



The Economic Feasibility of Insect-based Feed for Commercial Poultry Production in Kenya

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BACKGROUND

- ❖ Livestock production cost in SSA is 300% more expensive than in developed countries (Etuah et al., 2019).
- ❖ Food-feed competition over protein ingredients will be more pronounced due to projected increase in demand for livestock products in SSA.
- ❖ Alternative protein ingredients exclusively used in feed production like the black soldier fly (BSF) larvae will mitigate against this challenge and contribute to securing smallholder farmers' livelihood.
- ❖ The economic benefit of the optimal combinations of BSF larvae in substitution with existing protein ingredients on poultry growth is unknown in Kenya.
- ❖ This study conducted participatory experiments with smallholder farmers to reflect actual farmer-based field conditions.



Fig. 1: Broiler chicks in the brooding cage for one week in one of the four farms

METHODS

- ❖ Four farmers were randomly selected to participate in the experiments in Kiambu County, Kenya.
- ❖ Five experimental diets containing 25%, 50%, 75% and 100% BSF larvae substitution with fishmeal and a control diet were setup on the four farms.
- ❖ A total of 280 day-old broiler chicks (Cobb 500) were reared for a period of nine weeks.
- ❖ Weekly measurements of the chicken's live weight and feed consumed were recorded.
- ❖ The average body weight gain, gross margins and feed price sensitivity analysis were computed for each diet.



Fig. 2: Broiler chicken after 9 weeks of feeding on different combinations of BSF larvae (BSFL)

RESULTS

- ❖ Feeding chicken with insect meal leads to optimal growth of the chicken.
- ❖ Partial replacement at 75% leads to higher feed efficiency of 2.0 compared with 2.5 in the control group.
- ❖ The most profitable diet was 25% partial replacement with 147% rate of return and a gross margin of \$8.25 compared with \$7.79 for control diet.
- ❖ Partial replacements at both 25% and 75% remained profitable with 20% and 50% feed price increments by at least 74% compared to the control diet.

