



Assessing Starch Isolation Using Different Raw Pea Format

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INTRODUCTION

- Dry pea, a leguminous crop, is one of the world's oldest crops, accounting for 35-40% of total trade (2009).
- Pea starch is an inexpensive source of starch since it can be obtained as a by-product of protein extraction.
- There are several separation techniques for starch extraction. However, additional research on the starch isolation method is necessary for obtaining high starch yield and purity.

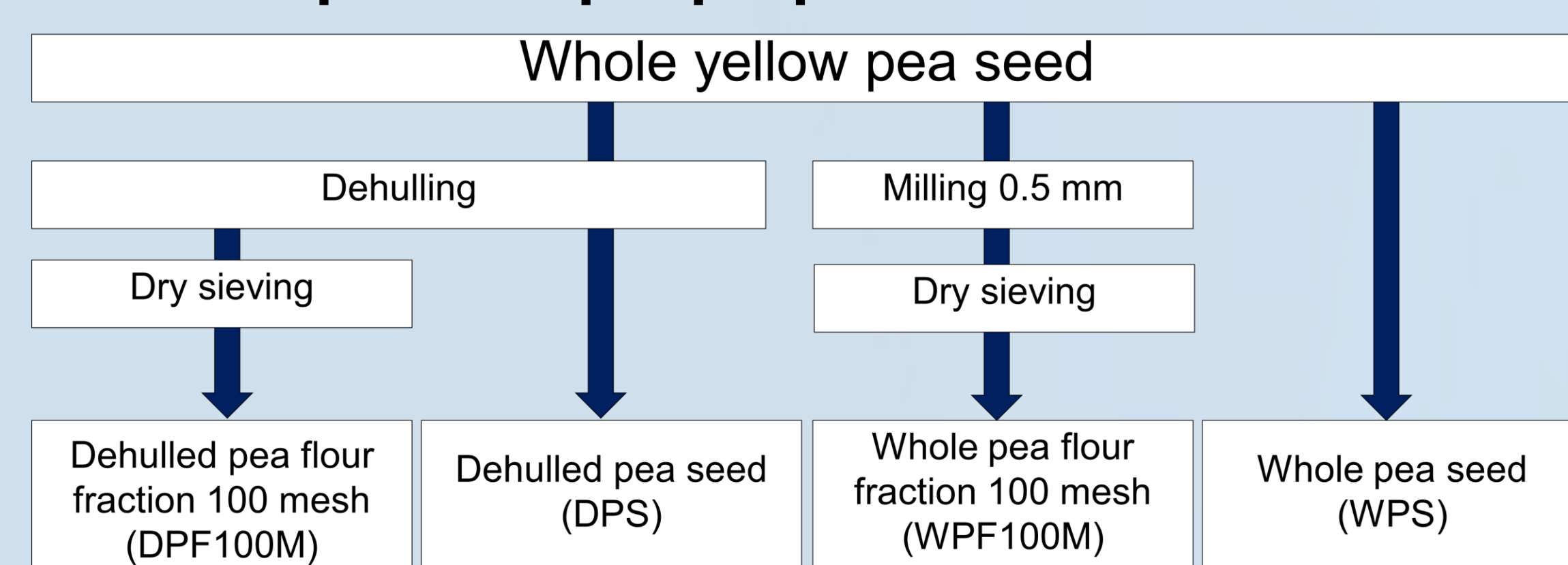
OBJECTIVES

The aim of this study is to:

