

An Acceptability Trial of Desiccated Beef Liver and Meat Powder as Potential Fortifiers of Complementary Diets of Young Children in Indonesia

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Abstract: The addition of desiccated beef liver to infant and young child complementary foods can be used to overcome nutrient deficits, however its acceptability is unknown. We conducted a series of studies to test the acceptability of complementary foods fortified with either powdered beef liver, beef meat, beef liver + meat or placebo among 96 Indonesian children aged 12 to 23 mo. This was achieved by determining liking of a single test food with added study powder, followed by a 2-wk home trial and focus group discussions to assess liking during repeated consumption of the study powders added to daily meals. The test food with added beef powders were well liked by mothers, with liking scores never falling below neutral on a 7-point scale. After home use, mothers reported that their children moderately liked their meals with added powder, with scores ranging between 3.3 and 3.5 on a 5-point scale. With the exception of lower liking for the combination beef liver + meat powder, there were no detectable differences in mothers' overall perception of child's liking between the placebo and any of the study powders. The low disappearance rate of the study powders during the home trial was a concern, with mothers reporting a strong smell and fishy odor as the major reason why children did not like their meals. Nonetheless, mothers declared they would continue using the powder on account of the nutritional value and perceived health benefits. Strategies are underway to minimize the level of fishy odor in the beef liver powder.

Keywords: acceptability, beef liver powder, complementary foods, infant and young children, sensory characteristics

Practical Application: The use of powdered beef liver as a fortifier to enhance the nutrient adequacy of infant foods in Indonesia appears feasible, although strategies are needed to ensure serving sizes consumed are sufficient. Mothers considered the powder as an alternative means of securing the nutritional value of beef consumption for their children, particularly given that cooked beef is relatively tough and difficult to chew for young children. The main negative aspect of the powder was the fishy odor. The addition of flavors such as soto (Indonesian soup) flavor, meatball flavor, garlic and other vegetables, was suggested to counteract the strong smell.

Introduction

Despite decreases in the overall rates of under nutrition in Indonesia over the past 2 decades, stunting among children under 5 y of age still remains at 37.2% (Ministry of Health Republic of Indonesia 2014). Such high rates of stunting are associated with increased morbidity and poor cognitive development, which can have lasting adverse effects on attained height and work productivity in adulthood. Most of the stunting in Indonesia occurs during the period of complementary feeding which should commence from 6 mo of age when breast milk alone is no longer sufficient to meet the high nutritional needs of infants. To encourage the provision of nutritionally adequate and safe complementary foods

together with continued breastfeeding to at least 24 mo of age, the World Health Organization (WHO) has developed guidelines for infant and young child feeding (IYCF) (World Health Organization/UNICEF 2003; World Health Organization 2010). However, in Indonesia compliance to these IYCF guidelines has been poor. In a recent national survey, only 35% of breastfed children aged 6 to 23 mo were fed according to the WHO IYCF guidelines (Ng and others 2012). Hence, it is not surprising that major deficits in the micronutrient adequacy of complementary diets for Indonesian children 6 to 23 mo of age have been reported. Specifically, consistently large discrepancies between the content of iron, zinc, calcium, vitamin B-12, and sometimes vitamin A—in complementary foods of breastfed children and the amounts required have been identified (Ferguson and others 2006; Santika and others 2009). These deficits arise in part because their rice-based complementary foods have a low dry matter content and are rarely enriched with animal-source foods, dark green leafy vegetables or yellow-orange fruits. As a consequence, a high prevalence of anemia and coexisting micronutrient deficiencies has been reported during early childhood in Indonesia (Dijkhuizen and others 2001; Lind and others 2004).

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