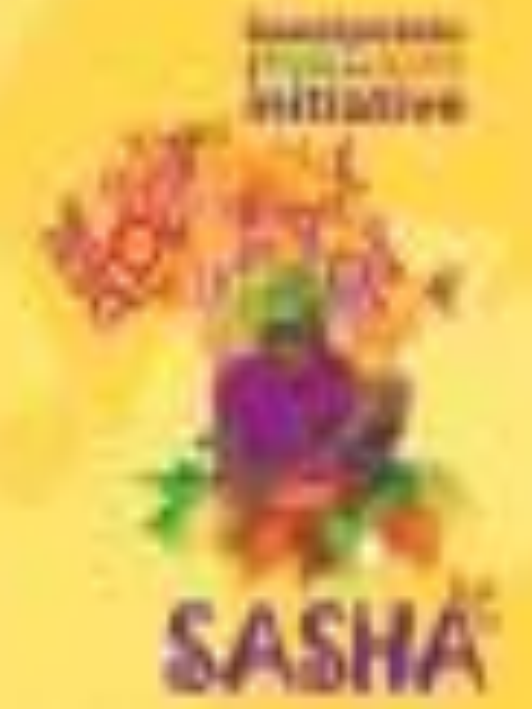


# Assessment of the Antioxidant Potential of Sweetpotato Peel Extract in Controlling Rancidity



Owusu-Ankomah O,<sup>1</sup>Oduro I<sup>1</sup>,Akwetey W<sup>1</sup>, Owusu-Mensah<sup>1,2</sup>.

<sup>1</sup>Department of Food Science and Technology, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana;<sup>2</sup>International Potato Center, Kumasi, Ghana

## Background

The increasing preference of consumers for natural food additives has spurred growing interests in the replacement of synthetic food antioxidants with natural ones in controlling rancidity. Sweetpotato peels (SPP) are reported to be rich in phenolic compounds (Zhan, 1997), but are often disposed as waste or used as animal feed after processing. The objective of this study was to screen the phytochemical constituents, determine the antioxidant activity of the peels of 5 sweetpotato varieties and the use of sweetpotato peel extract in controlling rancidity in lard.

## Methodology

- The peels of the 5 sweetpotato varieties were screened for the presence of phytochemicals (saponins, tannins, glycosides, flavonoids, triterpenoids, anthraquinones, sterols, alkaloids and cyanogenetic glycosides) according to the methods described by Evans (2002).
- This was followed by determination of antioxidant activity using DPPH method described by Ghasemiet *al.*, 2009.
- The SPP that recorded the highest antioxidant activity (Jitihadda) was mixed with lard at 200, 400, 600ppm and labeled as SPP<sup>200</sup>, SPP<sup>400</sup> and SPP<sup>600</sup> respectively for rancidity studies. BHT was used for comparative studies at 200ppm
- Peroxide (PV) and free fatty acid (FFA) values (Li *et al.*, 1999) were determined over a period of 120hrs at room (29°C) and refrigeration (5°C) temperatures

