

## Effect of packaging materials, storage methods, and storage durations on functional qualities of red-hot pepper powder

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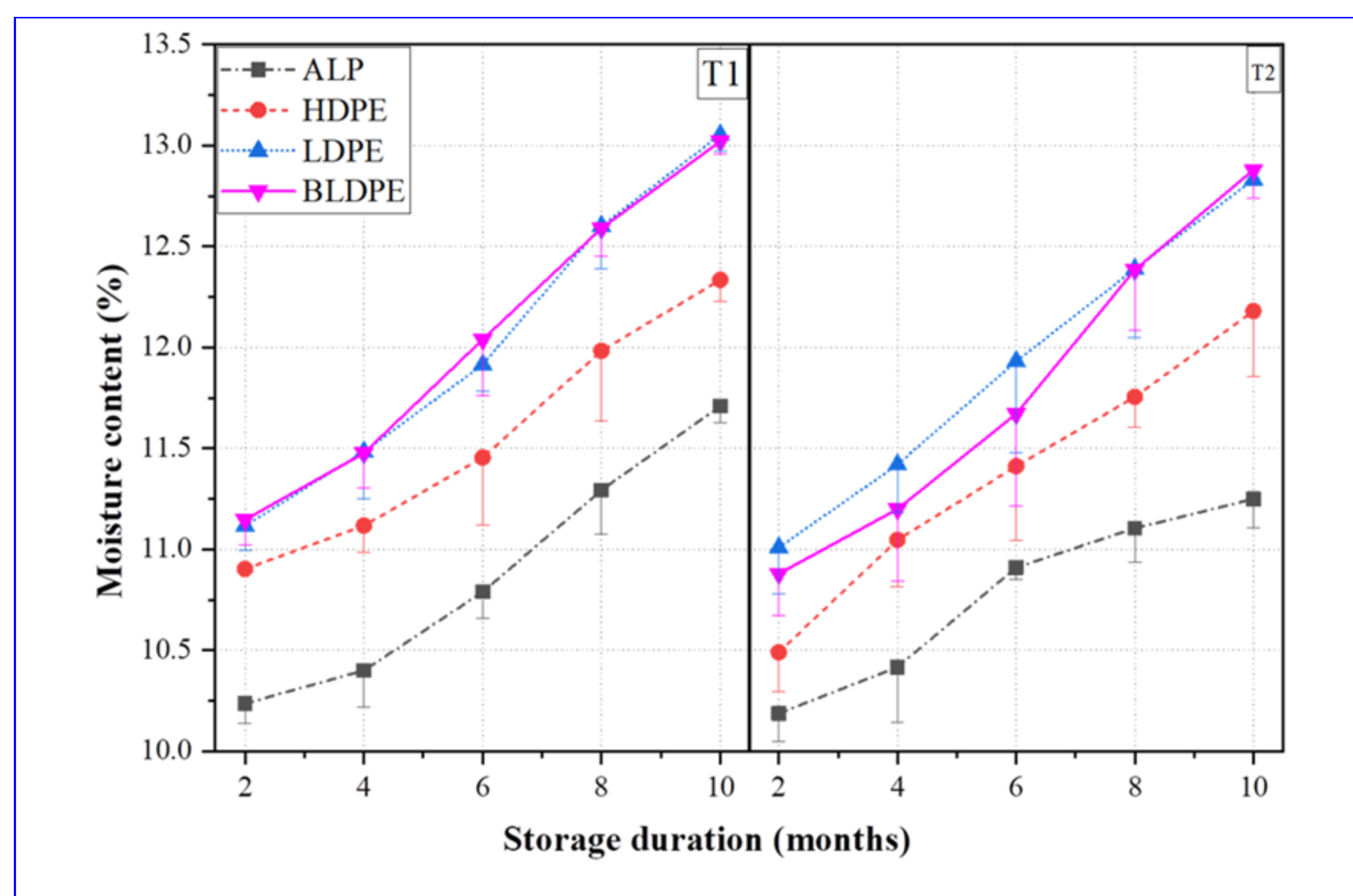
### Introduction