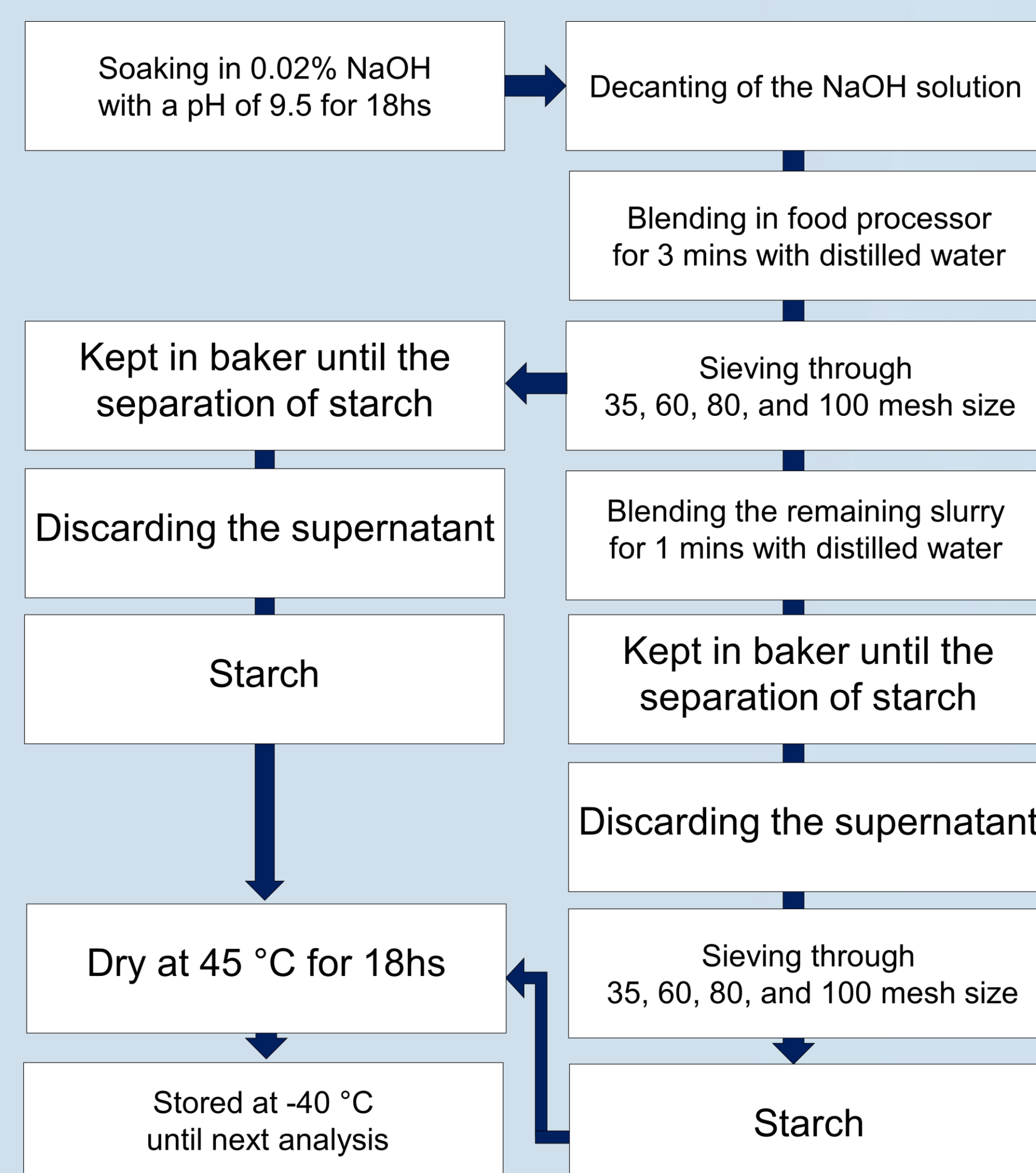
- Optimize starch extraction that will be used for subsequent experiments.
- Examine the dehulling impact on the extraction process and starch characteristics.

MATERIALS & METHODS

Yellow pea sample preparation.



- **Alkaline Steeping starch extraction:** Starch isolation was conducted according to the method of (Simsek *et al.* 2009) with some modifications.



METHODS

- **Physicochemical Properties:** Moisture, ash, protein, and total starch were demonstrated using official methods of AACC.
- **Starch properties:** pasting properties using Rapid Visco Analyzer (RVA): AACC International method 61-02.01 (2010)
- **Functional properties:** water holding capacity (WHC), and oil holding capacity (OHC).
- **One-Way ANOVA at $\alpha = 0.05$ & LSD**