## Results and Discussion

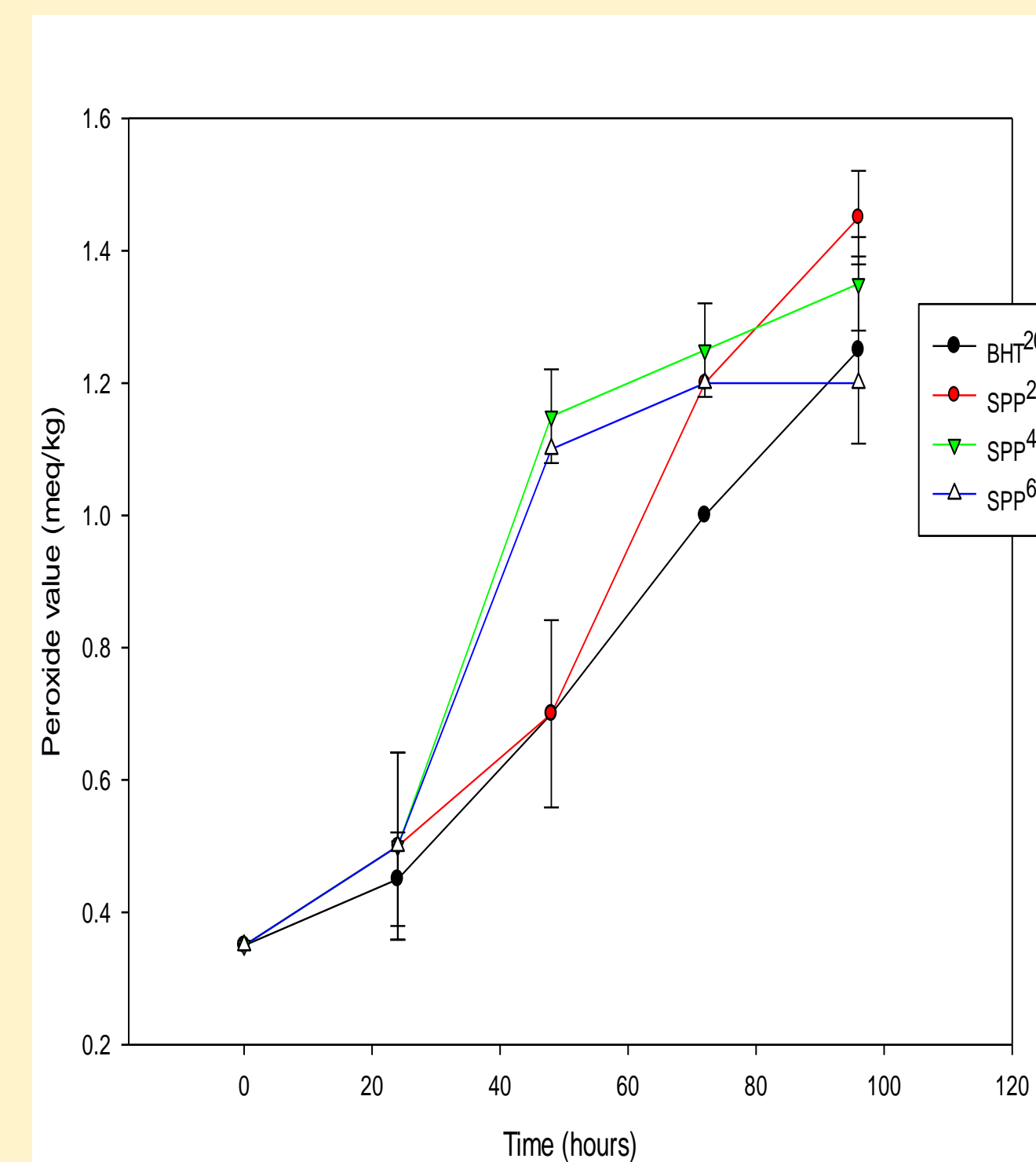


Fig 1 PV of lard containing BHT and different concentrations of Jitihadda peel extract at 5°C with time