- Red hot pepper is the most widely grown vegetable in Ethiopia
- Ethiopia is the second largest producer after Madagascar in Africa
- Red hot pepper quality loss in storage is the main constraint
- Up to 27.56% loss was reported in red pepper value chain due to post harvest handling practices
- Ethiopia lost over 10 million USD due to rejection by the European market
- The objective of this study is to investigate the effects of packaging materials, storage method, and storage duration on the functional qualities of red-hot pepper powder

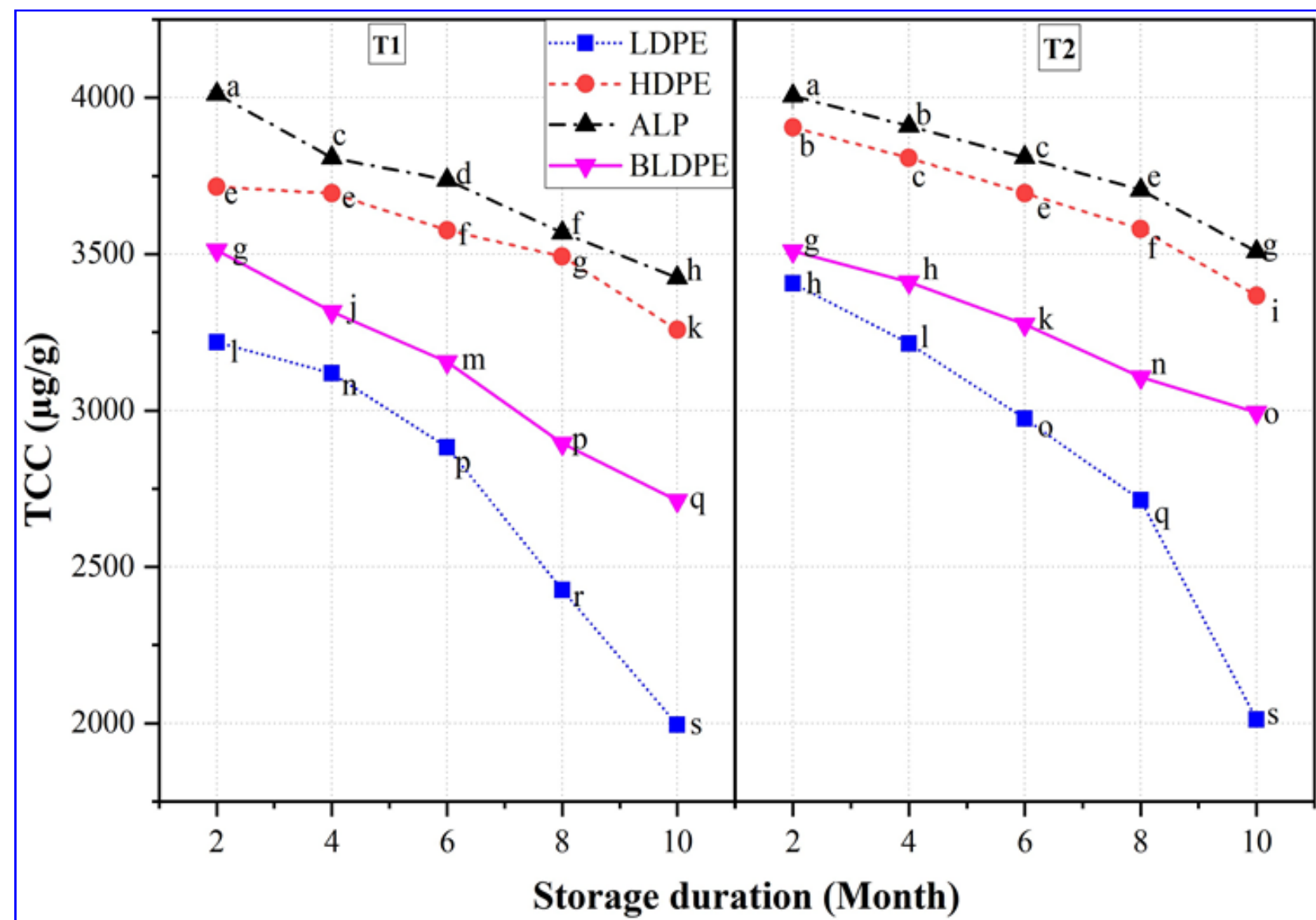


### Results

- The interaction effect of packaging materials, storage temperature, and storage duration significantly