RESULTS

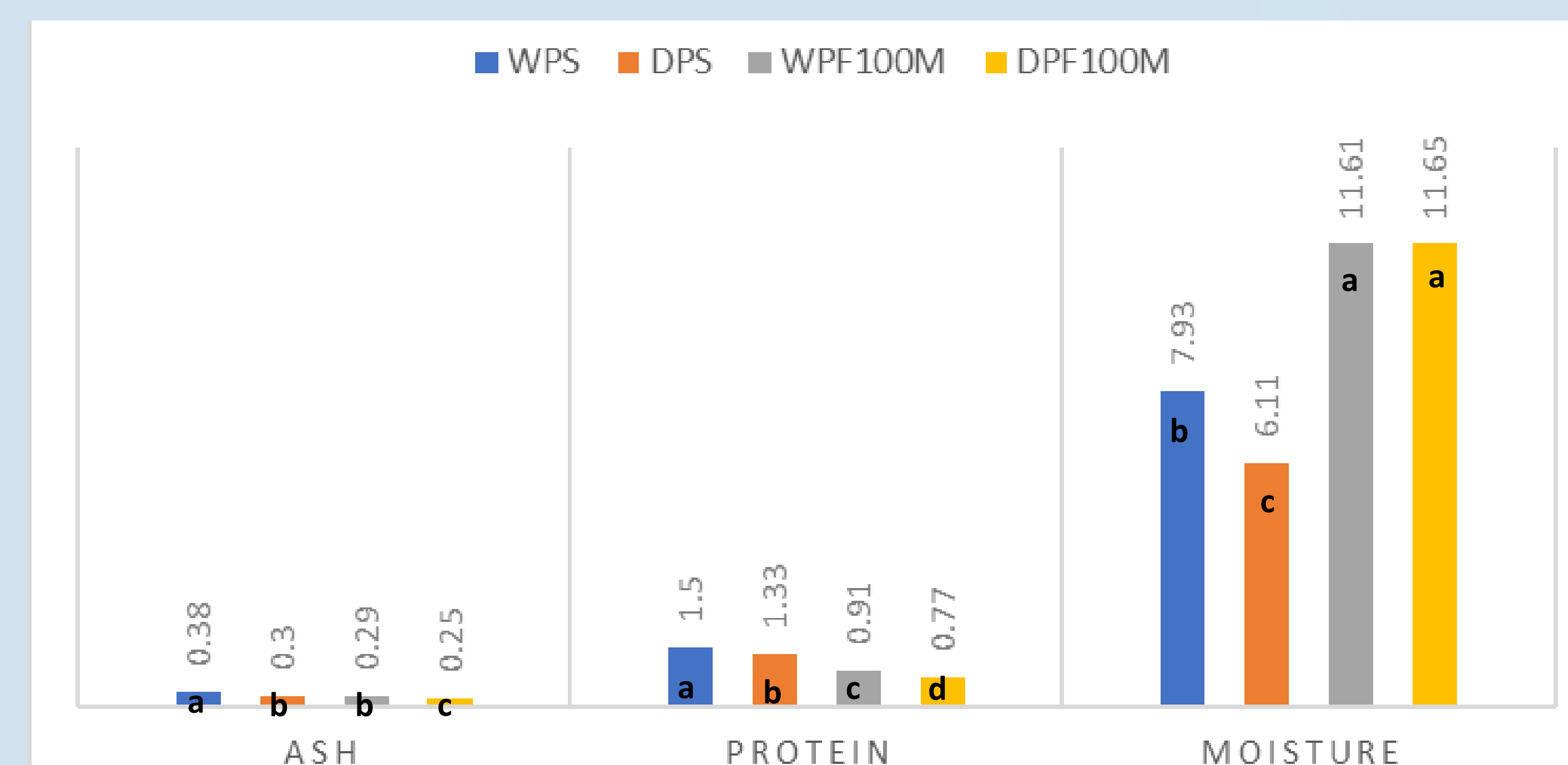


Fig 1. Compositions of isolated starches shown in percentages. Different letters represent significant difference at $\alpha = 0.05$.