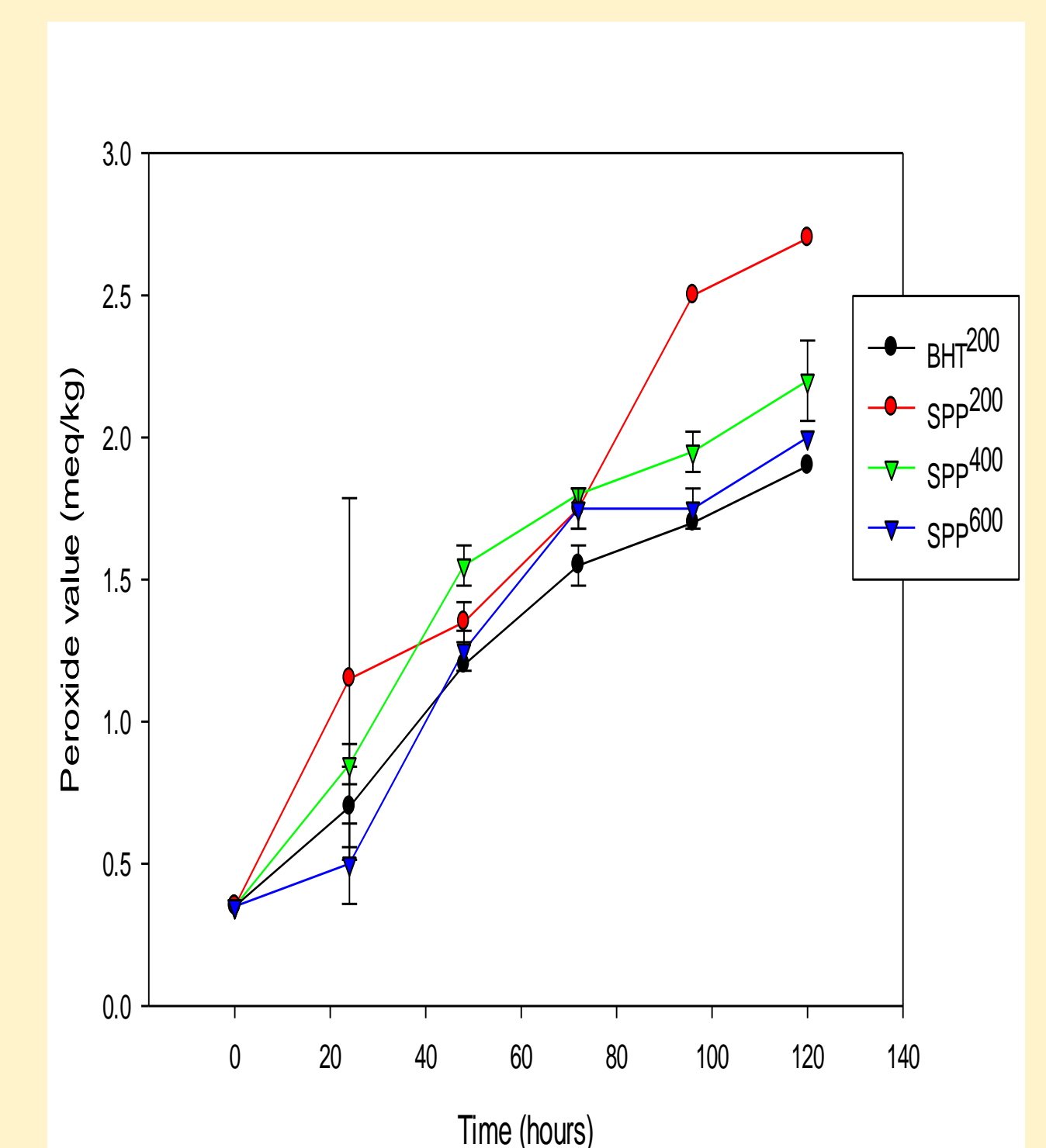


Fig 2 PV of lard containing BHT and different concentrations of Jitihadda peel extract at 29°C with time