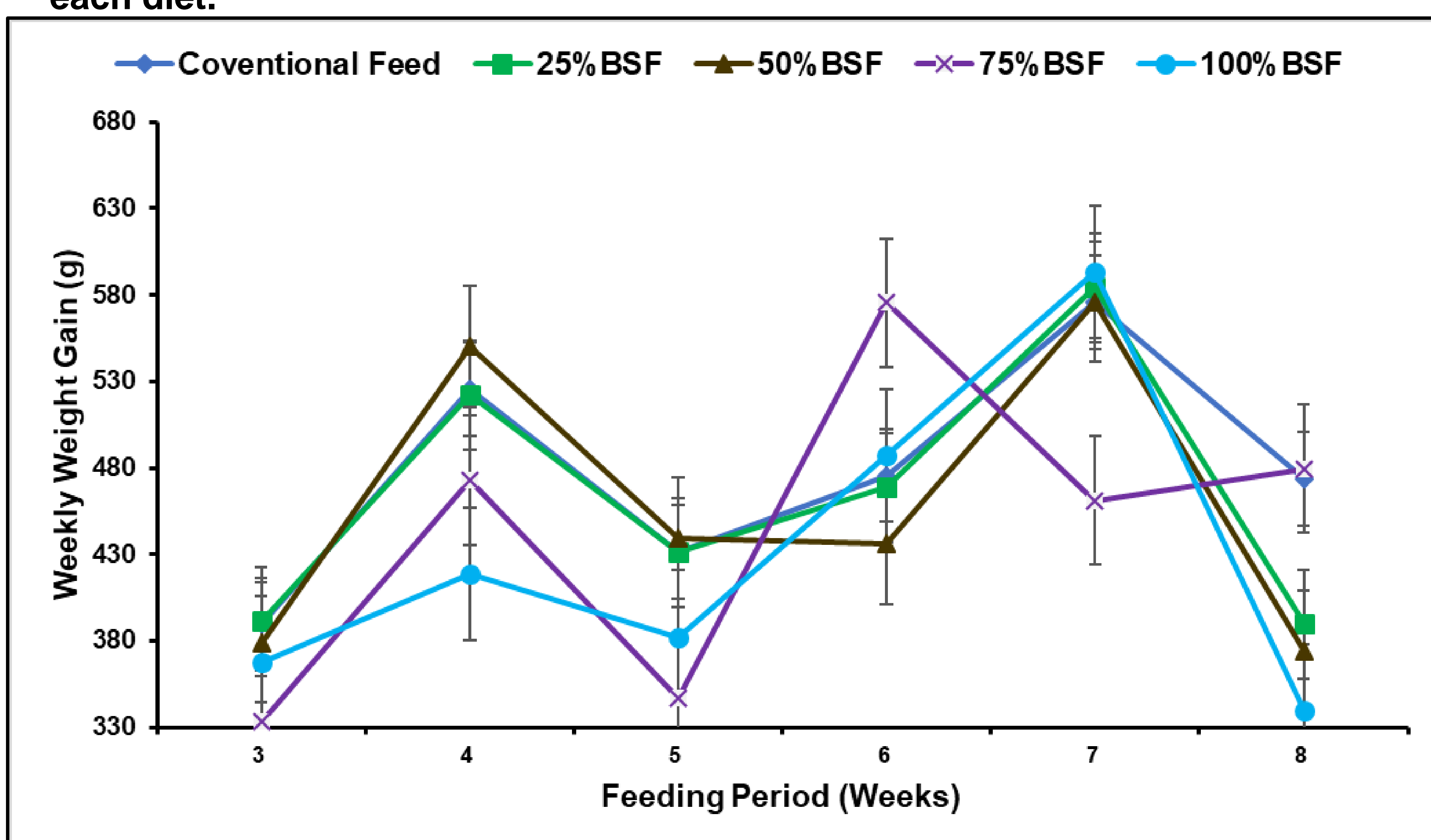


Fig. 3: Weekly body weight gain (mean ± SE) of birds fed with different diets containing different fish meal substitution levels with BSFL meal and conventional feeds. 25%, 50%, 75% and 100% represent levels of replacement of fishmeal with BSF larvae (BSFL)

