Project Title:

Detecting Patterns of Honey Adulteration Using WITS Export Data (1988-2023)

Introduction:

Honey adulteration has become a significant issue in the global food industry, particularly in recent decades. Professor Norberto Garcia highlighted a concerning trend where certain countries appeared to be exporting more honey than could realistically be produced by their available beehive populations. This suggests that a portion of the honey being exported and labeled as "pure" may be adulterated or counterfeit.

Objective:

This project aims to identify patterns of honey adulteration by analyzing export data from the World Integrated Trade Solution (WITS) database, spanning from 1988 to 2023. Specifically, I will:

1. Identify countries with unexpected increases or decreases in honey exports.

2. Analyze export trends post-2009 in countries known for honey adulteration – according to Garcia - (China, Ukraine, India, Vietnam, Thailand) and compare them to countries with a reputation for pure honey exports (Argentina, Brazil, Canada, Mexico).

3. Compare honey prices ($ per Kg) between these two clusters of countries to investigate if price discrepancies correlate with suspected adulteration.

4. Examine Switzerland's honey import trends from these countries to see if there is a correlation between increased imports and the potential for adulterated honey.

Methodology:

1. Data Collection:

- Extract honey export data (in Kg) and corresponding prices ($ per Kg) from the WITS database for the period 1988-2023.

- Collect data on the number of beehives for each country from available agricultural databases or reports.

2. Data Analysis

- Trend Analysis: Identify countries with significant changes in honey export volumes over time. Use statistical methods to detect anomalies or unexpected spikes, particularly post-2009.

- Cluster Comparison: Compare export trends and pricing data between two clusters of countries (those suspected of exporting adulterated honey vs. those not suspected). Statistical tests will be applied to determine if there are significant differences in export volumes and prices between these clusters.

- Switzerland Import Analysis: Analyze Switzerland's honey import data to determine if there is a correlation between the source of imports and the suspected adulteration.

3. Visualization:

- Use time series plots to illustrate trends in honey exports and prices over time.

- Generate comparative bar charts and heatmaps to visualize differences between the two clusters of countries.

- Create a detailed report highlighting key findings, with recommendations for monitoring potential food fraud.

Expected Outcomes:

- Identification of countries with suspicious honey export trends.

- Evidence of potential correlation between honey prices and adulteration.

- Insights into Switzerland’s honey import patterns and their implications for food fraud detection.

Conclusion:

By leveraging the WITS data and focusing on both quantitative analysis and country-specific case studies, this project aims to contribute to the understanding of honey adulteration trends. The findings may help in developing predictive models for detecting food fraud in the future, benefiting both consumers and regulatory bodies.

References

<https://www.apiservices.biz/documents/articles-en/history_honey_fraud.pdf>

data:

https://wits.worldbank.org/trade/comtrade/en/country/CHE/year/2023/tradeflow/Imports/partner/ALL/product/040900