## Results and Discussion

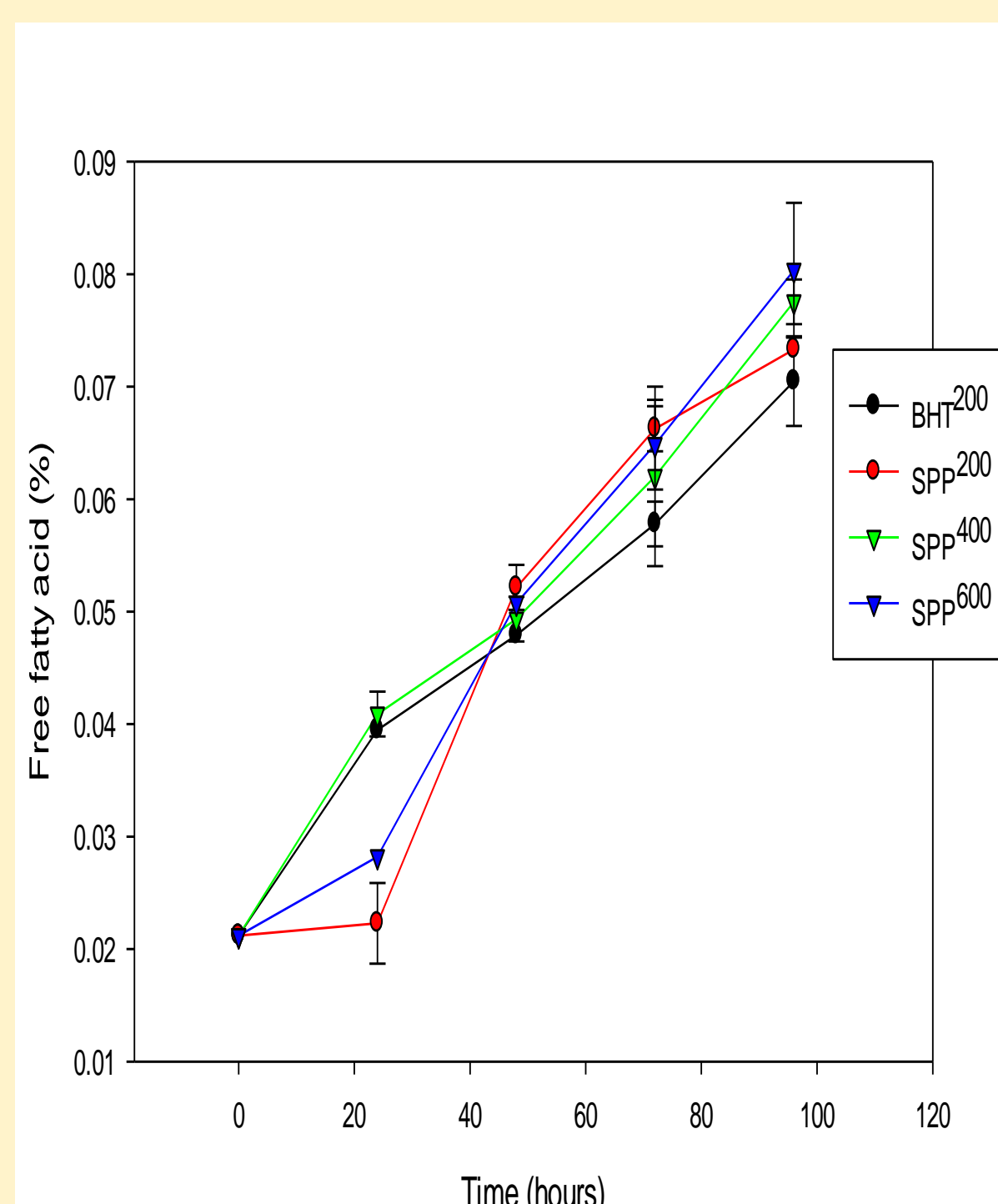


Fig 3 FFA values of lard containing BHT and different concentrations of Jitihadda peel extract at 5°C with time

