFIX and SyrupMaster acting together can have an important impact to apiculture by lowering costs for and improving the quality of bee feed for beekeepers in developed and developing regions.