

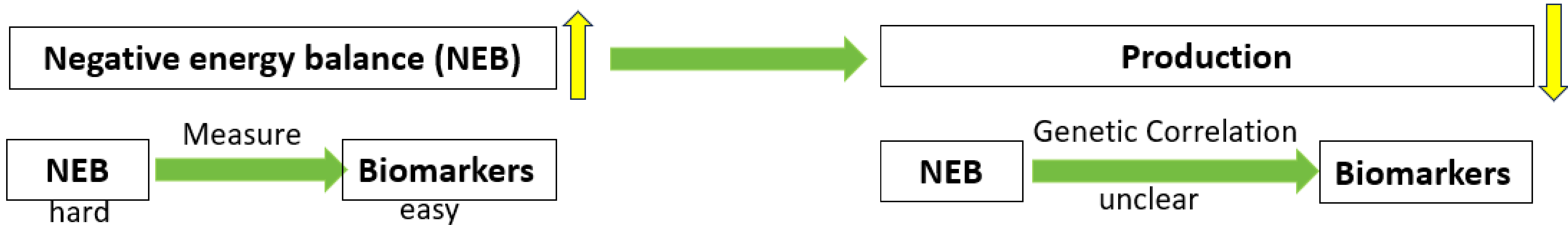


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# Genetic analysis of predicted negative energy balance and its biomarkers of first-parity Holstein cows in early lactation

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## Objective

- Estimate variance components for predicted NEB (PNEB) and its biomarkers
- Calculate the genetic correlations among them

## Data & Method

### 20 traits

Prediction	Reference	Prediction	Reference
Energy balance (EB)	Grelet et al., 2017	Cluster4 (CL4)	Franceschini et al., 2022

Multiple Biomarkers (15) + 3 production traits			
B_BHB	Grelet et al., 2019	SCFA	Soyeurt et al., 2011
NEFA		MCFA	
IGF-1		LCFA	
Glucose		C18:1 cis-9	Grelet et al., 2014
M_BHB	Grelet et al., 2015	Fat %	Foss
Citrate		Protein %	
Acetone			
C10:0			
C14:0	Soyeurt et al., 2006	Milk yield	Milk recording
C16:0			
C18:0			