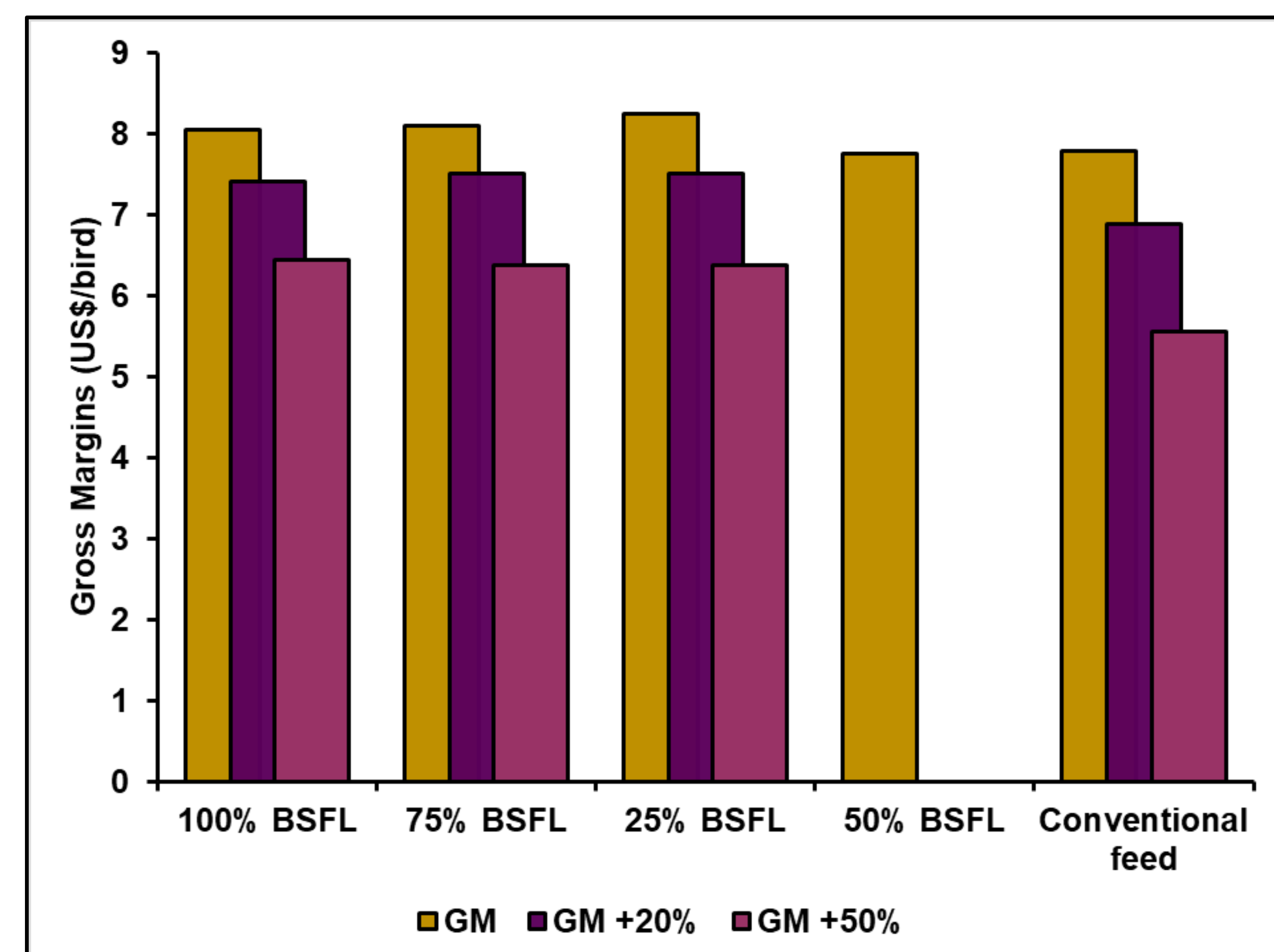


Fig. 4: Gross margin (GM) and sensitivity analyses of feed containing fishmeal substitution with BSF larvae and conventional feeds. 25%, 50%, 75% and 100% represent replacement of fishmeal with BSF larvae (BSFL). GM+20% and GM+50% represent sensitivity analysis at 20% and 50% increase in feed price.

POLICY IMPLICATION

- ❖ Farmer-based participatory experiments play a critical role in understanding the economic feasibility and acceptance of novel commercial feeds for livestock production.
- ❖ Insect-based feed is an economically viable alternative for commercial livestock feed production.
- ❖ Availainga insect-based commercial feed in the market will promote poultry production and consequently improve farmers' livelihoods.