affected the total carotenoid content, oleoresin content and total antioxidant capacity of red hot pepper powder during ten months storage except for moisture content and pungency index (Fig 1. 2, 3, 4, and 5)
- Cold storage temperature retained more functional qualities and recorded the greatest moisture content (Fig 1, 2, 3, 4, and 5)
- The quantity of functional qualities are degraded with increased storage period in all packaging materials (Fig 1, 2 and 3)
- Aluminium pouch laminate (ALP) preserved more Functional qualities as compared to other packaging materials Fig 1, 2, 3 and 4)



**Figure1** Effect of packaging materials, storage methods and storage duration on moisture content (%) of paper powder. T1 represents refrigerated storage, and T2 represents room temperature storage.



**Figure2.** Effect of packing materials, storage methods and storage duration on total carotenoids content (µg/g) of paper powder. T1 = Refrigerated and T2 = room temperature

### Moisture content

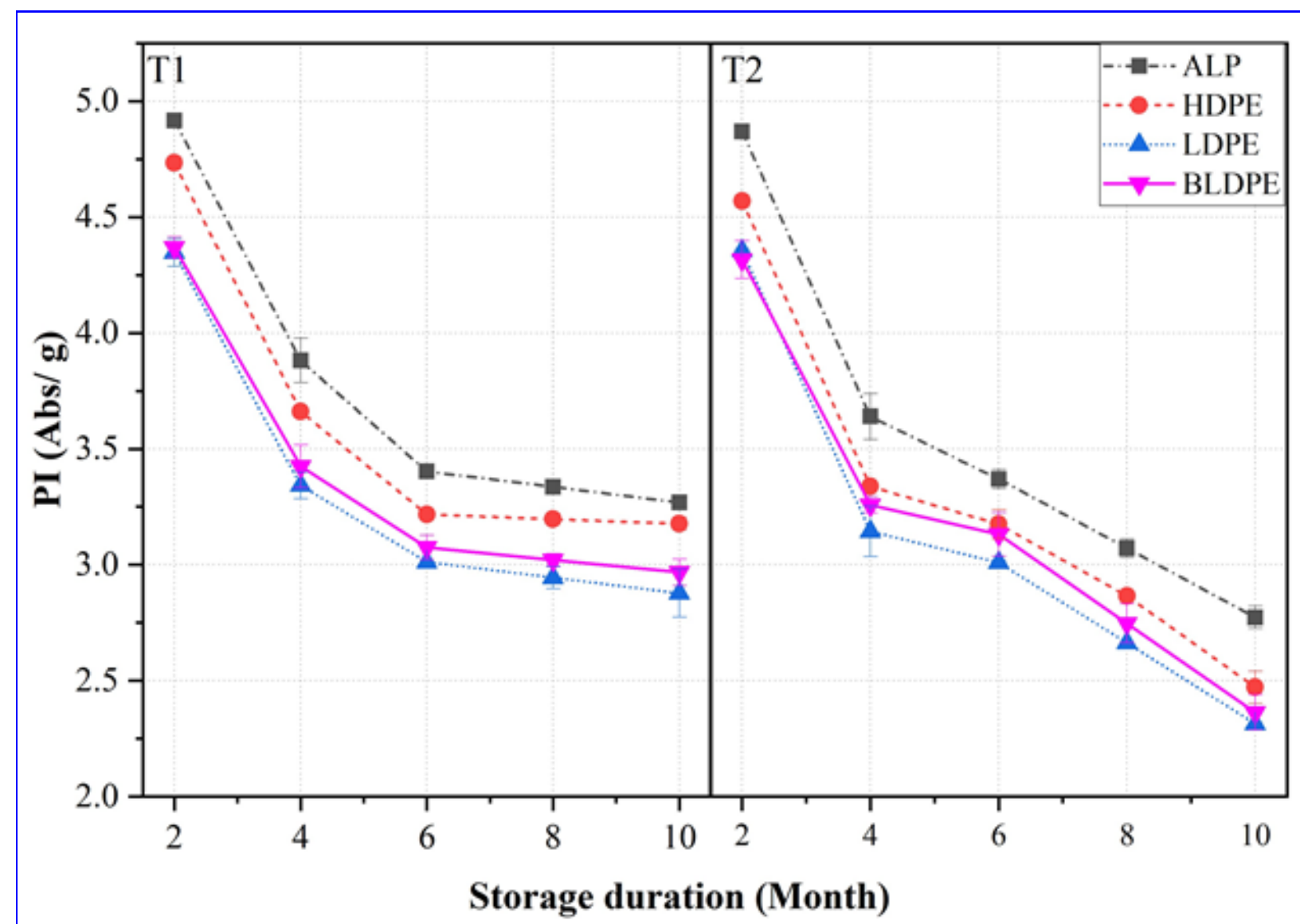
- Moisture content of foods significantly influences their stability during storage.
- The moisture content increased from 10.24-11.71%, 10.90-12.34%, 11.12-13.03%, and 11.15-12.59% under refrigerated conditions respectively.
- And from 10.19-11.25%, 10.49-12.18%, 11.01-12.83%, and 10.88-12.88%, under ambient conditions in ALP, HDPE, LDPE, and BLDPE bags respectively