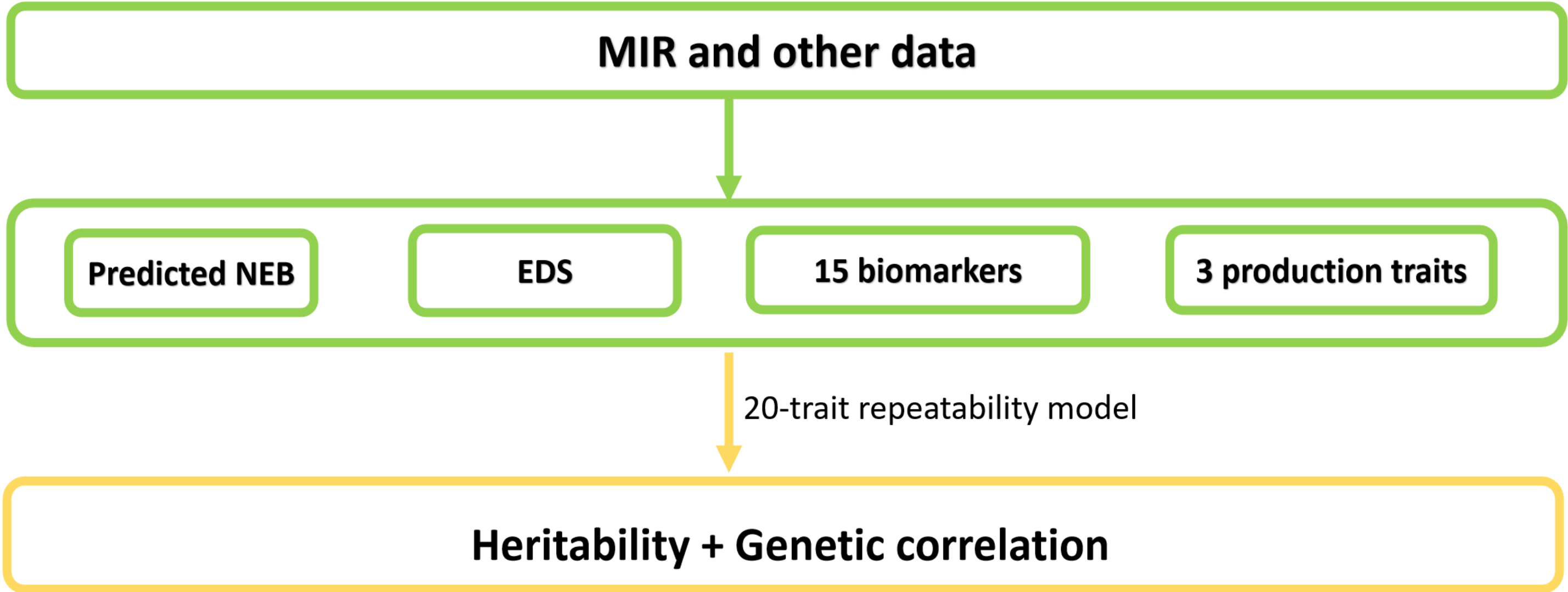


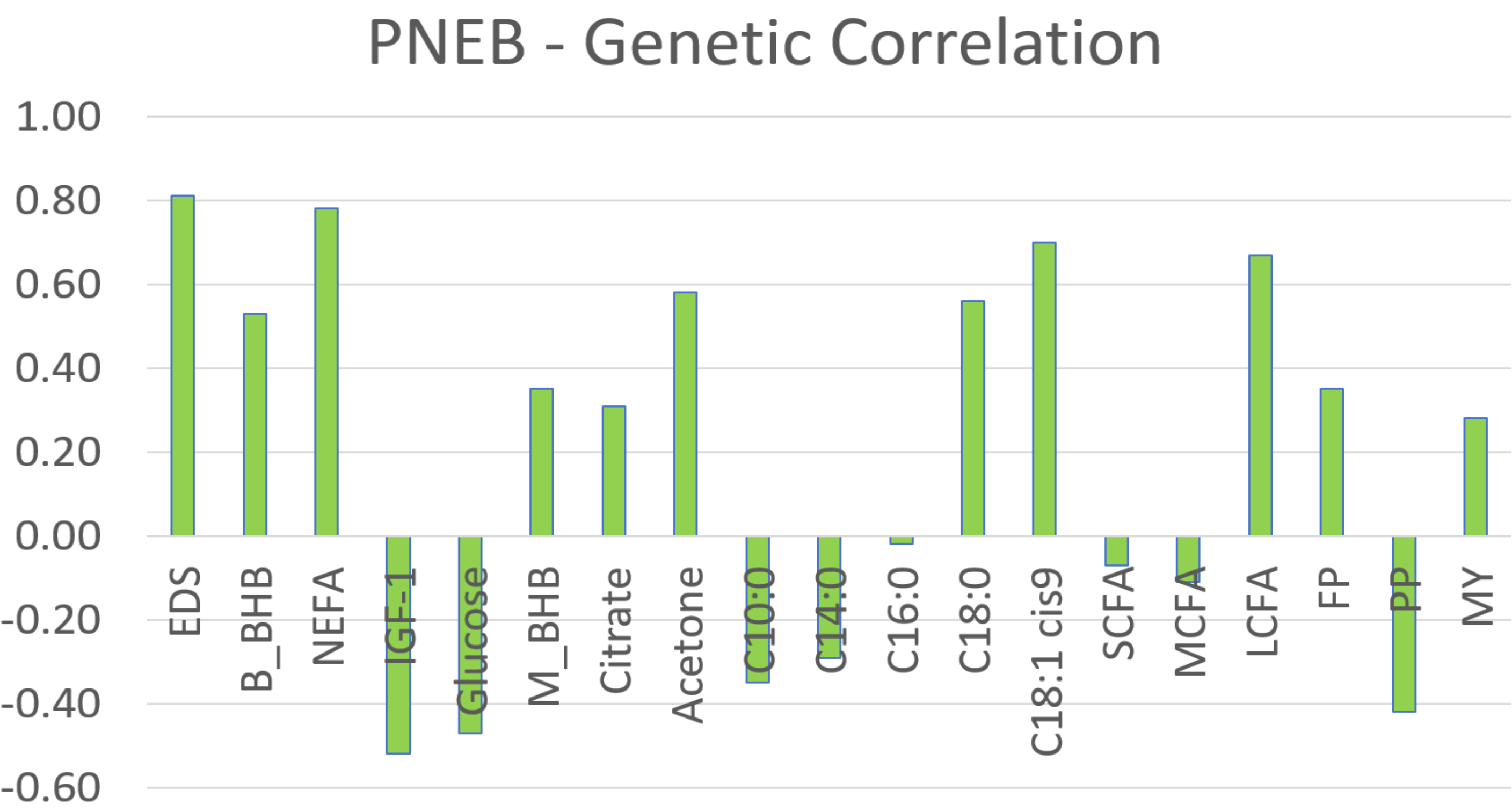
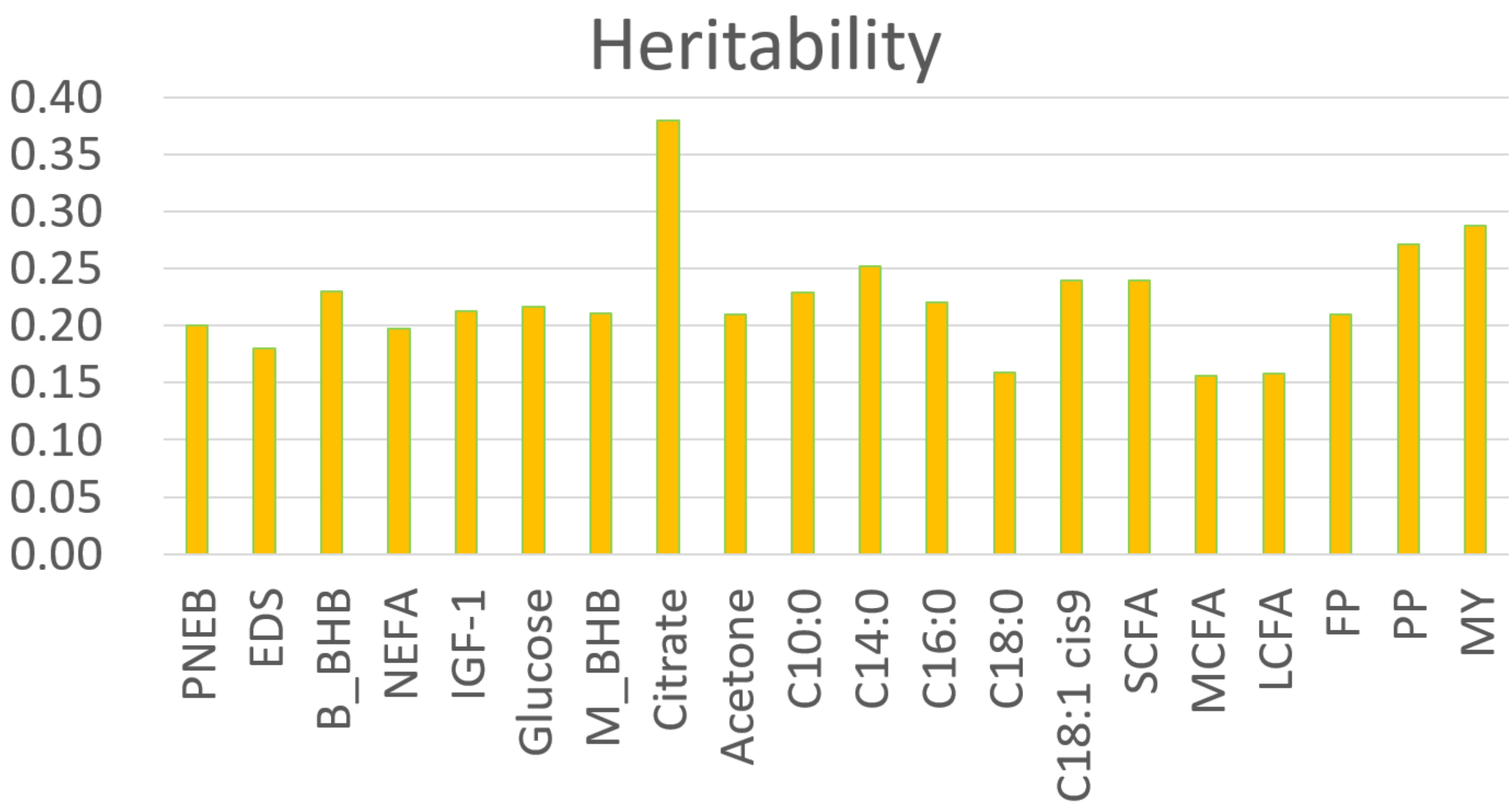
Fig 1. Workflow

Records	Cows
30,364	25,287

- Time: 2012 — 2019
- DIM: 5 — 50

**Cluster4** : Franceschini et al. (2022) used unsupervised machine learning method to integrate multiple biomarkers , we will call this novel trait **Energy Deficit Score (EDS)**

## Results



## Conclusions

- Moderate  $h^2$  (range 0.16 to 0.29) for all traits, except for citrate (0.38)
- 8 traits were highly related to PNEB, especially EDS.