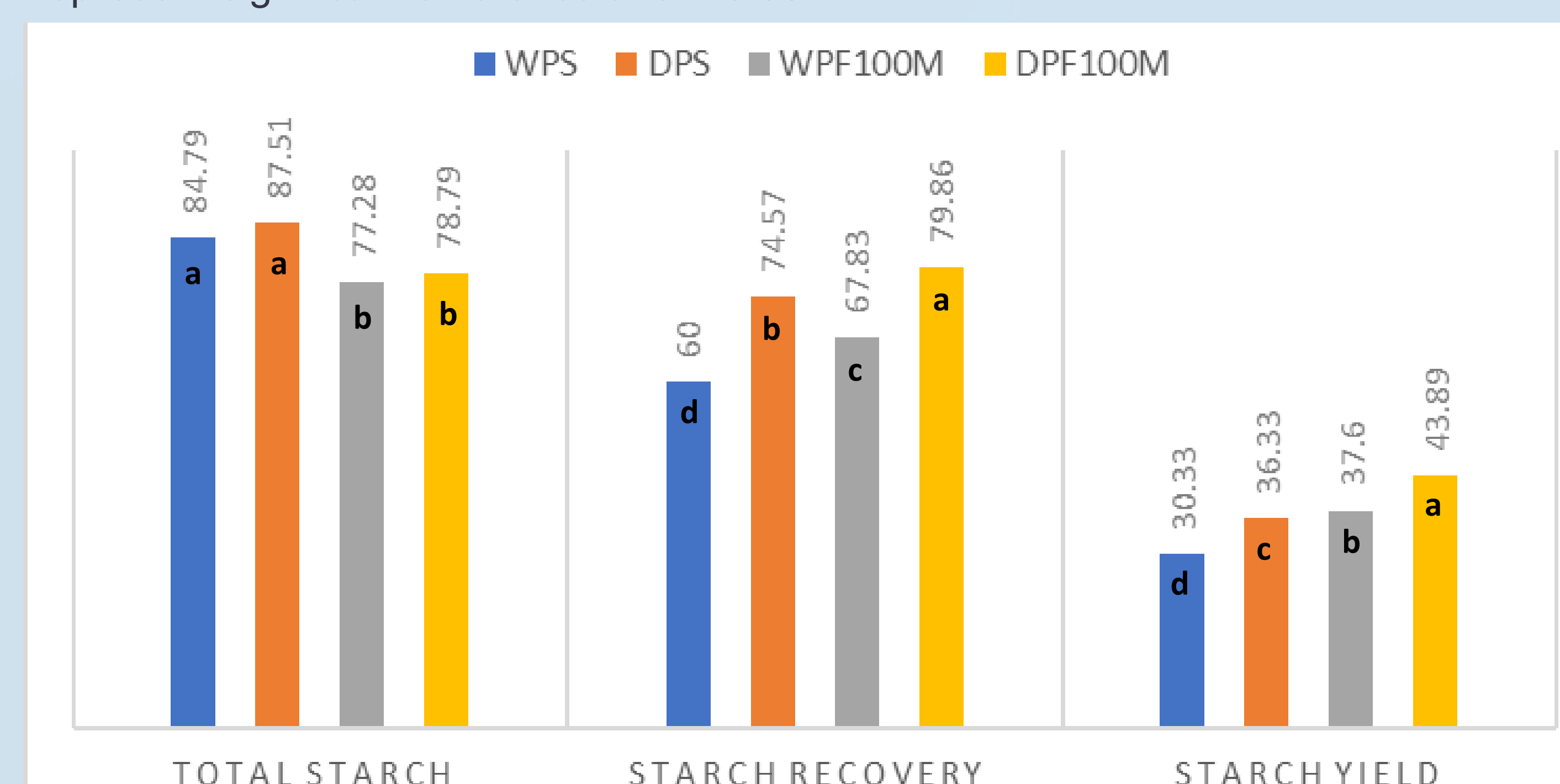


Fig 2. Starch recovery of isolated starches shown in percentages. Different letters represent significant difference at $\alpha = 0.05$.