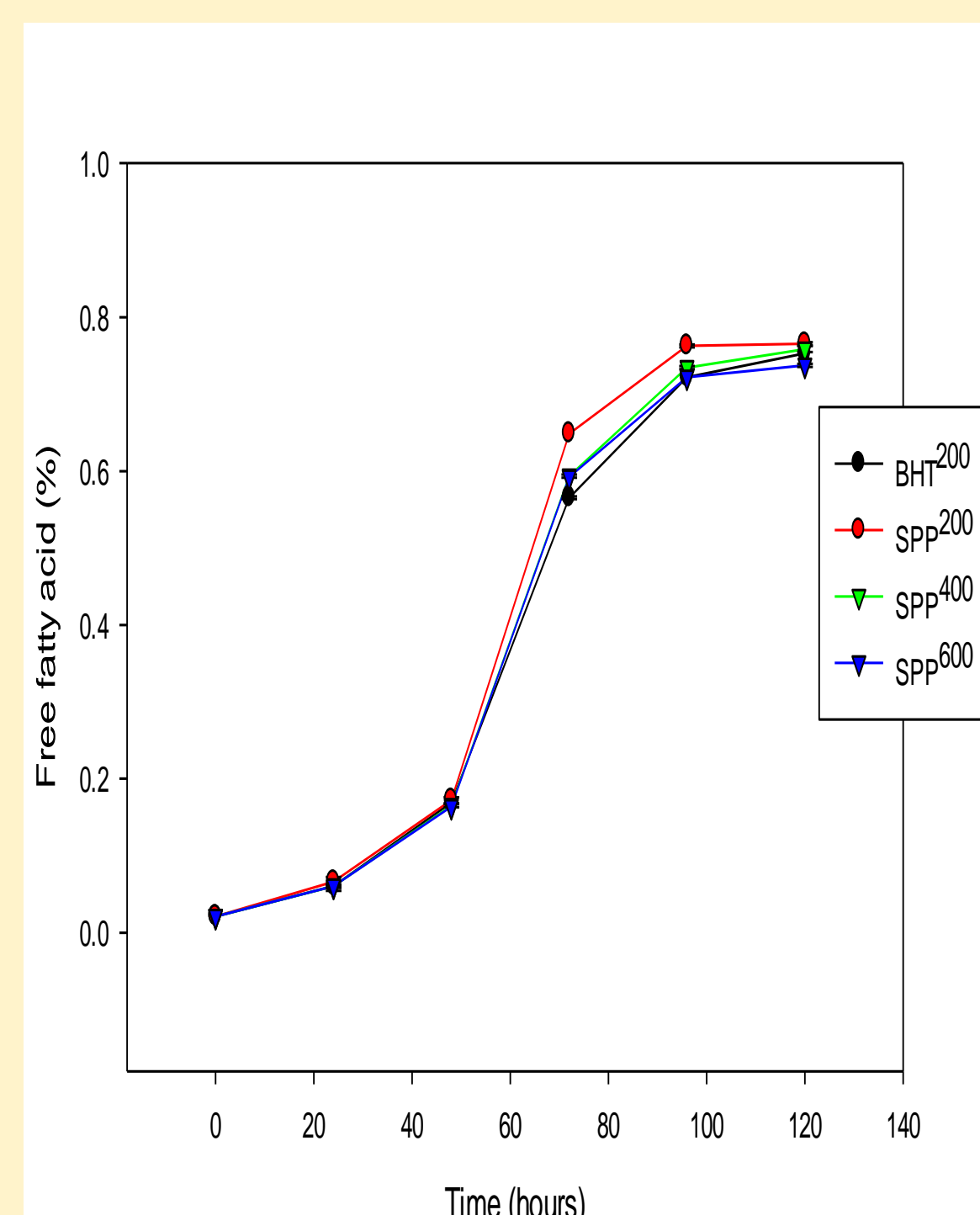


Fig 4 FFA values of lard containing BHT and different concentrations of Jitihadda peel extract at 29°C with time