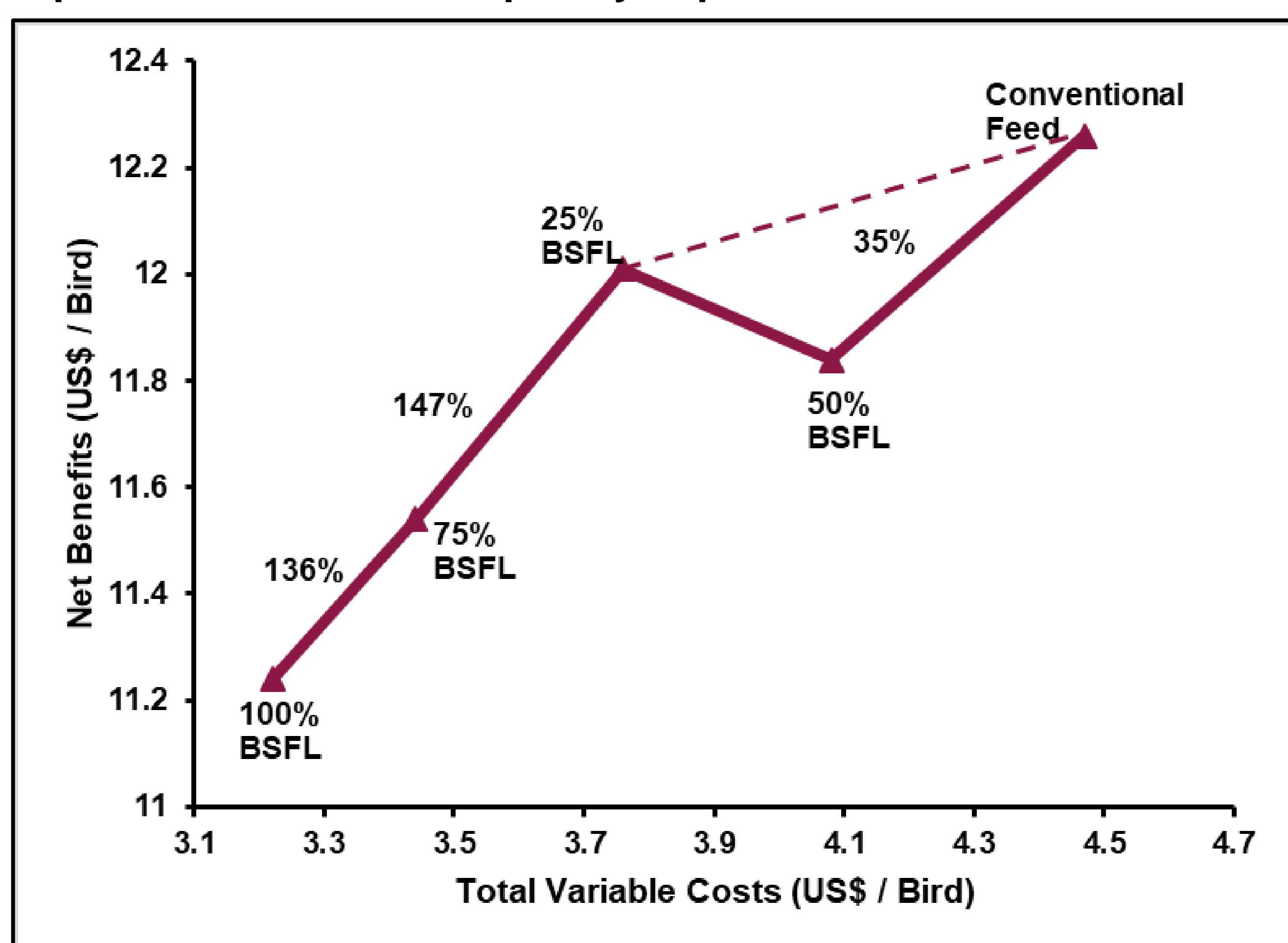


Fig. 5: Net benefit of feed containing different fishmeal substitution with BSF larvae and conventional feeds. 25%, 50%, 75% and 100% represent levels of replacement of fishmeal with BSF larvae