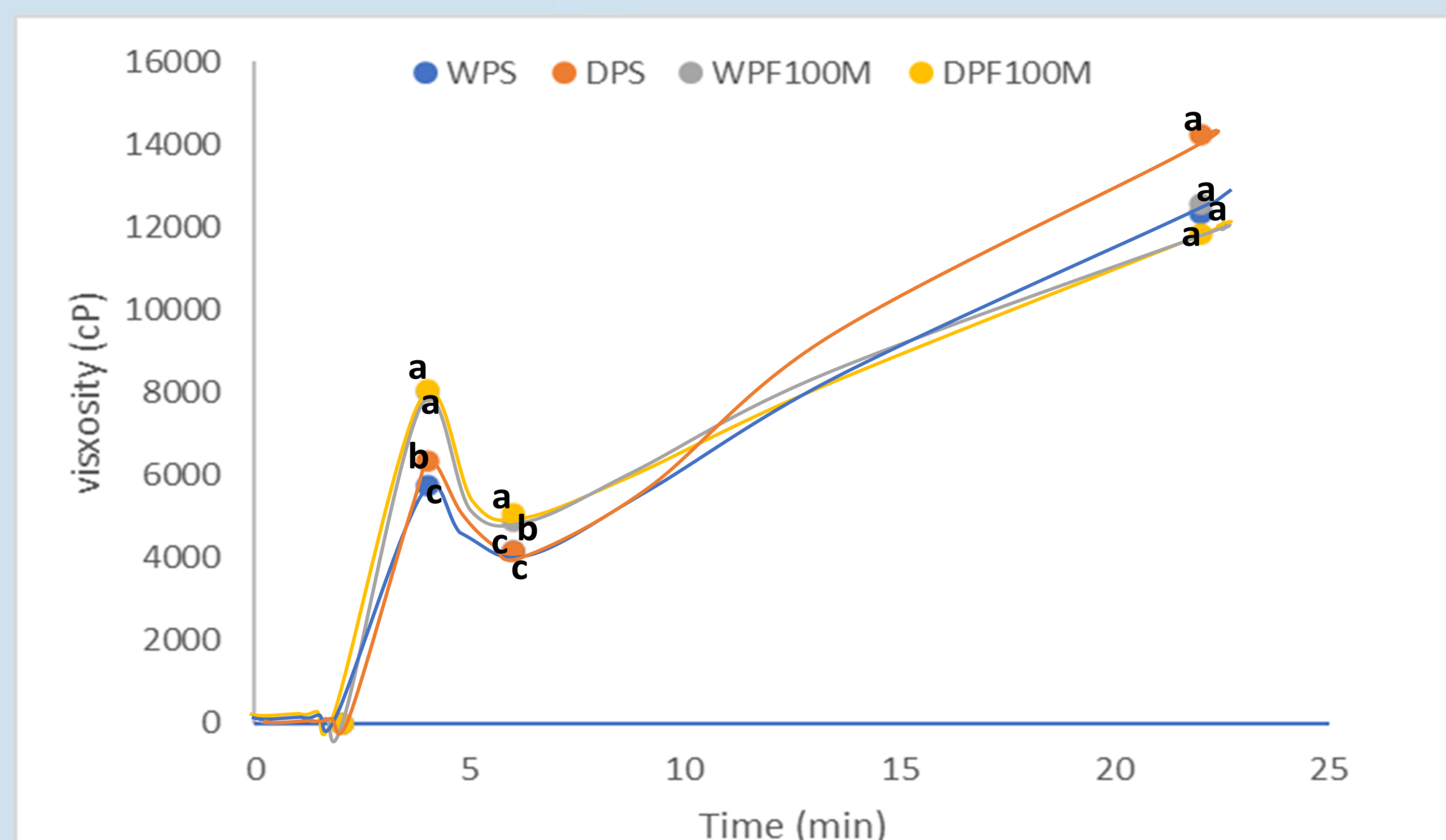


Fig 3. Rapid visco analyzer (RVA) plot of starch samples. Different letters represent significant difference at $\alpha = 0.05$.

DISCUSSION & CONCLUSION

Chemical composition:

- All sample had a protein content of less than 1.5% due to the use of sodium hydroxide which helps to solubilize the protein. In both cases of dehulling, the protein content was less than whole pea seed and flour fraction (Fig 1).
- The high moisture content in the flour fraction can be associated with the fine starch particle size compared to seed starch extraction as a result of an increase in the surface area (Fig 1).

Functional characteristics:

- Removal of hull or flour fraction starting format did not impact significantly ($p > 0.05$) the water and oil holding capacity compared to whole pea seed.

Starch recovery:

- The higher recovery of starch in both dehulling treatments, compared to their counterparts, can be attributed to the removal of the hull which acts as a barrier in other treatments with hull (Fig 2).

Pasting propriety:

- All samples had high peak viscosity followed by a significant breakdown with variations in individual pasting parameters observed among starch samples (Fig 3).

Conclusion:

- Starch obtained from various starting formats did not significantly differ the functional properties; however, an impact on the starch recovery and purity was observed.
- Dehulling prior to extraction improved the extraction yield and purity of starch and made available hulls to be used in other applications
- Isolating starch by the dehulling method is the most suitable way to produce starch from yellow dry peas for food ingredient utilization.

ACKNOWLEDGEMENT

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REFERENCES

- AACC International. (2010). Approved methods of analysis (11th ed.). Method 08-01.01, 44-15.02, 46-30.01, 56-37.01, 61-02.01, and 76-13.01. St. Paul, MN, USA: American Association of Cereal Chemists.
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