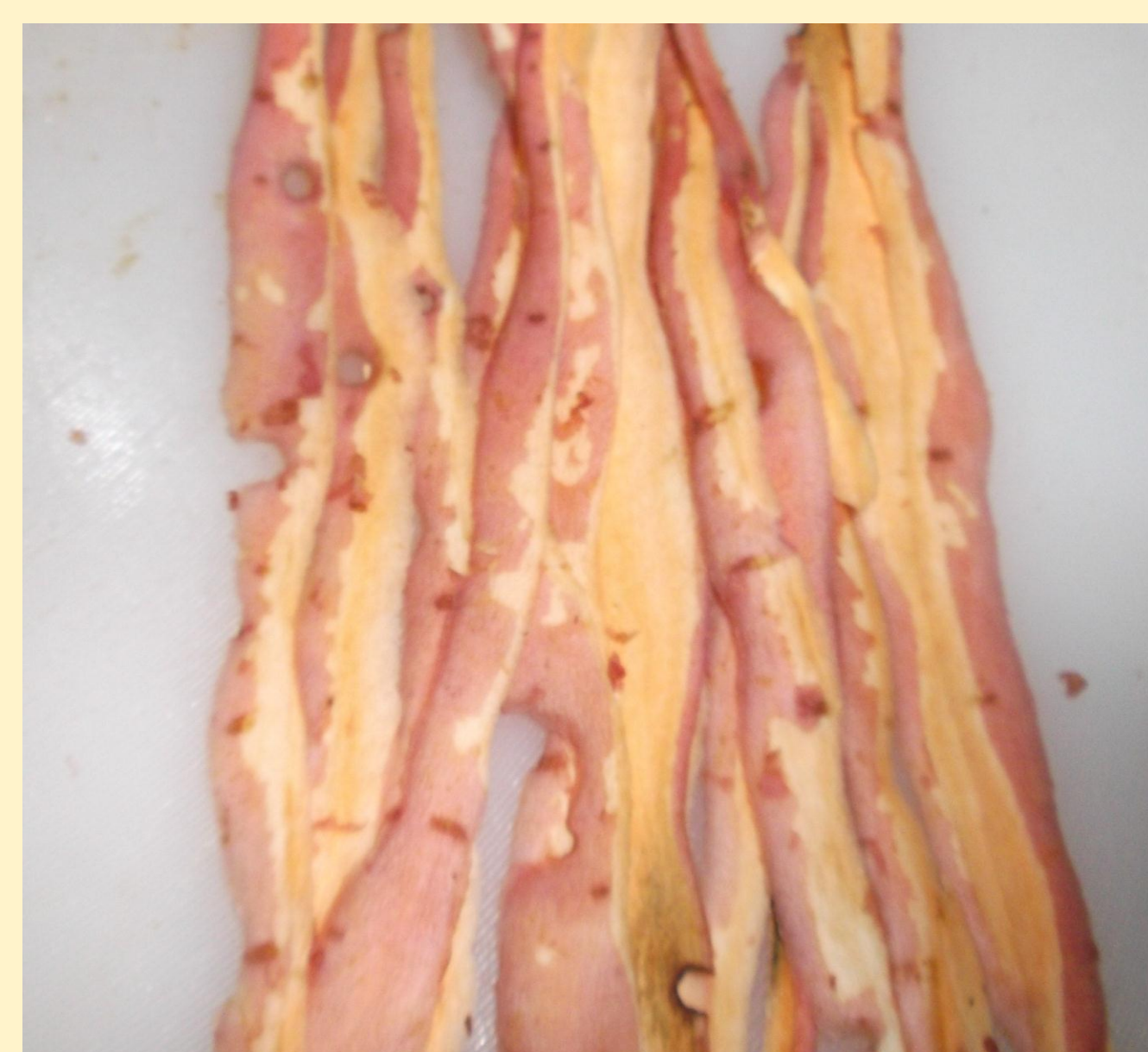


Fig 5 Sweetpotato peels

- At 5°C, a pronounced effect of the active components in SPP<sup>400</sup> and SPP<sup>600</sup> was delayed until after 48hr whilst the lower concentration (SPP<sup>200</sup>) were able to deplete faster and exert their antioxidative effect within 48hr.
- PV increased at 29°C irrespective of the concentration of the added extract.
- There were no significant differences ( $p < 0.05$ ) recorded among the different concentrations of the extract on the formation of FFA at 5°C.
- At 29°C, consistent significant lower FFA values (0.061 - 0.737 %) recorded in SPP<sup>600</sup> compared to SPP<sup>200</sup> (0.066 - 0.766 %).

- All 5 SPP samples tested positive for saponins, tannins, glycosides, flavonoids and triterpenoids whilst anthraquinones, sterols, alkaloids and cyanogenetic glycosides were absent.
- “Jitihadda” peel showed the highest radical scavenging activity (95.026±2.08%) among the 5 SPP.

## Conclusion

- Results revealed the potential of sweetpotato peels as a source of natural antioxidant with 4 out of 5 samples showing more than 50% radical scavenging activity.
- “Jitihadda” peel extract showed the highest radical scavenging activity (95.026±2.08%) and had a promising potential of controlling rancidity in lard at 600ppm.