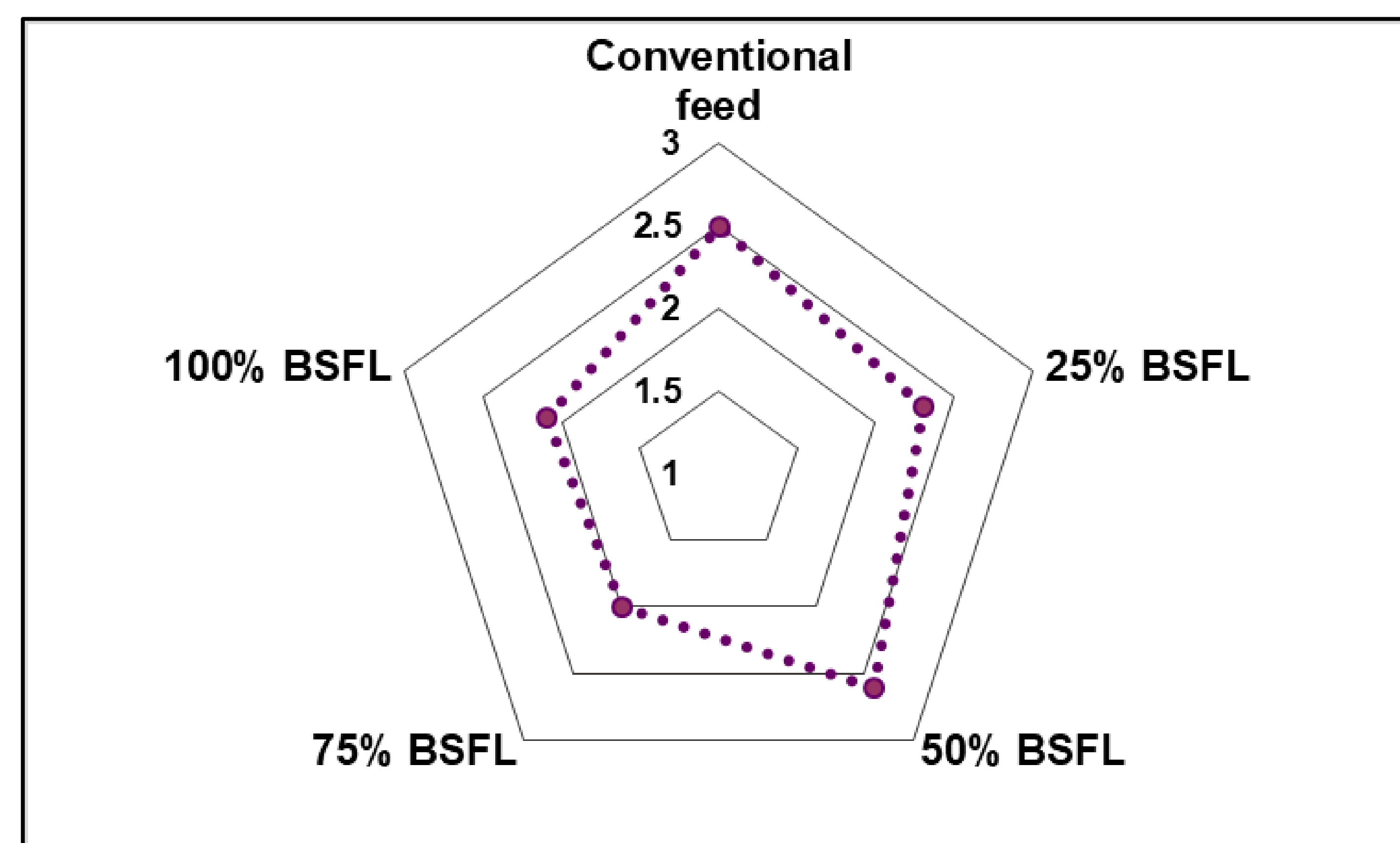


Fig. 6: Feed conversion ratio (FCR) of feed containing different fishmeal substitution with BSF larvae and conventional feeds. 25%, 50%, 75% and 100% represent levels of replacement of fishmeal with BSF larvae

REFERENCE

- Etuah, S., Ohene-Yankyera, K., Liu, Z., Mensah, J. O., & Lan, J. (2019). Determinants of cost inefficiency in poultry production: Evidence from small-scale broiler farms in the Ashanti Region of Ghana. *Tropical Animal Health and Production*, 52(3), 1149–1159. <https://doi.org/10.1007/s11250-019-02115-6>