### Total carotenoids

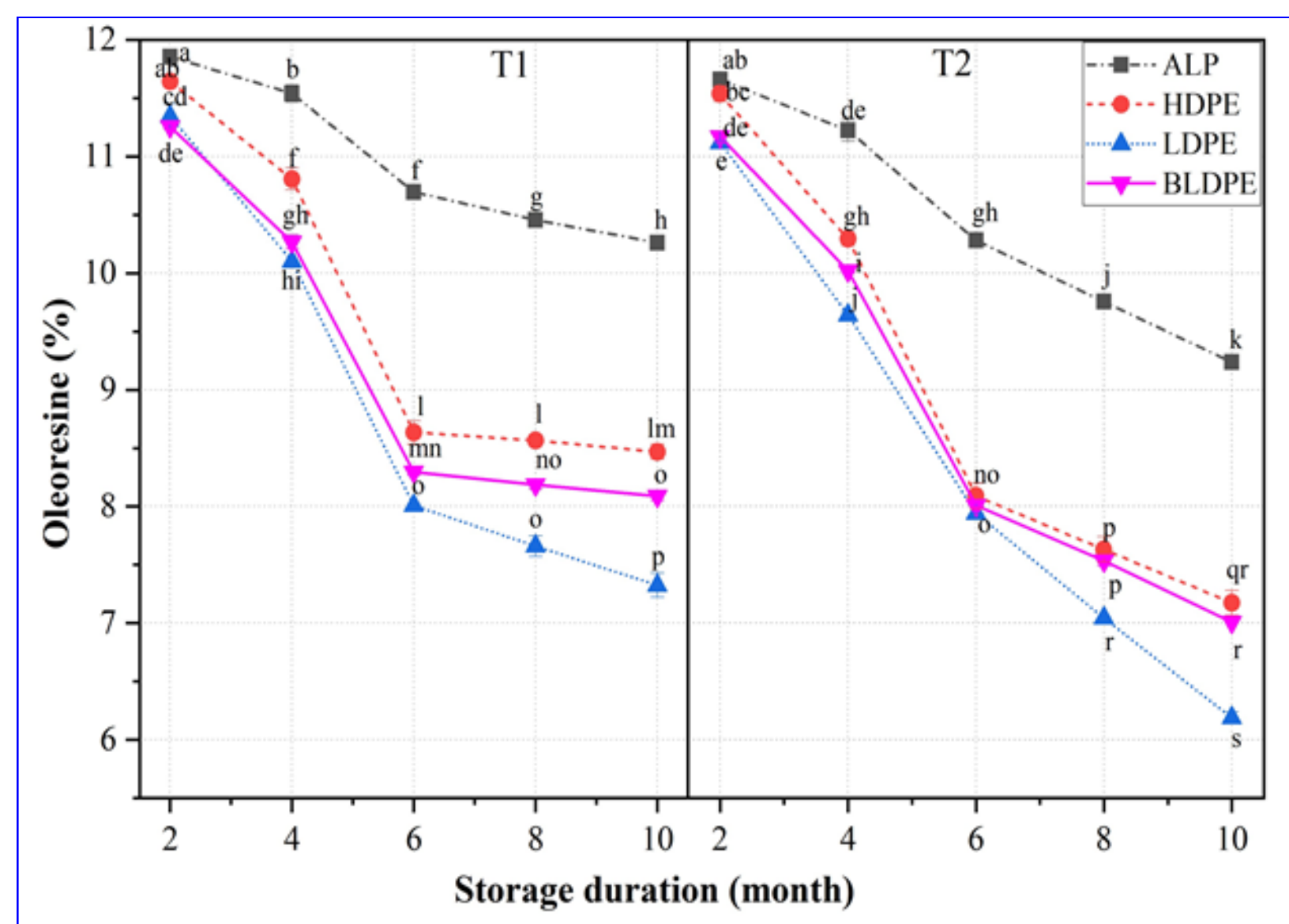
- Carotenoids are the color source of red pepper
- The total carotenoid values ranged from 4158.95-3809.03, 4158.95-3568.67, and 4158.95-3275.9 and 4158.95-2882.78 under cold storage, and ranged from 4158.95-3705.34, 4158.95-3424.87, 4158.95-3118.83 and 4158.95-1995.56 under room temperature storage in ALP, HDPE, LDPE, and BLDPE, respectively.