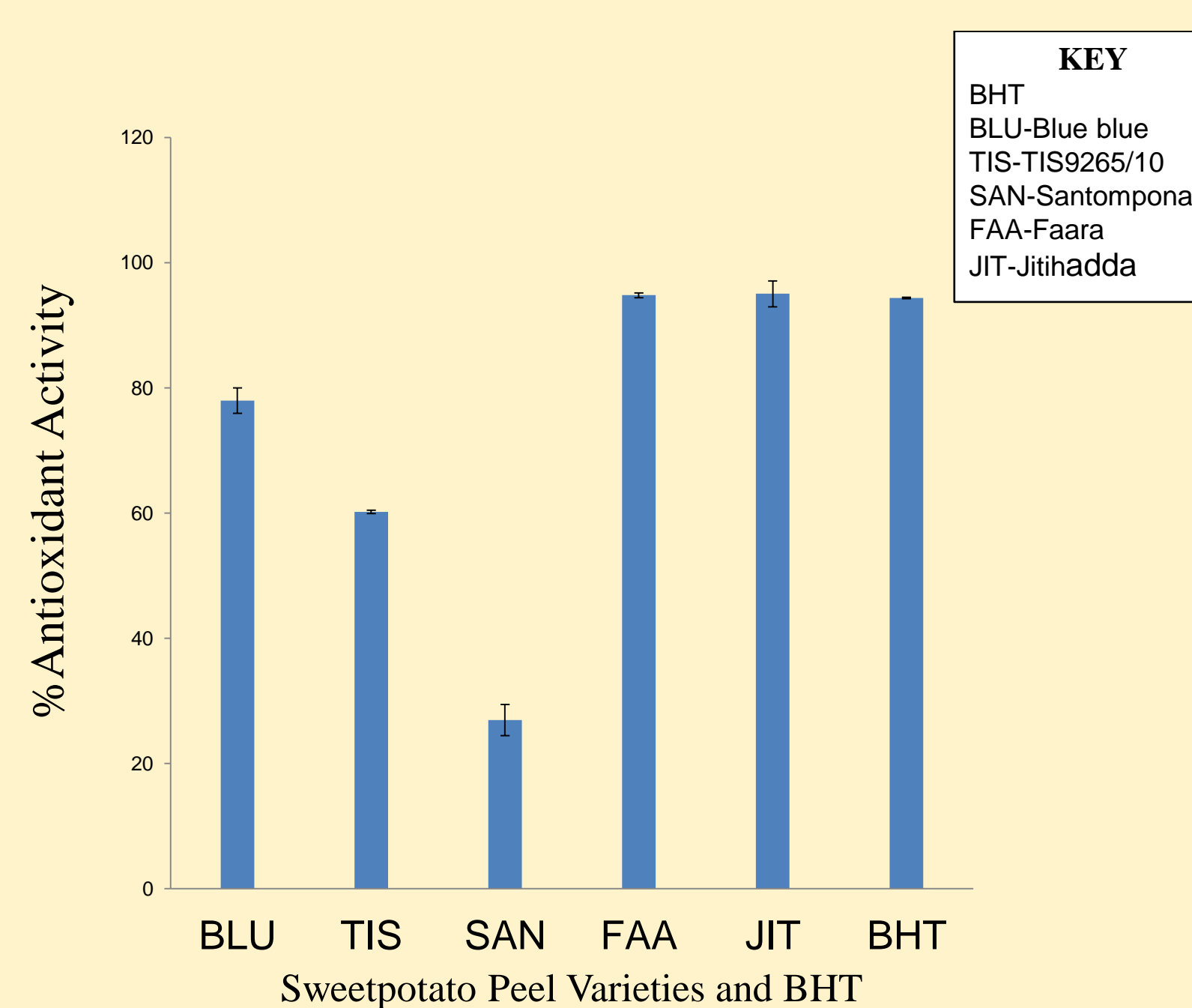


Fig 6 DPPH radical scavenging activities of 5 varieties of SPP and synthetic antioxidant (BHT)

## References

- Evans, W.C. (2002). Trease and Evans Pharmacognosy. 15th Ed., Bailliere Tindall, London
- Ghasemi K, Ghasemi Y. and Ebrahimzadeh MA. (2009). Antioxidant activity, phenol and flavonoid contents of 13 Citrus specis peels and tissues. *Pak. J. Pharm. Sci.* 22(3): 277-281
- Li, C.T., Wick, M. and Marriot, N.G. (1999). Evaluation of Lipid Oxidation in Animal Fat. *Special Circular Ohio Agricultural Research and Development Centre* 172: 38-43
- Zhan, P. X. (1997). Antioxidative activity of extracts from potato and sweetpotato. *Food & Fermentation Industries, FSTA* 2: 30–33