**Table 1.** The initial value of the studied parameters

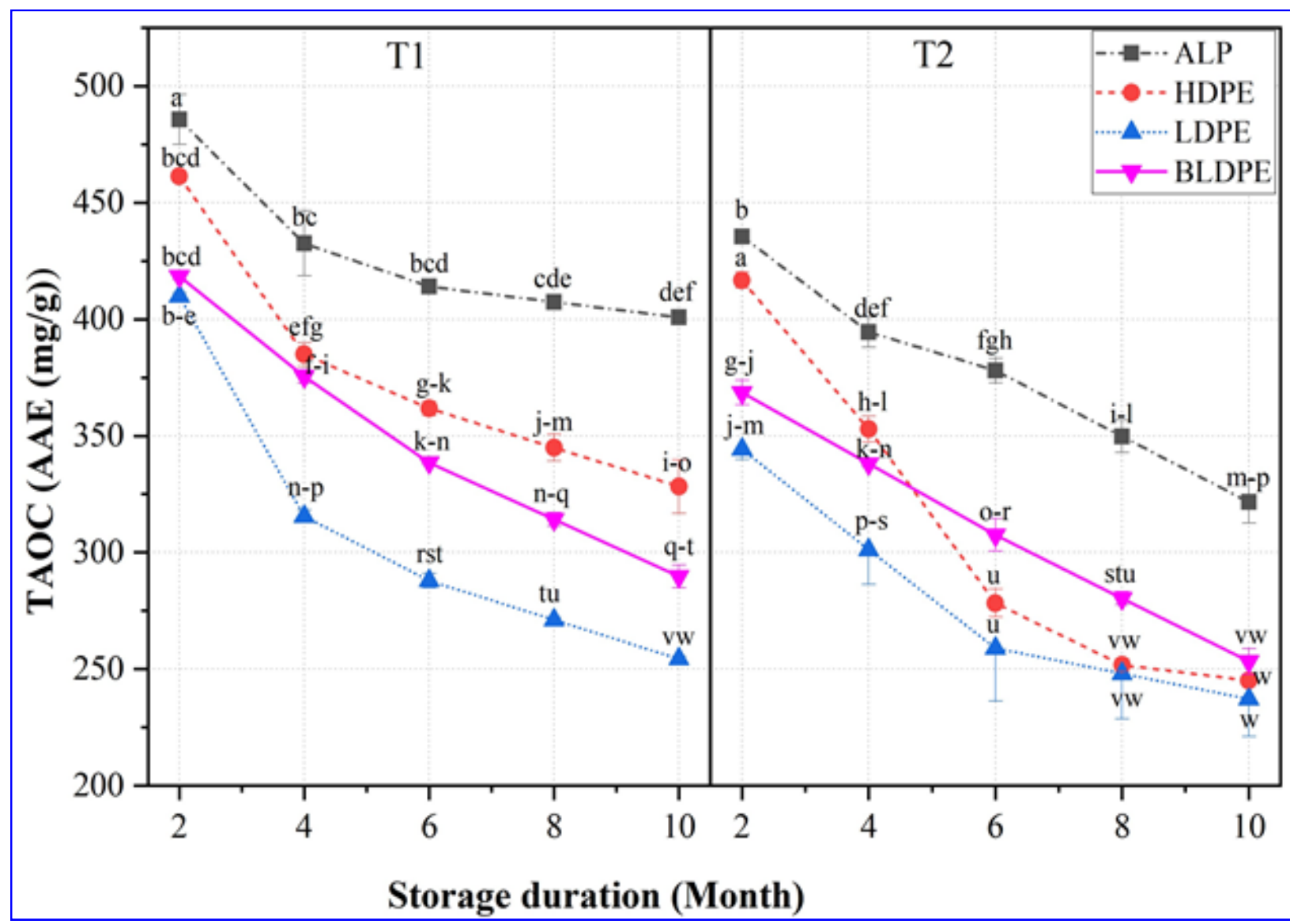
Parameters	Initial value
Moisture Content (%)	10.6
TCC (µg/g)	4158.95
PI (abs/ g)	5.01
Oleoresin (%)	12.25
TAOC (AAE mg/100g)	752.96



**Figure 3** Effect of packing materials, storage methods and storage duration on pungency index (Abs/g) of paper powder. T1 represents refrigerated storage, and T2 represents room temperature storage.



**Figure 4.** Effect of packing materials, storage methods and storage duration on oleoresin (percent) water activity of paper powder. T1 = Refrigerated and T2 = room temperature



**Figure 5.** Effect of packing materials, storage methods and storage duration on total antioxidant capacity (AAE mg/g) of paper powder. T1 = Refrigerated and T2 = room temperature

### CONCLUSION

- Cold storage temperature retained more functional qualities and recorded the greatest moisture content
- The quantity of functional qualities are degraded with increased storage period in all packaging materials
- Aluminium pouch laminate preserved more Functional qualities as compared to other packaging materials
- All packaging materials can alternatively used for up to six months storage duration while aluminium pouch laminate can be used to ten months duration
- A study on the impact of packaging materials, storage methods, and storage duration on safety and nutritional quality parameters and cost benefit analysis are recommended.

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